
# Guidelines for VP repurposing to different culture and language

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# Introduction

## Description of original VP and original educational setting

The original case has been selected from a list provided by the Ludwig-Maximilian-University in Munich, Germany. The name of the original virtual patient (VP) was Elvira Goetz. The patient presented with neurological symptoms. The final diagnosis of the case was Subarachnoidal Bleeding (ICD10: I60). Target group of the case were students in their final year of undergraduate study.

| | |
|---|---|
| **ID** | evip:vp:1000201 |
| **Title** | Kopfschmerzen bei einer 71-jährigen Frau |
| **Description** | A 71 yr old patient with headache |
| **Authors** | Jörg Schelling |
| **Classification** | ICD10: I60 (Subarachnoidal Bleeding) |
| **Context** | Undergraduate |

## Brief description of VP format

The case has been initially written in German language and authored in CASUS system. The structure was linear (consisting of 16 cards). The exported text contained 3152 words (20397 characters without spaces), 22 images (in PNG and JPEG format), 6 videos (MOV) and 11 interactive questions.

| | **Case before repurposing** |
|---|---|
| **System** | CASUS |
| **Structure** | Linear |
| **Cards** | 16 |
| **Words** | 3152 |
| **Characters (without spaces)** | 20397 |
| **Images** | 22<br><br>(5 pictures of patient, 4 CT scans, 1 scan of medical form, 3 tables with laboratory results, 4 schemas, 5 others) |
| **Videos** | 6 |
| **Questions** | 11 (4 Freetext, 1 Sorting, 5 MCQ, 1 Laboratory values) |

# Methods and Materials

## Selection criteria

The selected case presents a complex set of procedures in case of an instant acute headache that might be life-threatening. Headache is the most common symptom reported by patients and the ability to make a correct diagnosis has an impact on the patient's survival. Information included in this VP fits the objectives of the neurology course at Jagiellonian University Medical College and is most suitable for students in their final year of undergraduate study.

## What type of repurposing was done

The case has been repurposed from the German language and culture (Bavarian Hospital, Medical Guidelines from Germany and Switzerland) into the Polish language and culture. The text was translated by a Polish physician with profound German language knowledge (resident in a Polish hospital in southern part of Lesser Poland) and repurposed by a subject matter expert in neurology working in western part of Poland.

Translation included changing of German names – the VP was renamed from "Elvira Goetz" to "Elwira Bożko" in order to sound more natural. Repurposing involved multimedia localisation. Captions in figures (raster graphics) were translated and pasted into the images. Videos were localised by adding subtitles in QuickTime technology.

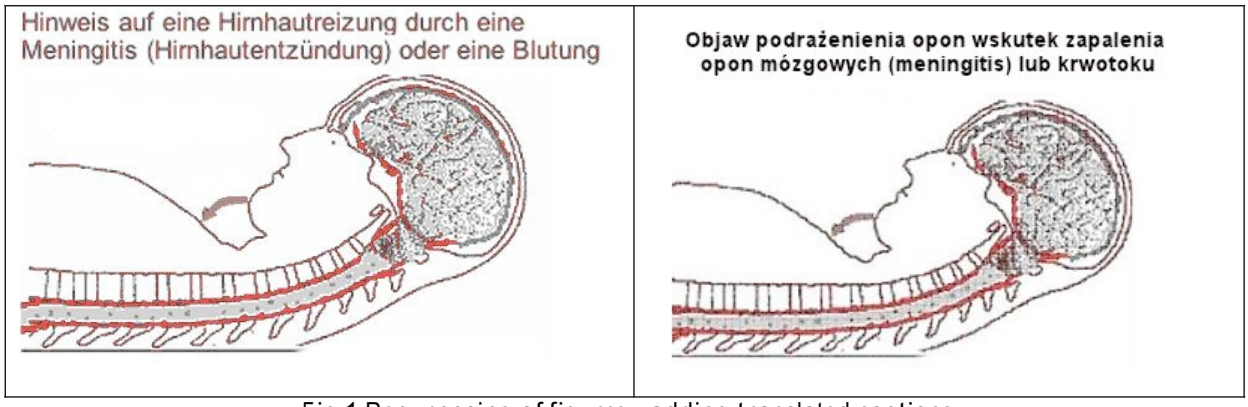



Fig 1 Repurposing of figures - adding translated captions


Fig 2 Localisation of video clips – adding subtitles in QuickTime technology

The characteristics of the national healthcare system have been taken into account. For instance local German medical documentation forms were replaced with Polish equivalents (Fig 3, Fig 4). Pictures presenting German ambulances were exchanged with photographs of Polish cars.

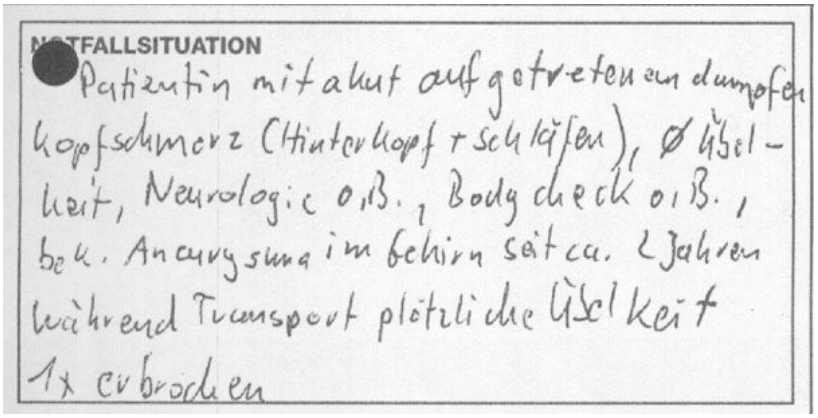



Fig 3 A German medical documentation form filled out by a member of the emergency team as presented in the original VP

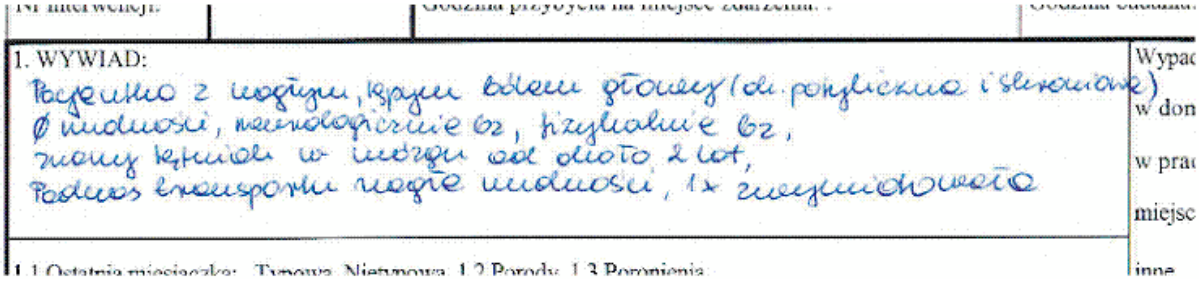



Fig 4 Polish equivalent of the form from Fig.3 inserted into the repurposed case

Fig 5 Repurposing of images presenting medical equipment characteristics for a healthcare system (Left: German ambulance, Right: Polish ambulance)

References to German/Swiss text books, scientific papers, guidelines, web pages were replaced by Polish references.

| | Original Case | Repurposed case |
|---|---|---|
| **Literature reference** | Nicht traumatische<br><br>intrazerebrale Blutungen | [1] Mirosław Ząbek (red.) Zarys Neurochirurgii. PZWL, 1999.<br>[2] Ryszard Czepko (red.) Wybrane |

| | | |
|---|---|---|
| | Teil 2: Klinik, Diagnostik, Behandlung und Prognose<br><br>Zerebrovaskuläre Arbeitsgruppe der Schweiz (ZAS) und Schweizerische Herzstiftung (SHS)1<br><br>Schweizerische Ärztezeitung, 2000;81: Nr 28 | zagadnienia diagnostyki i leczenia malformacji naczyniowych ośrodkowego układu nerwowego. Wydawnictwo Uniwersytetu Jagiellońskiego, 2007. |
| **Web resources** | http://www.uniklinikum-regensburg.de/kliniken-institute/neurochirurgie | http://neurochirurgia.2p.pl/pacjent.html?numer=3 |

Recommendations from German and Swiss guidelines have been exchanged by Polish procedures (e.g. the German SAB algorithm has been replaced by a description of the tasks carried out by medical personnel in Polish hospitals). Names of German drugs applied in the treatment have been localised. Narratives describing the story of the virtual patients were analysed and refined. For instance, the place where the patient lost her consciousness was changed (toilet → kitchen) which had the consequence that some of the movies become outdated and had to be discarded. Some comments, (humorous) images and videos were judged as irrelevant for the case and removed. The order of a few events of the story were changed (a note from the emergency team is now presented at the very beginning of the case, not as it was in the original case after physical examination). A few comments were added to reflect in a more authentic way the realities of a Polish admission wards.

| | **Case before repurposing** | **Case after repurposing** |
|---|---|---|
| **System** | CASUS | CASUS |
| **Structure** | Linear | Linear |
| **Cards** | 16 | 20 |
| **Words** | 3152 | 3521 |
| **Characters (without spaces)** | 20397 | 22831 |
| **Images** | 22<br><br>(5 pictures of patient, 4 CT scans, 1 scan of medical form, 3 laboratory result tables, 4 schemas, 5 others) | 20<br><br>(5 pictures of patient, 4 CT scans, 3 scans of medical forms, 4 laboratory result tables, 2 schemas, 2 others) |
| **Videos** | 6 | 3 |
| **Questions** | 11 (4 Freetext, 1 Sorting, 5 MCQ, 1 Laboratory values) | 12 (4 Freetext, 1 Sorting, 6 MCQ, 1 Underline) |

## Steps involved in repurposing

- Content export from CASUS in MS Word format
- Translation of the original case in MS Word format
- Translation and repurposing of the media files

    - For some figures source files (in Power Point) were available which made the repurposing fast and simple. In other cases a graphical image editor (Paint Shop Pro) was applied. Subtitles were added using Quick Time Pro (following the BPG no.4 -eViP from the technical guidelines, D2.3b [2]). Medical forms were obtained from the local hospital and scanned. Pictures were taken in the vicinity of the university's hospital.
- Change of the case by the subject matter expert
- Feedback from the Learning Technologist
- Clearance of copyright issues
- Insertion of the case from Word files into CASUS
- Final verification of the case by the subject matter expert
- Presentation of the case to students
- Students' evaluation of the case
- Refinements of the case in response to students' feedback

### How the work was planned

One person had been assigned to coordinate the repurposing process of this case. Her role was to communicate via e-mail with the translator, subject matter expert, learning technologist and teachers presenting the case to the students in their classes. She was also responsible for controlling the quality of the work in the repurposing process. If somebody lagged behind with the assigned work e-mail reminders were posted. By the end of the work, each member of the team has been asked to assess their expenditure of time.

### Brief outline of skill set required

- TRANSLATION: Polish as native language, proficiency in the German language, knowledge of medical terminology
- MEDICAL REPURPOSING: Knowledge of Polish medical and healthcare procedures and experience as medical practitioner
- TECHNICAL REPURPOSING:
    - Knowledge of copyright and patient's data confidentiality issues
    - Basic skills in
        - Image processing (Paint Shop Pro, PowerPoint)
        - Video authoring (QuickTime Pro)
        - VP authoring systems (CASUS)

## Results

### How the content was enriched

The case had been enriched. New images were added (like scans of medical forms used in Polish hospitals for ordering laboratory tests - Fig 6). Results of examinations not covered by the original case were included – like ECG findings. Tables with standard values of laboratory test have been added. Most of the time was spent on repurposing of existing images as described in the sections above.

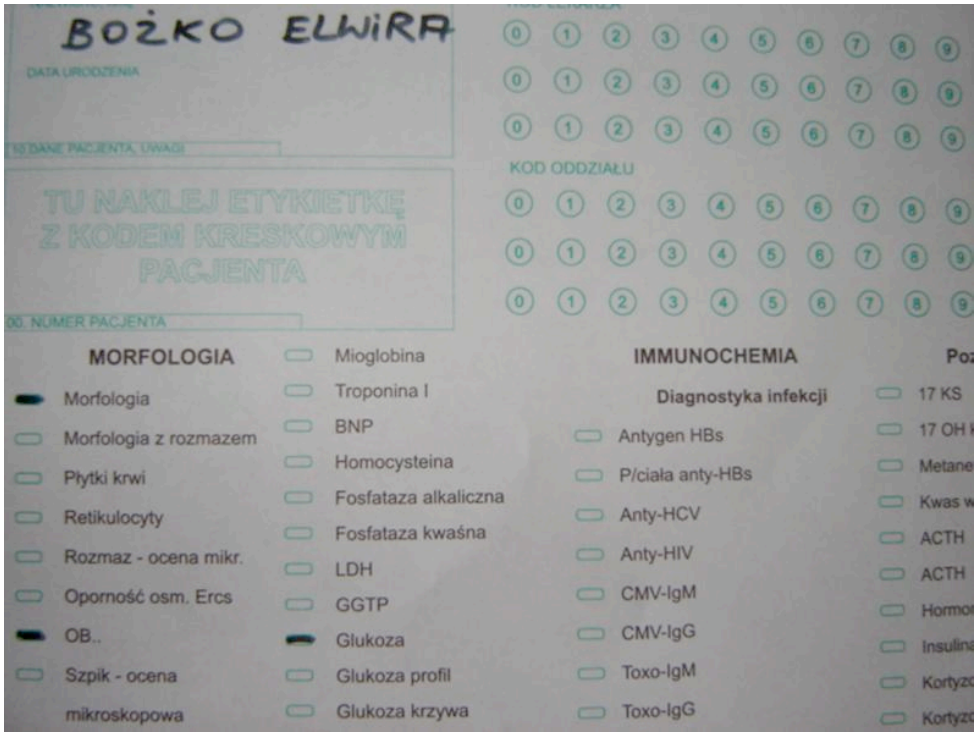



Fig 6 Newly added image presenting a scan of the lab tests

## How long it took per step and in total

The repurposing team consisted of four members. The table below presents the time efforts for the respective roles.

| Role | Time |
|---|---|
| TRANSLATION | 9 hours |
| MEDICAL REPURPOSING | 13 hours |
| TECHNICAL REPURPOSING | 7 hours |
| **Total** | **29 hours** |

## The repurposing workflow

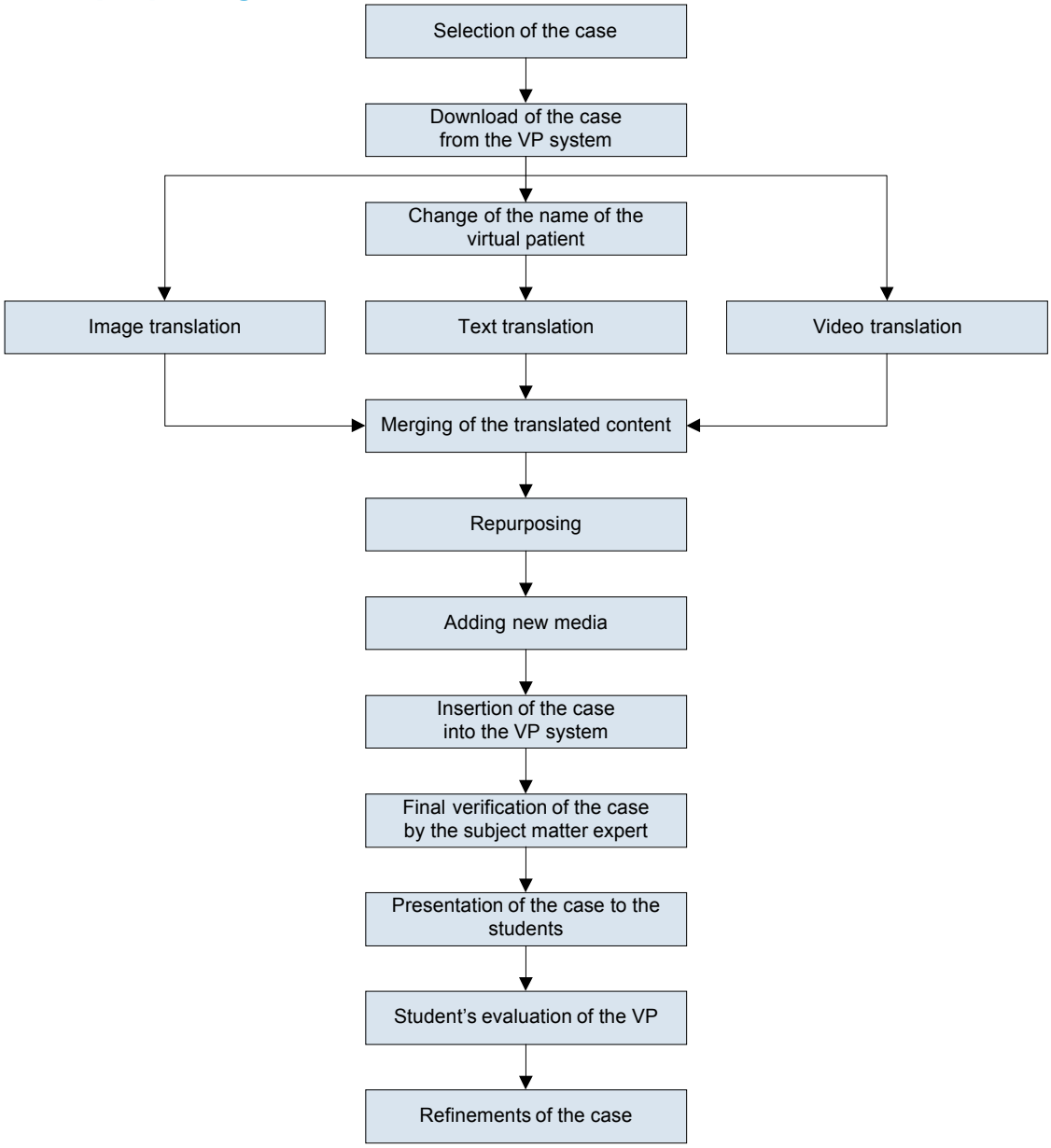


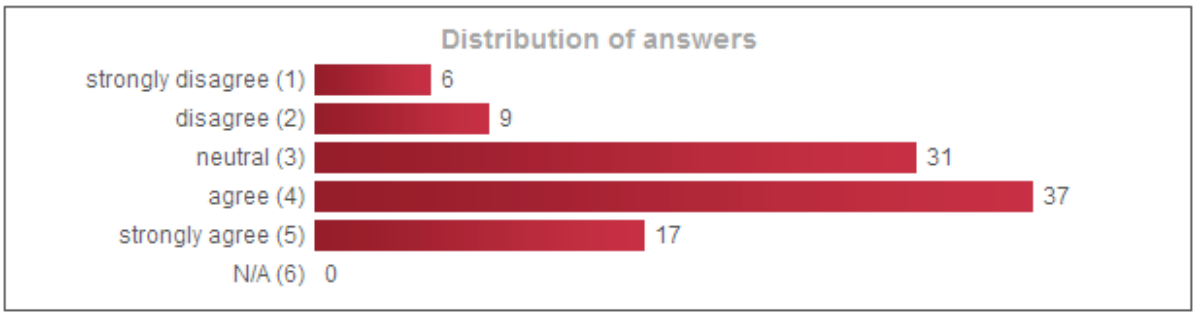

Fig 7 Workflow of the language and cultural repurposing applied while adapting the case evip:vp:1000201

## How the repurposed VPs were evaluated

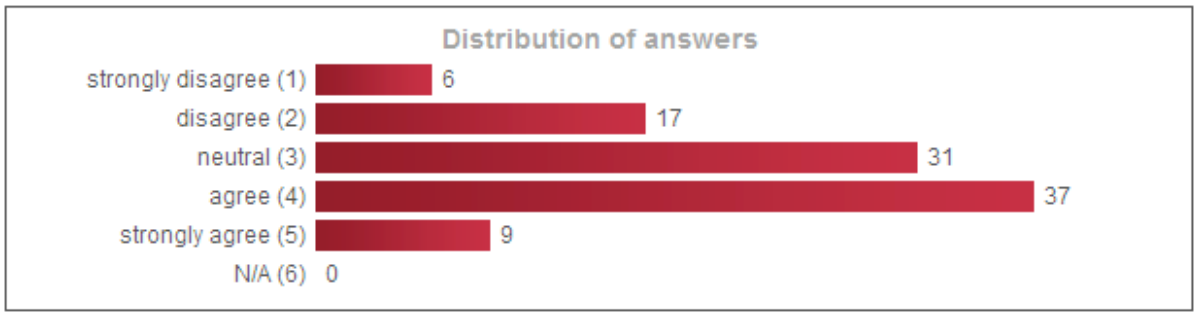
The Mrs Bożko's case has been evaluated at the end of the repurposing process by the subject matter expert as containing lot of interesting information presented in a way that is more appealing than traditional text book.

However, the major evaluation has been done by students of the third year of medicine participating in an obligatory course ("Telemedicine II") conducted in the Department of Bioinformatics and Telemedicine in October 2008. As an evaluation tool the electronic version of the eViP official VP evaluation instrument has been used [1]. Students' responses to the questions are presented in the figures below:

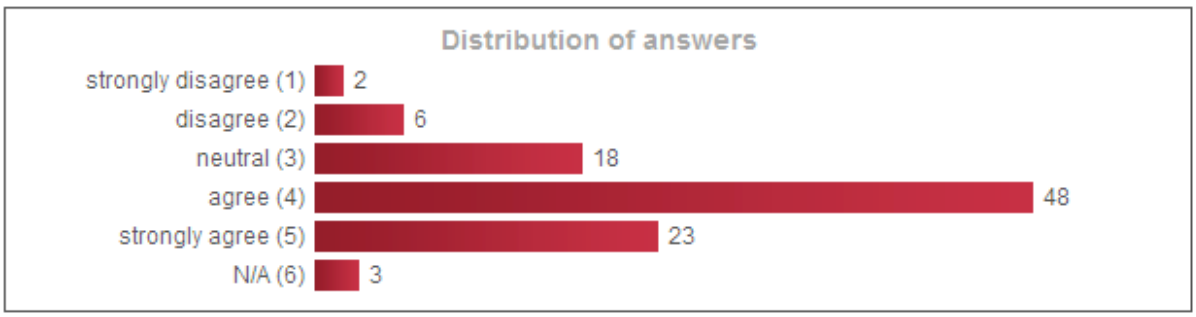
**Question 1:** "While working on this case, I felt I had to make the same decisions a doctor would make in real life."



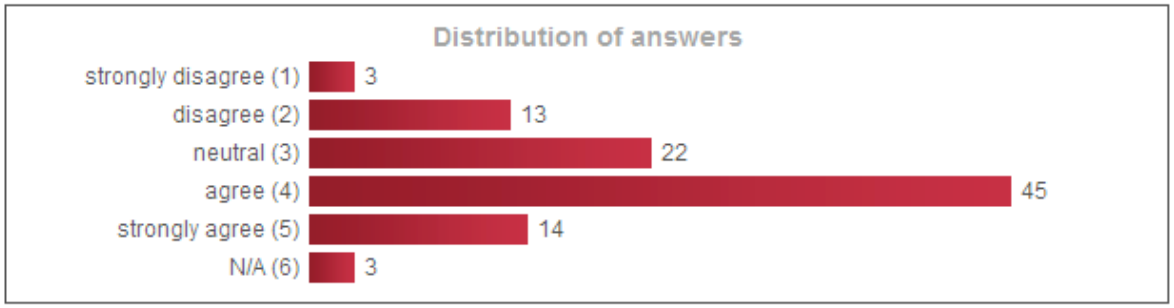

**Question 2:** "While working on this case, I felt I were the doctor caring for this patient."



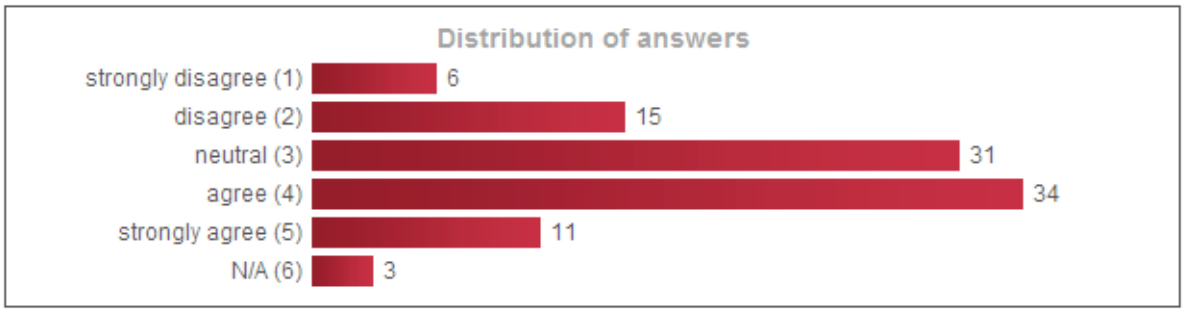

**Question 3:** "While working through this case, I was actively engaged in gathering the information (e.g. history questions, physical exams, lab tests) I needed to characterize the patient's problem."



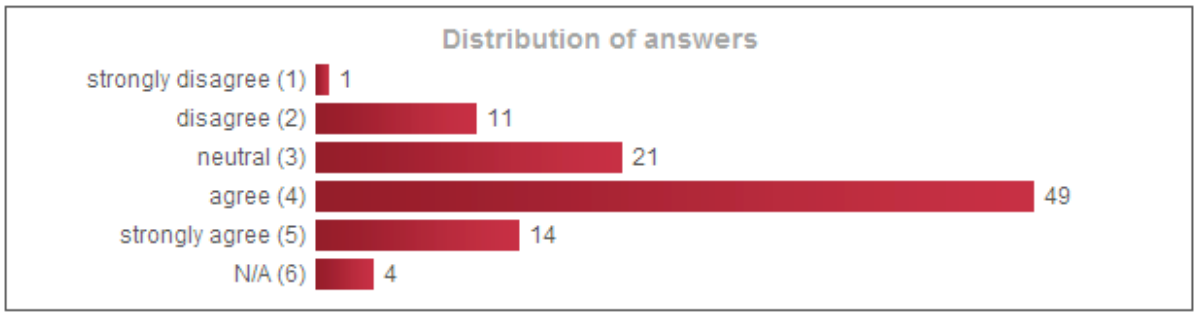

**Question 4:** "While working through this case, I was actively engaged in revising my initial image of the patient's problem as new information became available."



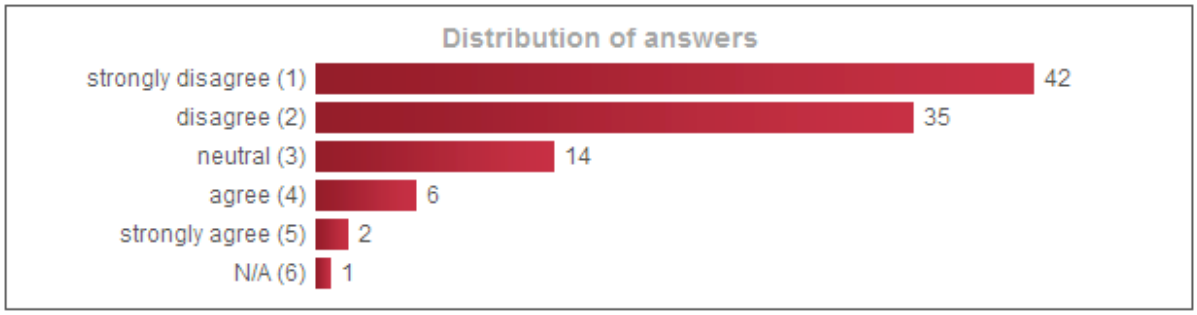
**Question 5:** "While working through this case, I was actively engaged in creating a short summary of the patient's problem using medical terms."



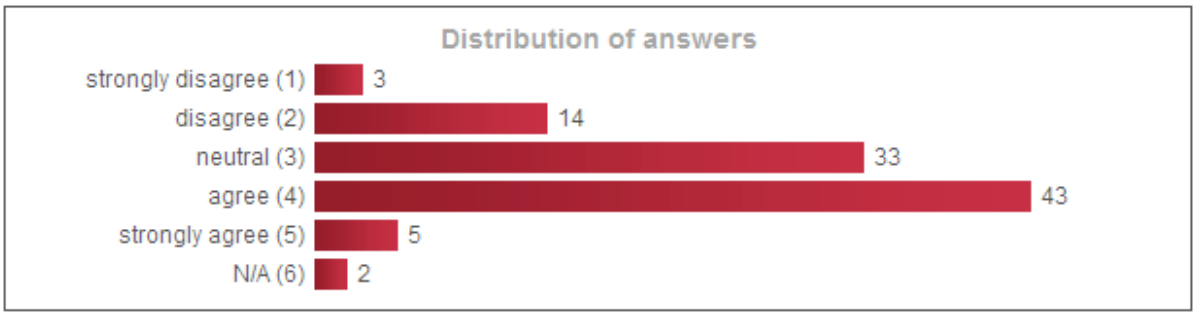

**Question 6:** "While working through this case, I was actively engaged in thinking about which findings supported or refuted each diagnosis in my differential diagnosis."



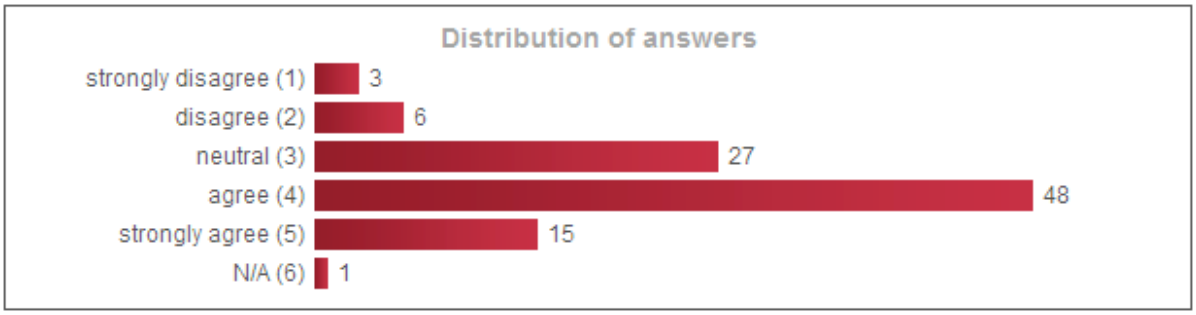

**Question 7:** "I felt that the case was at the appropriate level of difficulty for my level of training."



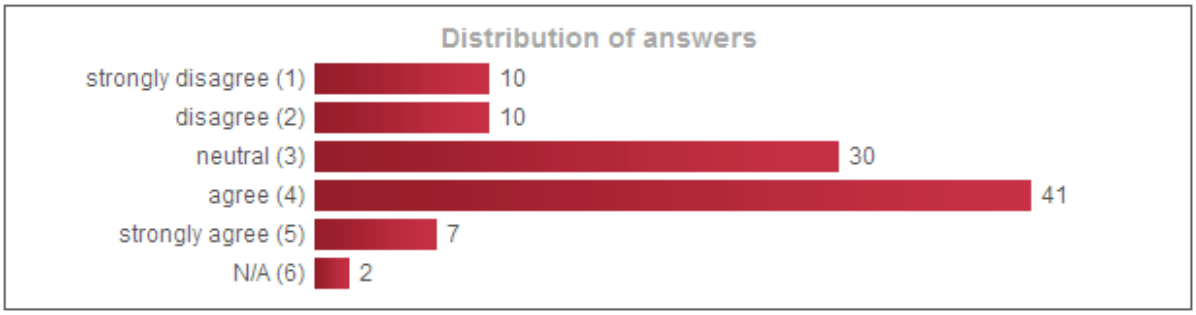

**Question 8:** "The questions I was asked while working through this case were helpful in enhancing my diagnostic reasoning in this case."



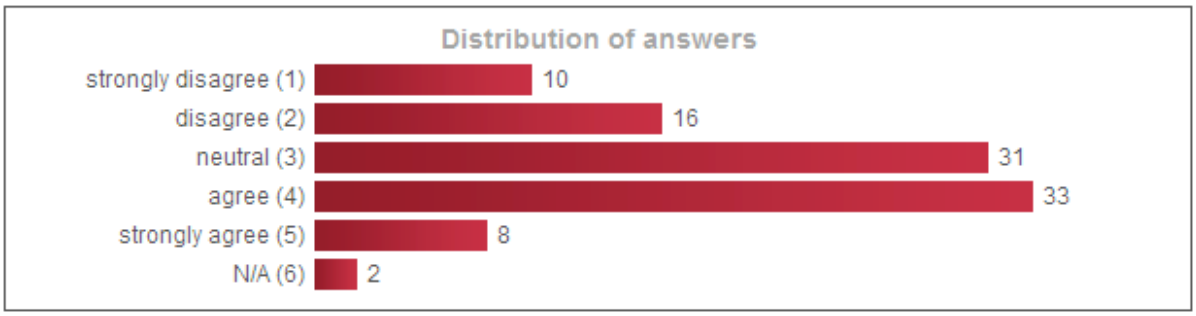

**Question 9:** "The feedback I received was helpful in enhancing my diagnostic reasoning in this case."



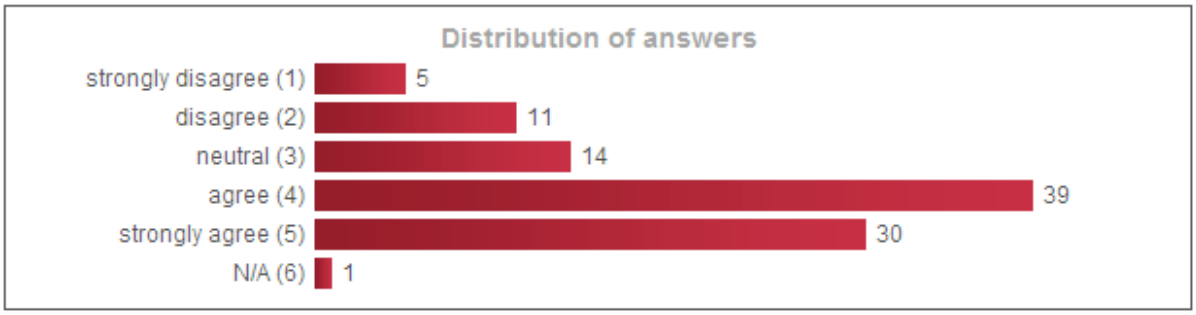

**Question 10:** "After completing this case, I feel better prepared to confirm a diagnosis and exclude differential diagnoses in a real life patient with this complaint."




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




**Question 12:** "After completing this case I feel better prepared to care for a real life patient with this complaint."




The free text questions Q13-Q15 enabled students to state the special strengths and weaknesses of the case as well to give general remarks (only few answers were given).

As usual in polling large groups of student the opinions were mixed and often contradictory. The students praised highly the presents of multimedia elements (like movie clips from the interview or CT scans), however one person criticised the quality of some multimedia resources.

In general the students liked the repurposed case even though most of them complained that the case was too difficult for their level of training (Question 7 & free text comments). This finding is not surprising for the authors since the case has only been repurposed to the Polish language and culture conditions but not yet (for technical reasons) implemented properly into the medical curriculum.

## Discussion and conclusions

Based on the experience collected while repurposing this case we came to the following general conclusions.

- Selection of one person for the role of the case's repurposing coordinator proved to be efficient
- Translations should always be made by a translator with medical background (physician or student in final years of medical study)
- It is very helpful for the language repurposing if the authors of the original case also saved the source files of diagrams
- Localisation of images (like scanning of local questionnaires for medical documentation or taking pictures of local equipment) is not very time consuming but contributes significantly to the realism of the case

- Correct placement of the VP in the curriculum is very important (but often not easy to achieve)
- The recommended diagnostic and treatment pathway of the repurposed VP may vary between different hospitals in Poland due to the lack of widely acknowledged medical standards.

## References


[1] de Leng B., Donkers J., Brasch C., Huwendiek S., Kononowicz AA, 'Evaluation instruments to support educators in making deliberate choices when they use virtual patients to teach clinical reasoning" Bio-Algorithms and Med-Systems, 5(9), 2009 (in press)

[2] Best Practice Guidelines for the eViP application profile and associated conformance metrics, eViP deliverable D2.3b