

International Collection of Virtual Patients - Digitized Education in Europe beyond the pandemic



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IO3 - Guideline and best practices on how to integrate the VP collection

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1. Introduction

The goal of this intellectual output was to provide educators and faculty staff with guidance on how to integrate virtual patients (VPs) effectively into their curricula. Such a guideline should be easy-to-use and based on current educational research literature and hands-on experience. Therefore, we followed a systematic approach and combined it with small group discussion rounds to adapt what we found in the literature. Finally, we published the guideline on our [website](#).

2. Methods

2.1 Analysis of literature

As a first step we formed a working group with ten members from different partner institutions who conducted a systematic literature review to search for articles on how to implement virtual patients into curricula. We designed a search strategy for the following five research databases: PubMed/Medline, Embase, Web of Science, CINAHL, and ERIC. We then screened more than 2000 abstracts returned by the search strategy and located close to 150 full-texts that potentially contained useful information for our purpose. We then met in bi-monthly online meetings to extract themes and recommendations from these full-texts and grouped them into themes. We then mapped these themes with the six steps of the Kern's curriculum development cycle [1]:

- Problem identification / general needs assessment
- Targeted needs assessment
- Goals and objectives
- Educational strategies
- Implementation
- Evaluation and feedback

The working group presented new results and facilitated discussions in our larger team meetings with all partners and refined the initial thematic framework accordingly. We also organized two workshops as part of the project meetings in Kraków on May 11, 2022 and in Porto on November 10, 2022. During these two hybrid half-day workshops with representatives from all project partner institutions we worked in small groups to discuss the themes and recommendations and extended them with experiences from our institutions.



Figure 1: Small groups working on identified themes and recommendations in Kraków in May 2022.

After the workshop in May in Kraków, we started publishing the integration guideline on our [project website](#) and continuously updated and extended it.



Figure 2: Small group work on identified themes and recommendations in Porto in November 2022.

Parallel to elaborating on themes and recommendations, we identified important terms that were part of the articles for which we felt that less experienced educators and healthcare professionals might not be familiar with. Thus, we decided to provide explanations for these terms in a way that they can be accessed if needed, but do not extend the main texts and distract experienced educators, who are familiar with these terms.

To make the integration guideline more applicable, we collected suitable integration examples from our partners, either from the pilot implementations or general experience with integrating VPs into their curricula.

2.2 Implementation

At the beginning of this IO, we researched possibilities to visualize and publish the integration guideline. As our website is based on the content management system Wordpress, we focused on freely available plugins that facilitate a user-friendly and accessible display of such guidelines and glossary. We chose and tested a few promising plugins and finally decided on using the plugins **Echo Knowledge Base** for the integration guideline and **CM Tooltip Glossary** to display our glossary entries and provide a configurable mouseover effect for covered terms throughout the guideline and the whole website. After the themes, recommendations, and glossary terms had been created, reviewed, and agreed upon in the form of a Google document, we transferred the content to our website. Each theme is introduced by three guiding questions, helping the reader to better understand what to expect, and recommendations to conclude each theme.

3. Results

We published the integration guide and glossary on our website

3.1 Structure and theme of the guideline

Based on the extracted articles we identified and agreed upon the following 14 themes, including 6 subthemes and mapped these to the steps of the Kern cycle.

Problem identification and general needs assessment

- This introductory theme provides guidance on why and how the introduction of VPs into a curriculum makes sense and elaborates on the pros, but also some cons. ([More information](#)).

Targeted needs assessment

- **Phase of the curriculum:** Covering aspects of when to implement VPs in a curriculum, identifying the target groups. ([More information](#)).
- **Limited resources:** Elaborating on different types of barriers that might have to be overcome when integrating VPs, such as a lack of funds, expertise, or infrastructure. ([More information](#)).

Goals and objectives

- **Alignment with curricular learning objectives:** Covering aspects of selecting, and if needed, adapting the VPs to match the curricular objectives in an optimal way. ([More information](#)).
- **Prioritization:** Covering details of integration, such as providing VPs as mandatory or voluntary learning activities and how to make them most relevant for students. ([More information](#)).

Educational strategies

- **Relation to other learning activities:** Elaborating on three main strategies (subthemes) on how to include VPs into a curriculum: (1) Extending existing content, (2) Replacing existing content, and (3) Aligning or sequencing VPs with existing teaching activities / content. ([More information](#)).

Implementation

- **Time allocation** in terms of providing time for students to work on the VPs and also whether time should be limited in some situations, similarly as in assessments. ([More information](#)).
- **Group learning setting:** Discussing aspects of students working alone or in groups including experiences in terms of an "optimal" group size and how such groups should be put together ([More information](#)).
- **Technical infrastructure** that is required for a successful integration of VPs including a combination with other online learning tools, such as E-Portfolios. An

important aspect are also the involved costs and how to manage these. ([More information](#)).

- **VP orientation & for students and faculty development:** This theme covers the aspects of whether a dedicated training of students is necessary when introducing VPs and what to consider when planning such a training. We also elaborate on the importance of faculty training and what makes such training effective. Additionally, we discuss possibilities of how to buy-in or motivate staff and educators to use VPs ([More information](#)).
- **Face-to-face, online, and blended learning** are discussed including an elaboration on criteria on how to choose the "optimal" setting ([More information](#)).

Evaluation and feedback

- **Sustainability, maintenance and quality assurance:** Elaborating on how to sustain using VPs in a curriculum and how to organize regular update and quality assurance activities ([More information](#)).
- **Assessment of VP learning outcomes:** In this important theme we cover aspects of summative and formative assessment, but also the potential of using learning analytics, i.e. the use of system-generated learner data for providing feedback ([More information](#)).
- This section also includes a link to our evaluation tools.

In addition, the guideline includes an introductory section explaining the concept and creation process of the iCoViP VPs and describing how to access them.

Finally, we provide five [integration examples](#) from partners, providing scenarios for pre-clinical and clinical students in different settings (asynchronous, blended learning) applying also different selection criteria for the VPs.

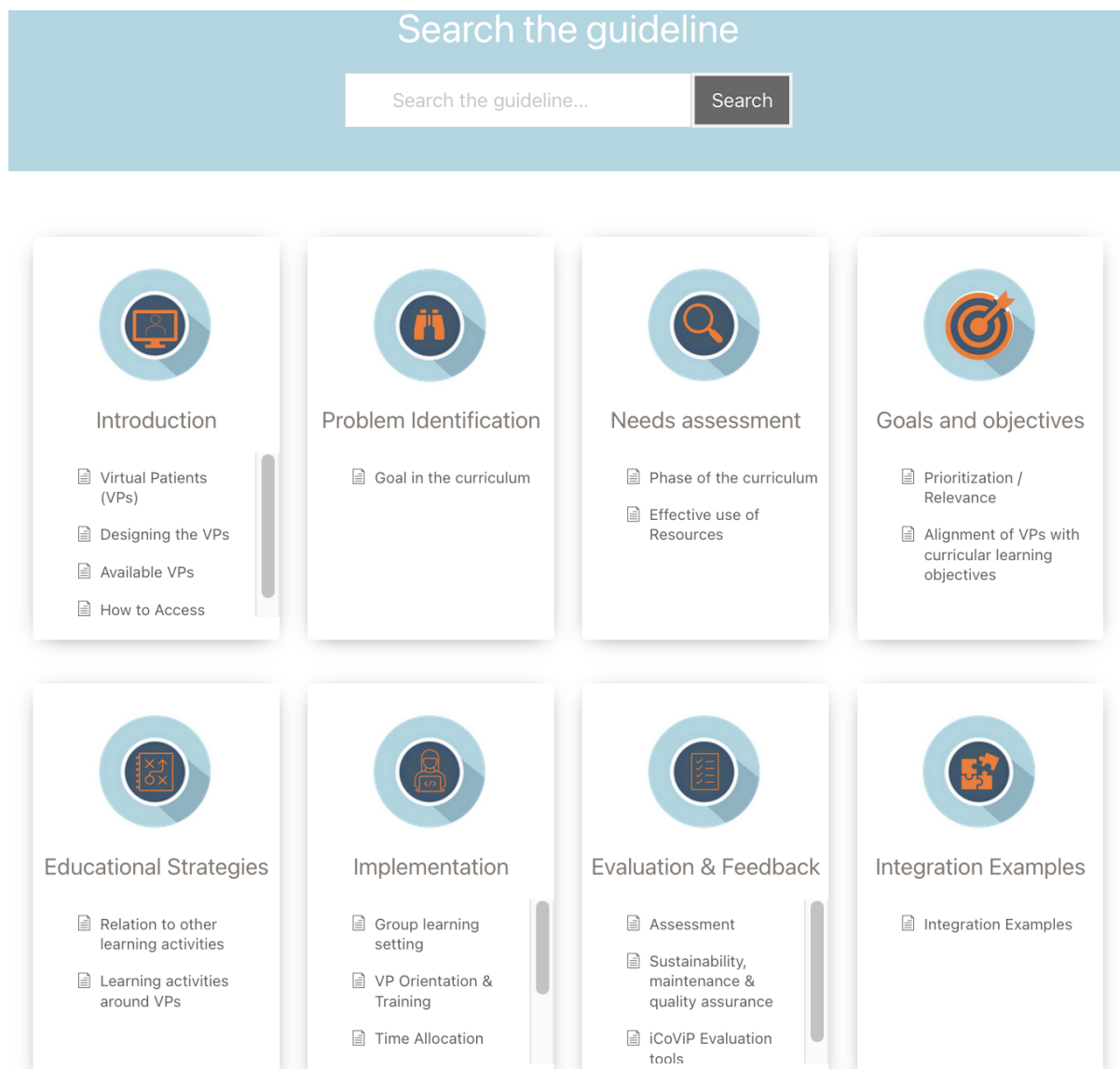


Figure 3: Display of the integration guide on the iCoViP website

3.2 Glossary

Overall, we identified 61 terms that we defined in the glossary. For example, we provided definitions on terms or concepts related to integration of VP, such as "constructive alignment", "self-directed learning", or "creative commons". The full [glossary](#) is available in the navigation menu of the page and terms can also be accessed directly when used throughout the website. These explanations are supposed to help especially educators who are new to the topic of VPs to make use of our integration guideline.

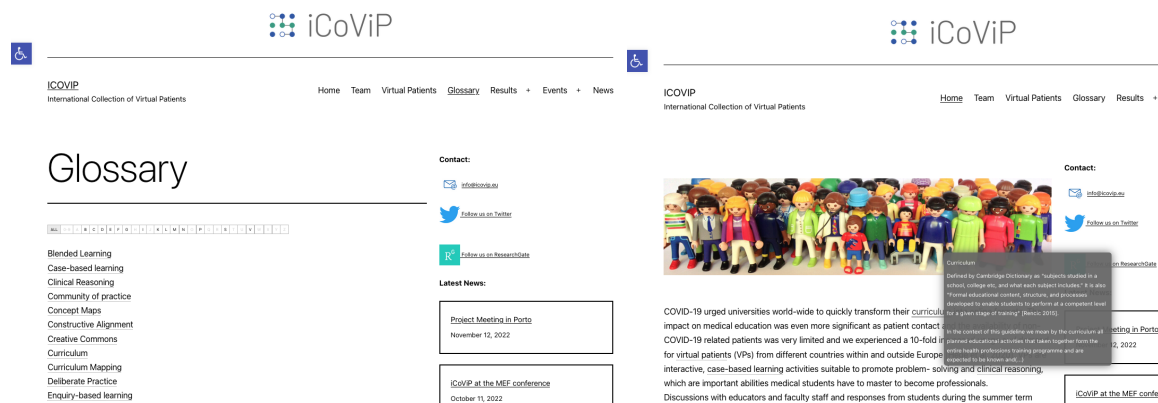


Figure 4: Main page of the glossary entries ([Link](#)) and screenshot of a mouseover effect displaying the glossary entry for "curriculum".

4. Conclusions

We are confident that our combined strategy with a thorough review of the literature and the discussion of the emerging themes in small groups led to a guideline that is grounded in the literature but at the same time also applicable and based on our experience. As our consortium includes educators with different levels of experience in using VPs, from newbies to long-time users, we ensured that the guideline is meaningful for stakeholders with different levels of experience working in different settings and curricula. The Kern cycle, which is well known and frequently applied in curriculum development and reform processes, served as a helpful framework for our themes. Assigning the themes to Kern's six steps reassured us that the themes are relevant for the integration of VPs into a curriculum, which can be regarded as a curricular reform. It also ensured that we cover all relevant steps in this cycle. After having the complete guideline published on our website, we will approach more stakeholders and collect feedback about its applicability and usability. If needed, we will continuously refine the guideline based on this feedback.

5. References

1. Thomas PA, Kern DE, Hughes MT, Chen BY, editors. Curriculum Development for Medical Education: A Six-Step Approach. third edition edition. Baltimore: Springer Publishing Company; 2015..