

DIGITAL TOOLBOX FOR INNOVATION IN NURSING EDUCATION (I-BOX)

Intellectual Output 4

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“The participation of Sechenov University in this Project ended on 8 April 2022 in accordance with the provisions of Council Regulation (EU) 2022/576 of 8 April 2022 amending Regulation (EU) No 833/2014”

PARTNERS:

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This is a public document belonging to the project Digital Toolbox for Innovation in Nursing Education (I-BOX) intellectual output n^o 4.

Title: Best practices and recommendations document.

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Foreword

This document constitutes the final part of the Digital Toolbox for Innovation in Nursing Education (I-BOX) project (WP6 – Dissemination, exploitation and communication).

The project secretariat (the coordinator) draws up a good practices document throughout the 3 years of the project but is an important opportunity to showcase the fantastic diversity and resourcefulness of the project members. The result of this report should mean to analyse, detect, elaborate, integrate, consider, evaluate and document the digital nursing education and learning procedures. It was designed for the broader context of recommendations.

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Executive Summary

The Best Practices document is an intellectual output of the project lead by TecnoCampus Mataró-Maresme Pompeu Fabra University. The supportive cooperation of all partners was key in developing the good recommendations and publishing a scientific paper as a reference document. It would not have been possible without the partner's collaboration which contributed to fostering a quality outlook.

Moreover, its purpose was to seek in array of key components; self-impact, challenges, thoughts, feelings, experience, skills, values, accessibility, comprehension, cohesion, flexibility, usability, resourcing, critical issues, practical application, capacity building, technical knowledge, learning methods, languages, length of educational materials and so on.

The document offers a number of recommendations that can help nursing students, educators and professionals to fully advance the potential acquisition of the I-BOX platform and the multiple virtual content that there are inside, infographics, podcasts and videos.

On behalf of the Project Coordinators – Spanish team

“We would like to thank the amazing work that all Consortium has done and the study participants. Being part of this network was extremely enriching and a great privilege”.



I-BOX Principal Investigator, Esther Cabrera Torres RN, PhD, FEANS (left)



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1. Introduction

Higher education can no longer take place in the traditional way by sitting in a classroom. The coronavirus (COVID-19) pandemic has changed the landscape of higher education. There is a need to examine different instructional approaches including online, hybrid, and blended learning methods.

Flexible learning options, such as: part time study, accelerated programs, bridge programs, work based learning and blended programs are needed to ensure that nursing education is offered and delivered in the most cost-effective and time-efficient way to guarantee standards of quality.

Therefore, these aspects should be built into the programs through the delivery of educational technologies such as e-learning, distance learning and virtual simulation. E-learning technologies have been explored extensively for students in health professions in the academic context.

The I-BOX digital toolbox is a European Project developed by an academic institution which aims to develop material for teaching nursing students and nurses and to offer teachers, researchers, and professionals a platform to promote long life learning.

The objectives of the I-BOX project were aligned with the horizontal strategy of open education and innovative practices in a digital era because it promotes innovative methods and pedagogies and develops digital learning materials and tools open-access.

The digital and technology age outlines a global vision and academic plan for teachers across the education system to use technology to improve the digital transformation in Europe and beyond. This document of best practices could provide several recommendations for achieving the goals by a better integration of technology tools in the European nursing studies. Based on the latest [EC insights on digital transition and strategy technology](#) education action plan 2021-2027 and the [Digital skills initiatives](#) would be essential to assist nursing students and educators in adapting to a changing culture of technology active engagement.

The Digital Education Plan sets out two strategic priorities and fourteen actions to support them:

Priority 1: Fostering the development of a high-performing digital education ecosystem

Action 1: Structured Dialogue with Member States on the enabling factors for successful digital education and skills

Action 2: Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education

Action 3: European Digital Education Content Framework

Action 4: Connectivity and digital equipment for education and training

Action 5: Digital transformation plans for education and training institutions

Action 6: Ethical guidelines on the use of AI and data in teaching and learning for educators

Priority 2: Enhancing digital skills and competences for the digital transformation

Action 7: Common guidelines for teachers and educators to foster digital literacy and tackle disinformation through education and training

Action 8: Updating the European Digital Competence Framework to include AI and data-related skills

Action 9: European Digital Skills Certificate (EDSC)

Action 10: Proposal for a Council recommendation on improving the provision of digital skills in education and training

Action 11: Cross-national collection of data and an EU-level target on student digital skills

Action 12: Digital Opportunity Traineeships

Action 13: Women's participation in STEM

The European Digital Education Hub to support both priority areas, the Commission will also establish a European Digital Education Hub strengthening cooperation and exchange in digital education at the EU level.

Action 14: European Digital Education Hub

1.1 Context and background

This document was focused to share the experience of design, creation, and validation of educational materials in digital format for nursing education and recommendations of best practices to implement educational e-learning material (theoretical or practical subject). The fact that these audio-visual materials are open access enables students, teachers, and healthcare professionals to keep updated on the techniques, share knowledge without borders and therefore ease generation of new expertise.

The experience we have had putting the platform into practice with students and professors at a European level was challenging and therefore a very good added value.



Why do we create it? Significantly crucial to the success of our ongoing and future nursing students, the material shown in the platform can be watched as many times as possible if they liked it. All the practical learning during the course/degree should help them to be empowered and improve the techniques they have developed.

The topics to meet nursing students and teachers needs were:

- **Learning:** Providing different ways for students to access and learn through digital content, demonstrate their theoretical learning by simulation cases.
- **Teaching:** Providing professional development opportunities to educators for using technology.
- **Leadership:** Having a vision for the use of technology to enhance achievement of student learning outcomes. Educators support concept-based learning curricula, which help students gain a deep understanding of major nursing concepts.
- **Assessment:** Having assessment strategies for providing feedback to learners and having valid and reliable measures to assess student learning.
- **IT Tools** Providing adequate means (platforms, moodles, apps) for students to engage technology and utilising openly access educational resources.

The teachers were really impressed with the visual content and characteristics of the platform. Can be introduced when preparing the lessons, showing to the students the digital resources. This is an important input and easily catches the attention of the students while teaching in class. Also, a dynamic with students could teach them how to interact in the platform and upload their own digital ideas and maybe interesting research work.

1.2 Aims and scope

The general objective of the I-BOX project is to design and develop audiovisual e-learning materials related to nursing procedures and techniques in a clinical simulation environment, through an open access online platform to improve nursing education in the field of clinical simulation.

The project aimed to be a reference tool for all kinds of educational organisations and professional individuals enabling to spread nursing knowledge at all levels. As a result, we identified six axes:

1. Digital learning material.
2. Analysis and evaluation of programs or activities.
3. Process modernization.
4. Identification of knowledge gaps.
5. Identification of training needs.
6. Development of methodologies and creation of simulation environment practicum training.

1.3 Approach and feedback

Develop an online collaborative learning platform where students and teachers can share the material and information in open access (scientific articles, tools, infographics, news, etc.), that's why the I-BOX platform was created. A space for virtual debate where students and teachers from different countries can share doubts and raise real situations to solve collaboratively.

The I-BOX platform is hosted by TecnoCampus and from the project website, it is possible to access. To ensure a good performance of the platform and its accessibility. External people interested should sign up for free and get started. Also, has the possibility to be embedded onto other platform suppliers.

The Project learning activity was planned to be the perfect scenario to validate the I-BOX platform and materials. During the course, held in April-May 2022, 15 international students were able to work intensively to achieve the purpose of the activity. **The I-BOX practicum training** was organised in the Center of Simulation and Innovation Health (CSIS) of TecnoCampus Health School.



As a result of this exchange program, students reached competences and skills in techniques and clinical procedures.

The mission of a practicum training in simulation environment, generally was to validate the content, design, format of the platform.

The simulation training program brought students and teachers from 4 European countries (Austria, Finland, Slovenia and Spain).



1.4 Validation of the I-BOX Platform

Between the students, there were some differences and discrepancies. The main reason, some of the study subjects were taught throughout the year and other students had not even started. So, that was the only case or barrier considered in the students with a lower practice experience.

Period: from April 19 to May 6, 2022

Subject: 28339 - Clinical Practicum of the Nursing Degree in TecnoCampus

Teaching team:

Carlos Martínez	Lisa Haller-Schmölz
Carme Planas	Lucija Gosak
Carolina Chabrera	María José Reyes
Ester Mateo	Nino Fijačko
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Laura Curell	



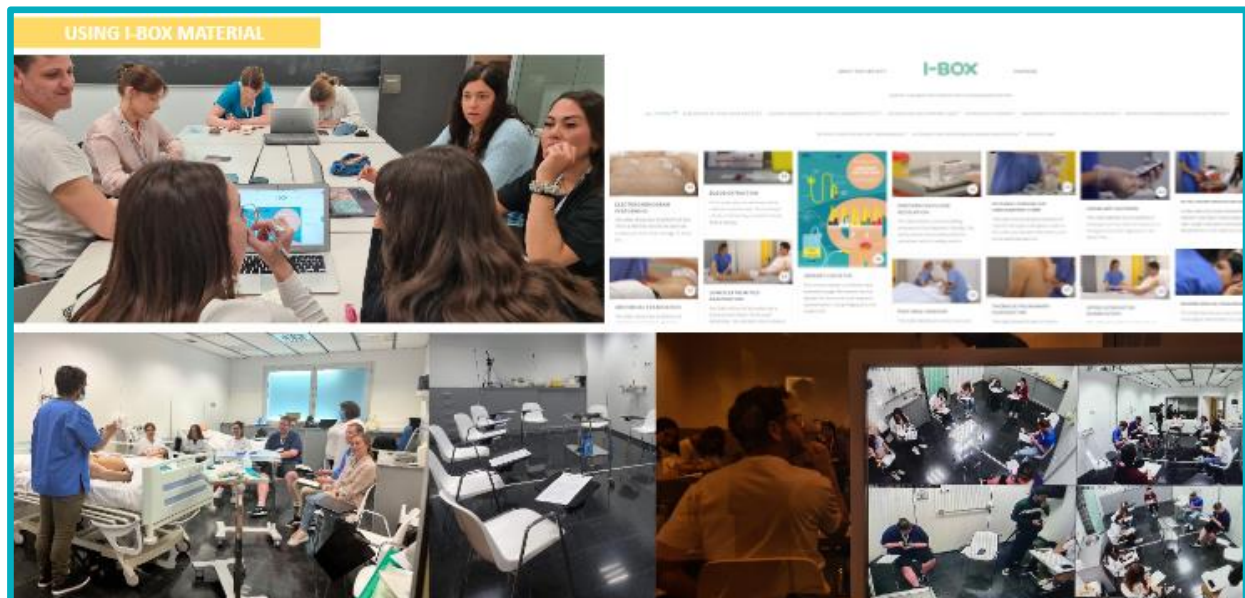
The training program content was satisfactory to all level of studies and students, perfectly matched no matter the experience they had before. In practice, the students did not encounter any difficulties to get access either in the validation process neither in the effectiveness of the platform.

They all came to the same conclusion: [the platform was very intuitive.](#)

The international students were able to validate the materials based on the ASSURE model. Since the beginning, they have been told to check and review the platform.



Some research methods (focus groups interviews in person and via Zoom, questionnaires) were conducted. Once finalised, we had to transcribe and export the qualitative data to be analysed.



Having in mind that it was important to know from every single student the background in new technologies and who had previous experience managing e-learning materials in digital education platforms.



This information was very useful to export the data collected and analysed responding to the traditional manner of teaching in making a replacement changing the conservative or old-fashioned ways of teaching.

The previous experiences with e-learning materials that students said were:

- 1** Use of e-learning material increased in the **wake of the COVID-19 pandemic**
- 2** E-learning usually takes place in seclusion, resulting in **a lack of interaction with fellow students**
- 3** E-learning **improves the effectiveness of knowledge** and skills by providing **easy access to a large amount of information**
- 4** E-learning **requires a high level of self-motivation**, structuredness, organizational skills, and time management
- 5** E-learning can be **accessed regardless of time and location**

The students' experiences with I-BOX e-learning materials were:

- 1** **Country-specific differences** in the individual techniques or procedures were a challenge
- 2** When learning a technique or procedure for the first time, **a video with audio or subtitles would be better**
- 3** The differences in the executions of the interventions also **promoted critical thinking and collaboration among the students**
- 4** **Practical instruction cannot be replaced by e-learning**
- 5** **Videos were the most helpful material, followed by the infographics.** Podcasts are not suitable for learning a technique or procedure

1.5 The importance of digital material integration

The ASSURE model was chosen as it is the most popular model that guides instructional designers and training developers down the right path with creating reliable training courses.

According to the model integration of elements in the platform, it was necessary to describe what sort of information we wanted. To do that, a survey was circulated and distributed to the nursing students which gave us a realistic perspective about the activities, learning objects, type of materials and flexible learning resources would benefit and make it more profitable for them to fulfil the study career.

The 75% of the students who participated in the study were female. The average age of all students was 23.5 years and 56% of the students worked as nurses in their respective countries.

<p>E-Learning</p>	<p>Reusable Learning Object</p>	<p>Types of Materials</p>
<ul style="list-style-type: none"> Delivery of learning materials using technologies in an open & flexible learning atmosphere. The materials are deployed to anyone, at anyplace, and anytime. Khan (2005) 	<ul style="list-style-type: none"> Any digital object that can be used to fulfil specific learning objectives for a course or in a classroom scenario. A Youtube clip, audio file, video, powerpoint slide etc. Whittle et al. (2011) 	<ul style="list-style-type: none"> Videos Infographics Podcasts

The platform design and development process were set up in four steps as well as the definition of topics and blocks.

The production of materials was established in terms of card sorting, whereas with a high volume of content from different country clinical processes, the design method resulted in 14 categories in which a classification was needed. Followed by the best learning content and user profile functionalities.

It is advisable to draft a standardisation guideline when creating new digital e-content material to solve any irregularity. The involvement of students to participate in the development of the materials can be a good starting point to feel engagement with them. At some point, they felt happy and proud to contribute to the project execution activities and therefore interested to collaborate in other project actions.



The assessment to address any problem or unforeseen situation regarding the suitability of the materials, the validation instrument chosen was the Learning Object Review Instrument (LORI). This instrument helps users to evaluate the quality of a learning object by LORI reviewers rating and comment the particularities in eight items. The results for each item obtained can be averaged and see the reviewer's comments respectively.

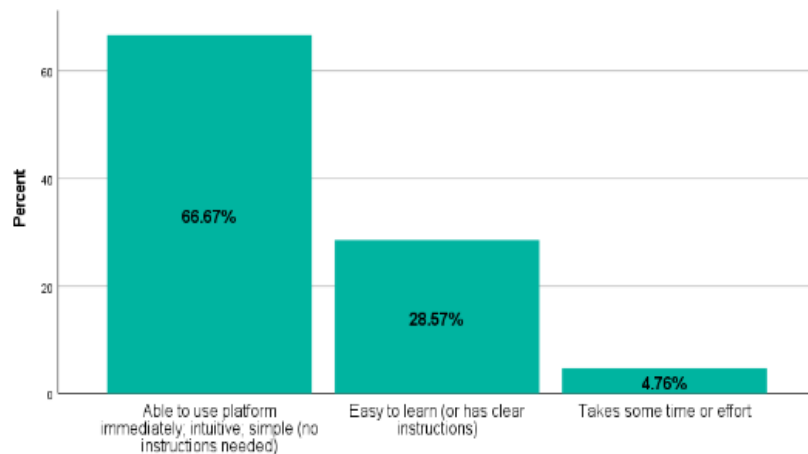
Concerning the general functionalities of the platform, it was decided that the basic requirements were:

- **Open access:** students, professionals, and teachers from any country in Europe can access the platform.
- **Accessibility:** students, professionals, and teachers can access, view, and navigate through the platform.
- **Device adaptation:** users can access, view, and navigate through the platform satisfactorily, regardless of the device from which they access (desktop, mobile, or tablet).
- **Language:** students, professionals, and teachers can access, view, and navigate through the platform in their language (Spanish, English, Finish, German, Slovenian, Russian).
- **Activity and usage tracking:** teachers and users with specific permission can access the usage metrics of the platform.
- **Participation:** students, professionals and teachers can leave comments in the publish content and start or continue a debate in a forum environment.
- **Participation moderation:** teachers or administrators can moderate comments and messages in the forum.

How to use the I-BOX online e-learning platform? The online platform is freely available and can be accessed via the project's website or directly by linking to the platform. A document guideline has been prepared for a better understanding to the users (students and teachers) explaining the main characteristics and functionalities of the platform and materials.

The participant’s opinions and reactions: almost the 67% agreed on the ease, simplicity and intuitively of the platform.

How easy is it to learn how to use the platform?



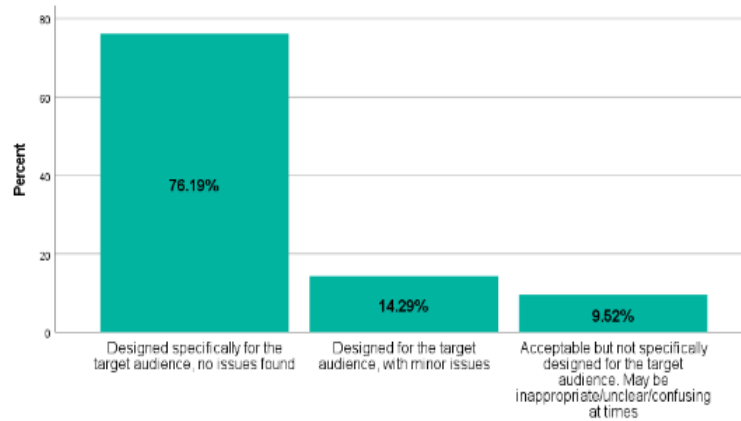
The reported feedback (advice, doubts, comments) perceived by students: the final conclusions made were that the 70% concluded that the overall platform content is well above satisfactory.

Please mark the answers that hold for you and range from strongly agree to strongly disagree (SUS: Brooke, 1995).

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I think that I would like to use this platform frequently.	0%	0%	5%	55%	40%
I found the platform unnecessarily complex.	63%	26%	11%	0%	0%
I thought the platform was easy to use.	5%	0%	5%	25%	65%
I think that I would need the support of a technical person to be able to use this platform.	75%	25%	0%	0%	0%
I found the various functions in this platform were well integrated.	0%	0%	10%	55%	35%
I thought there was too much inconsistency in this platform.	65%	30%	0%	5%	0%
I would imagine that most people would learn to use this platform very quickly.	0%	0%	0%	30%	70%
I found the platform very cumbersome to use.	50%	20%	10%	10%	10%
I felt very confident using the platform.	5%	0%	5%	30%	60%
I needed to learn a lot of things before I could get going with this platform.	65%	35%	0%	0%	0%

Feedback (counselling) perceived by teachers: the 76% agreed that the platform content is well enough satisfactory.

Is the platform content (visuals, language, design) appropriate for the target audience?



The **Focus Groups** were capable of identifying the real needs and feelings of the students when experiencing the platform. This design method allowed to define the user archetype that will use the product or service.


Two types of end user of the platform were defined:

- 1) students
- 2) professionals. Although the end user is these two, teachers and design experts were also considered.

The results of the focus groups in the learning activity were in total 8,70/10.

FOCUS GROUP METHOD

- Identification of opinions, experiences and areas for improvement (O'Connell & Dymont, 2007)
- Qualitative evaluation of the user's experience
- Qualitative evaluation of the user's perception of usefulness
- Identification of areas of improvement




FOCUS GROUP METHOD

$n^1=6$ $n^2=8$ *provisional results (30/8/2022)

- Highlight the usefulness of the platform in simulation processes
- They think that the platform is easy to use and user-friendly
- They believe that the platform fosters critical thinking
- They would use the platform in real contexts
- Identify areas for improvement in the classification of the content
- Identify areas for improvement in the navigation of the platform





RESULTS OF SATISFACTION WITH THE PROGRAM

Teaching Planning	8,71
Goals and Objectives	8,55
Teachers	8,63
Course contents	8,80
Methodology of the course	8,72
Environment in the course	8,82
Total	8,70 / 10

The **Multiplier Event** had a very satisfactory result of 69,4%. In this event, the I-BOX platform was officially launched and some of the students presented their training learning experience at TecnoCampus. They had the chance to evaluate the platform during the training. It was profitable to have the students there to present how they validated and what methods were applicable.

2. Methodology

2.1 The best online tool and e-learning material for nursing education students

The project has been developed by five higher education institutions that offer nursing programs in Spain, Slovenia, Russia, Finland and Austria and have worked together in a Strategic Association organised with the following packages of activities (PA) and subprojects:

PA 1. Project Management

PA 2. Conceptual structure of the project and assessment

- Adaptation and validation of the **DREEM tool** in the five partner languages.
- Measure the **Educational Environment**.
- Adapt the **ASSURE** instructional model for the project.

PA 3. Development of educational e-learning material

- Development of **educational material** to teach nursing techniques and procedures.
- Creation of **guidelines** for the development of learning objects.
- Validation of the educational material developed with the **LORI scale** through a panel of experts.
- Translation, retranslation, and production of learning objects into the **native language** of each partner.

PA 4. Development an online platform

- Design and develop the I-BOX platform through a **Human Centered Design** approach, defining users and their needs and involving them in different phases of the process.
- Validate and **test** the online platform within the subjects of the study plan.
- Evaluate the **usability, acceptability** and **quality** through the Systems Usability Scale (SUS) questionnaire and the User Version of the Mobile Scale (UMARS).

PA 5. Development of a Practicum training

- Design and development of an international practical training in a simulation environment, for 3 weeks, with the aim of piloting learning objects and the I-BOX platform: **Simulation-Based Training Program for Nursing Practice**
- Assess the I-BOX platform through the experience of the participants through **focus groups**.

PA 6. Dissemination, exploitation and communication

A continuous mixed methods experience along with the research methodology undertaken was possible through the:

- ❖ ASSURE and DREEM tool
- ❖ focus groups interviews
- ❖ questionnaires/surveys
- ❖ trainings and multiplier events
- ❖ narrative/thematic/descriptive
- ❖ QUAL and QUAN analysis
- ❖ peer reviewing



This document will underline each topic of the platform on what worked well and what worked badly and to detect situations that have arisen to enhance nursing learning.

Overall feedback perceived - What should be highlighted as positive/negative impact

Topics about the I-BOX Platform and Materials	What worked well?	What can be improved?	Identify risks or problems that occurred that need to be considered to improve.	Indicate what needs to be done to improve e-learning on nursing education.
A) Coordination and Management	Project Managers are always attentive and resolute.	Communication.	Time management inefficiency.	Keep it on and do not close the platform.
B) Partners responsibilities	The objectives were achieved.	Duplication of work when translating. Prioritization of tasks and follow up.	Waste of time in double checking the material content (titles, etc) and storage (doc repository) not well-organised.	Run out of time in some work package deliverables.
C) Process development	Categorization and skills classification.	Results of the pilot test were late as scheduled.	Little troubles to link the portfolio to the project webpage.	Self-motivation to monitor the current
D) Educational materials – platform	The materials are fully comprehensive.	Barely visible.	Problems charging the whole page. Slowly scroll down to see all the resources available on the front page.	It will be nice to maintain the platform up to date with more recent material. To add new content and objects from EU HEI.
E) Platform – validation	Excellent tool.	Format/structure and add filtering options.	The menu search should be clearer.	Upload situations and life simulation 'real' situations.
F) Open access format	Great idea.	N/applicable.	Opt by a free sign up/registration to get as many subscribers as possible.	Insert reliable material.
G) Dissemination, exploitation, and communication	Social media icons to share in other external media.	Publish periodic posts and reminders.	Feeds and source to be approved before.	It is essentiality nurse's view, perceive, interpret clinical

Please describe your experience with the platform.

University of Maribor
Faculty of Health Sciences

"the look of the platform is very appealing (clean lines, color, not cluttered). the background music of the videos is very pleasant. the size of the embedded videos did not need to be changed"

"what i liked most about the platform is the welcoming and pretty design. right from the start it is simple to navigate and find important informations and instructions. it is obviously targeted to students who are interested in learning more about specific nursing practices and everything is explained very accurately"

"i really liked how easy and simple the web site is when use. the colors are soft and soothing to the eye. it is a very intuitive platform. the content is of quality and made by professionals. that will help many students"

"keep doing a great job!! it's a great idea and i'm sure it will help a lot for the students comunity"

"i like easy access to videos, understandable topics or explanations, and the ability to share videos with others"

"a very good and instructive matter that will be of great help to students in learning procedures and interventions"

"keep doing a great job!! it's a great idea and i'm sure it will help a lot for the students comunity"



The pros and cons to minimise the potential risks to deploy an e-learning platform, should first be well documented (literature review) in a scientific paper.

To produce the best practices, certainly should be questioned based on a combination of common argument and/or features.

2.2 Development of an e-Learning Platform

The platform was designed as a virtual showcase and acts towards a health digital education space. The pilot testing of the platform was rated within the User version of the Mobile Application Rating (UMARS). The average rate was 75/100%.

The 10 recommendations of good practices to implement e-learning material in nursing education were created based on an integrative literature review, which has been submitted as a research article.

Recommendations of good practices to implement e- learning material in nursing education



Meanwhile, some of the best practices conclusions were:

- Stronger integration of e-learning in nursing education is necessary.
- Blended learning environment is the best variant tool to implement in meeting rooms.
- Different styles of students are essential with the disruptive progression of nursing studies.
- International views and differences can foster collaboration and encourage critical thinking.
- Henceforth, the advantages of the platform are infinite.

2.3 Key recommendations of good practices to implement e-learning material in nursing education

Recommendation 1

Consider the learner; their level of knowledge and competencies in accordance with the complexity of the content and learning methods.



Recommendation 2

Ensure adequate orientation and possibility of technical support.



Recommendation 3

Ensure that the material is evidence-based and up to date.



Recommendation 4



Strive for authentic e-learning material



Include case scenarios and videos.

Recommendation 5

Involve the learner actively; assure that the learner is behaviorally engaged in the learning process.



Recommendation 6



Enable student-teacher interaction.



Enable learner-learner interaction.

Recommendation 7

Verify that the e-learning material is accessible and easy to use.
Consider the possibility to use with mobile devices.
i-boxplatform.com



Recommendation 8

Ensure freedom from time restraints; allow flexibility of study time and self-paced learning.



Recommendation 9

Provide feedback from learning without delay.



Recommendation 10

Use as an additional and supplemental learning method.

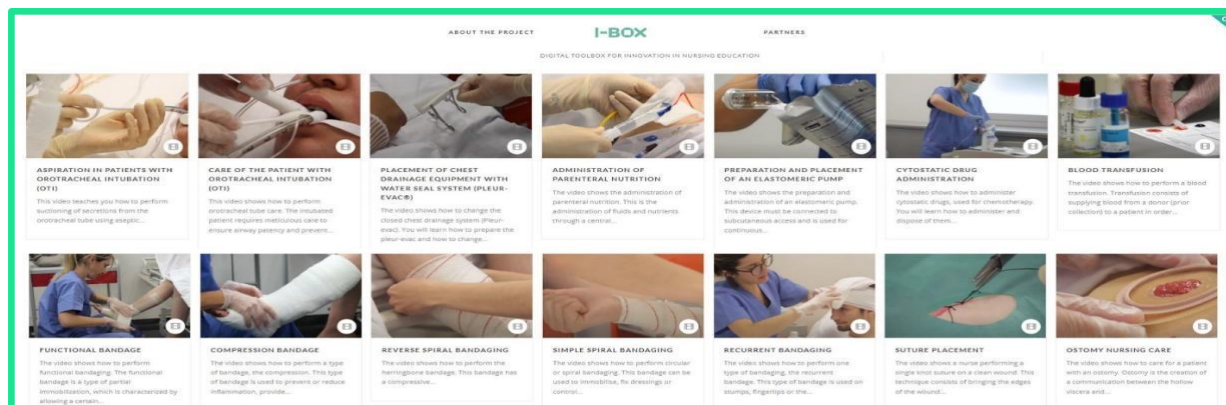


3. Results

The final results of the project are:

1. An open access platform to share knowledge and learning materials in a simulation environment. Open free content without language barrier.
2. Recommendations of good practices for the implementation of e-learning resources in nursing education to be used in high education institutions or others into standardised procedures. This could be included in nursing curricula but also in the healthcare system to promote lifelong learning (LLL).
3. Audio-visuals material (infographics, podcasts, videos) related to health procedures and nursing techniques to be used by all the European universities and/or others interested. These materials could be used in the different devices and easy access to students and healthcare professionals.
4. Promoting the project and the virtual platform with the partners engagement acting as ambassadors in conferences, events, forums, seminars and congresses worldwide.
5. Continuing research and writing of new publications with nationally and internationally scope.
6. Feeding the project website generating content and digital news relevant to the project goals.
7. Strengthening the relationship between key stakeholders and strategic networks.
8. Collaborating with high education institutions which give us the opportunity to work in diverse ways: research, innovation, and mobility projects.
9. Searching new trends and possibilities to apply for new funding schemes and European grants.

Figure 1. Main page of the I-BOX platform



4. Conclusions

The I-BOX best practices document has been a guide on how to implement e-learning material with a combined collaboration between EU nursing schools that faced challenges when preparing the different outcomes, specially the audio-visual and graphic material.

Finally, the I-BOX project platform has delivered the following:

1. A **user centered and validated tool** to underline new teaching methods, and it is adapted to a new generation of nursing students.
2. By this new method of teaching, students can better be prepared for the simulation training and **focus on the patient** instead of the procedure.
3. The project consortium underlines the increased value of the fact that materials are **developed in different countries**, as a result, the context and procedures are recorded according to the local practices. This shared production of materials allows at a glance to see the cultural nuances of nursing practice, it enhances the **international exchange of knowledge and experiences**, but foremost it will require and train skills of critical thinking.
4. The I-BOX platform also aims to **be a reference tool** for all kinds of educational organisations and professional individuals that enables the spread of knowledge at all levels.
5. Unified in a single platform all the traditional content in nursing education into digitalisation format. Transferred knowledge and resources to e-learning material that will **facilitate the transition of conservative nursing studies into a modern and innovative way of (e-)learning**.
6. The platform will be used as a space for **virtual debate** that anybody, preferably health/nursing students and teachers should share doubts, **raise consultations trying to solve collaboratively**.

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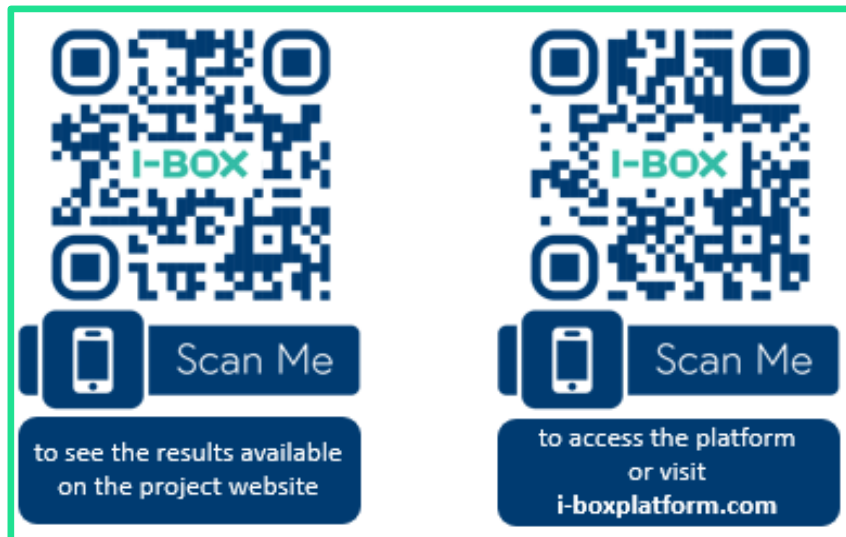
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For more information, they can scan the codes shown in the following image and thus see both the results and the platform.



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