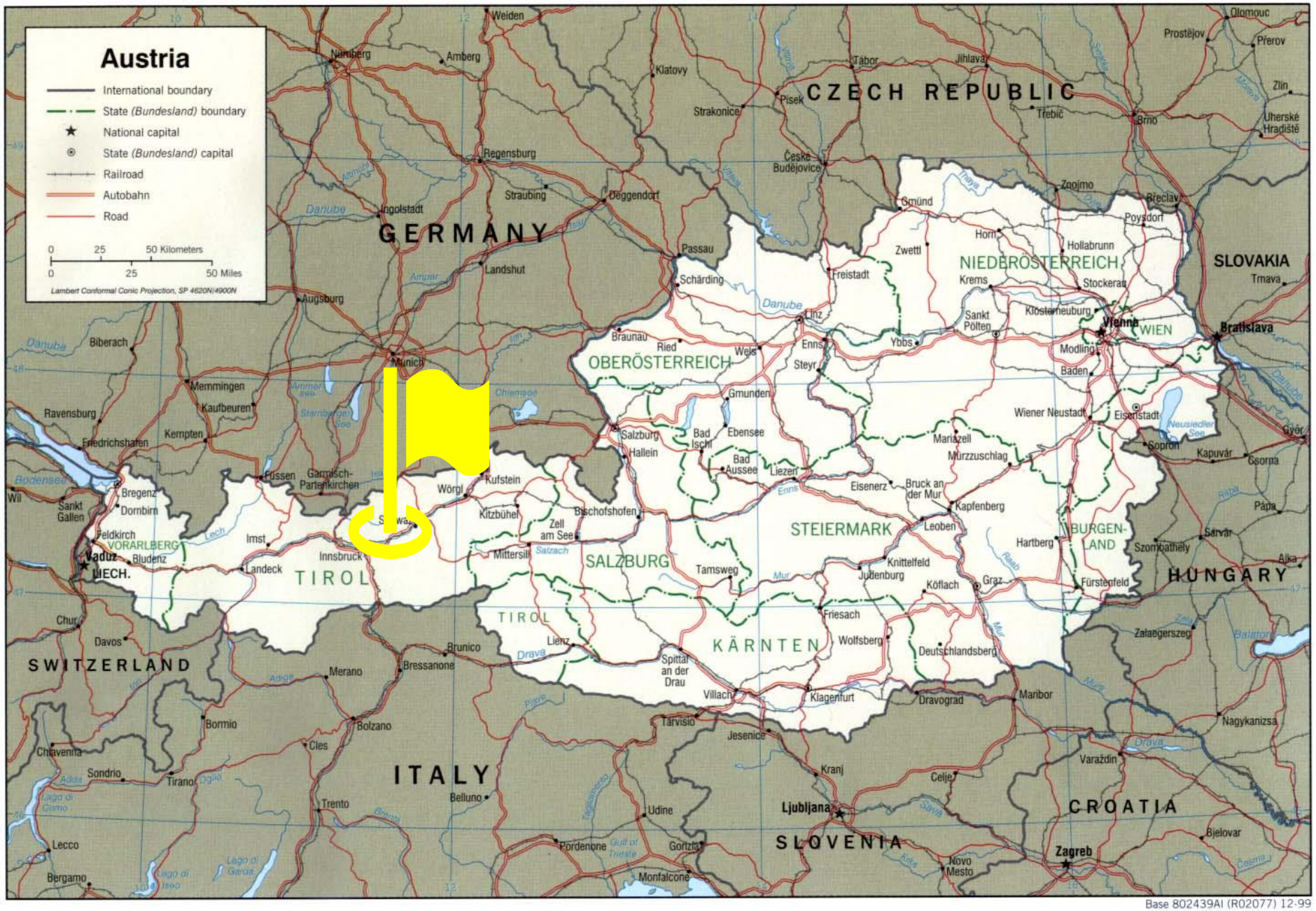
Development and Validation of the Digital Tools (E-Learning Materials)

Digital Toolbox for Nursing Education Conference 2022

I-BOX
Co-funded by the Erasmus+ Programme of the European Union

Work Package Leader (UMIT TIROL):
Scientific Direction & Senior Scientist: Ao. Univ-.Prof. Dr. Eva Schulc
Junior Scientists: Mag. Margarethe Achenrainer & Chiara Messina, BA, MA

TecnoCampus School of Health Sciences
Affiliated center Universitat Pompeu Fabra Barcelona
Univerza v Mariboru Fakulteta za zdravstvene vede
TURKU AMK TURKU UNIVERSITY OF APPLIED SCIENCES
SECHENOV UNIVERSITY LIFE SCIENCES


Austria
International boundary
State (Bundesland) boundary
National capital
State (Bundesland) capital
Railroad
Autobahn
Road
0 25 50 Kilometers
0 25 50 Miles
Lambert Conformal Conic Projection, SP 4620N/4900N
GERMANY
CZECH REPUBLIC
SLOVAKIA
HUNGARY
SWITZERLAND
ITALY
SLOVENIA
CROATIA
LIECH.
NIEDERÖSTERREICH
WIEN
OBERÖSTERREICH
SALZBURG
TIROL
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STEIERMARK
BURGENLAND
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Vienna
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Graz
Salzburg
Innsbruck
Klagenfurt
Bolzano
Trento
Udine
Brno
Ostrava
Prague
Budapest
Danube
Drava
Mur
Inn
Salzach
Enns
Traun
Lake Constance
Neusiedler See
Chiemsee
Starnberger See
Ammer See
Lake Como
Lake Garda
Lake Iseo
Balaton
Base 802439AI (R02077) 12-99

UMIT TIROL - Private University For Health Sciences and Health Technology

Staff: 250 (teaching, research, projects, administration)

Students: approx. 1550 - of which approx. 400 are first-year students each year

4 Departments in research and teaching

12 Focus areas in research and teaching
Nursing science, health and nursing informatics, health sciences, health informatics, public health, medical technology, medical and biomedical informatics, mechatronics, gerontology, health technology assessment, psychology, sports medicine

Supporting Persons

Christa Them *Lisa Haller-Schmölz* *Janine Figallo* *Gerhard Müller* *Matthias Rohringer*

I-BOX Scientific Lead & Project Members of WP3

Division for Integrated Care of the Department for Nursing Science

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Associate Professor in Public/Community Health Nursing

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__IMPORTANT NOTE:__ 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.

CONTENT

1 Introduction

2 Development of the E-Learning Materials

3 Validation of the E-Learning Materials

4 Integration of the E-Learning Materials into Nursing Education

CONTENT

1 Introduction

Development of the E-Learning Materials

Validation of the E-Learning Materials

Integration of the E-Learning Materials into Nursing Education

Introduction

The I-BOX Project

Strategic Partnership

- **Five higher education institutions**
- Working together in a **Strategic Partnership**
- Create a **network of universities**
- Developing new **materials in nursing education**

Key Data

- **Full Title:** Digital Toolbox for innovation in nursing education (I-BOX)
- **Co-funded Through:** Erasmus+ Programme (KA2 Strategic Partnership No. 2019-1-ES01-KA203-065836)
- **Duration:** 2019-2022

General Aim

- Develop **audiovisual materials** related to procedures and nursing techniques
- **Improve education and training** of nursing students
- **Collaborative digital platform**

Work Packages

PA1 Project Management
School of Health Science TecnoCampus

PA2
Conceptual structure of the project and assessment
Sechenov University

PA3
Development of educational and audiovisual e-learning material
UMIT University

PA4
Development an online platform
Maribor University

PA5
Development of a Practicum training in simulation environment
School of Health Science TecnoCampus

PA6 Dissemination, explotation and communication
Turku University

Work Package 3

PA3
Development of educational and audiovisual e-learning material

UMIT TIROL
DIE TIROLER PRIVATUNIVERSITÄT

UMIT University

Development of audiovisual materials

+

Validating the developed educational material

Based on the **ASSURE MODEL**

=

Audiovisuals, educational material, related to nursing techniques **to be used by all the European universities**

ASSURE Model

- **A** nalyse Learners
- **S** tate Objectives
- **S** elect Materials
- **U** tilize Materials
- **R** equire learner participation
- **E** valuate and revise

Conceptual Structure of the Project

6 Phases

Instructional Design Model

CONTENT

Introduction

2 **Development of the E-Learning Materials**

Validation of the E-Learning Materials

Integration of the E-Learning Materials into Nursing Education

E-Learning Materials in I-BOX

E-Learning

- Delivery of **learning materials using technologies** in an open & flexible learning atmosphere.
- The materials are **deployed to anyone, at anyplace, and anytime**. Khan (2005)

Reusable Learning Object

- 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.** Windle et al. (2011)

Types of Materials

- **Videos**
- **Infographics**
- **Podcasts**

E-Learning Materials in I-BOX

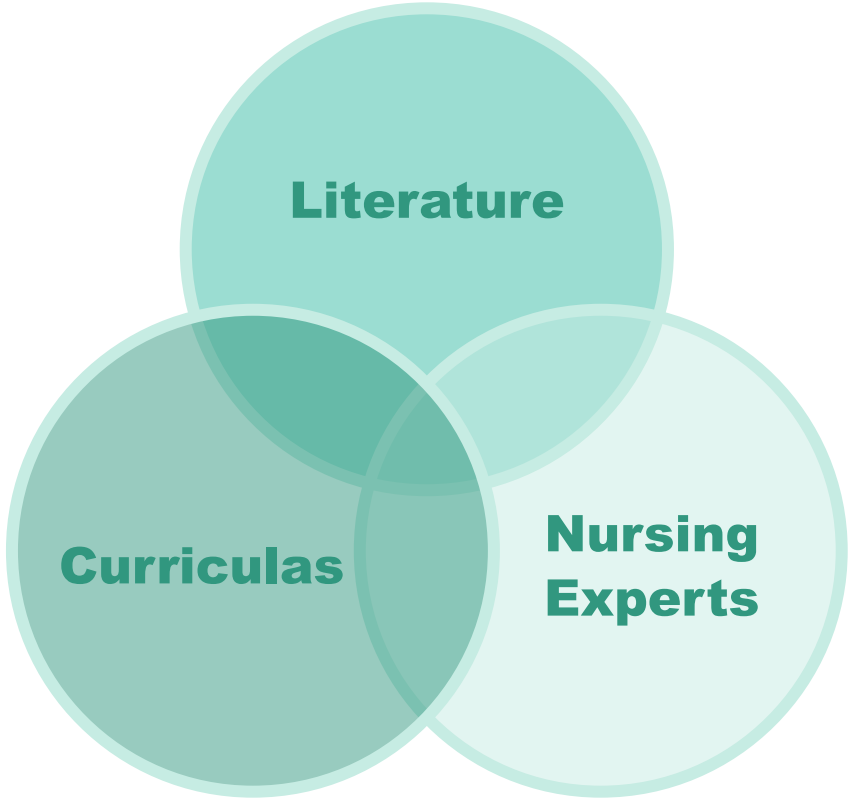
	Spain	Slovenia	Austria	Russia	Finland	Total	
Videos	60	10	10	0	10	=90	x 5 (Translations) = 60
Podcasts	1	3	4	1	3	=12	x 5 (Translations) = 60
Infographics	1	3	3	2	3	=12	

Development of the E-Learning Materials
Process of Development

1. Agreement on **Topics and Blocks**
2. Creation of **Guidelines & Example Materials**
3. **Production** of Materials
4. **Interim Results**

E. Schulc, M. Achenrainer, C. Messina
August 2022

Development of the E-Learning Materials
Agreement on Topics & Blocks



1. **Block:** Standard and transmission-based precautions
2. **Block:** Moving, Positioning and Transferring
3. **Block:** Hygiene and post-mortem care
4. **Block:** First Aid
5. **Block**: Clinical Assessment and taking laboratory tests
6. **Block:** Medication preparation and administration
7. **Block:** Intravenous Therapy
8. **Block:** Management of **Nutrition** and Elimination
9. **Block:** Respiratory Care & Airway Management
10. **Block: Newborn** care
11. **Block:** Assessment of vital signs and ECG
12. **Block:** Wound Care
13. **Block:** Perioperative Care
14. **Block:** Nursing Theories

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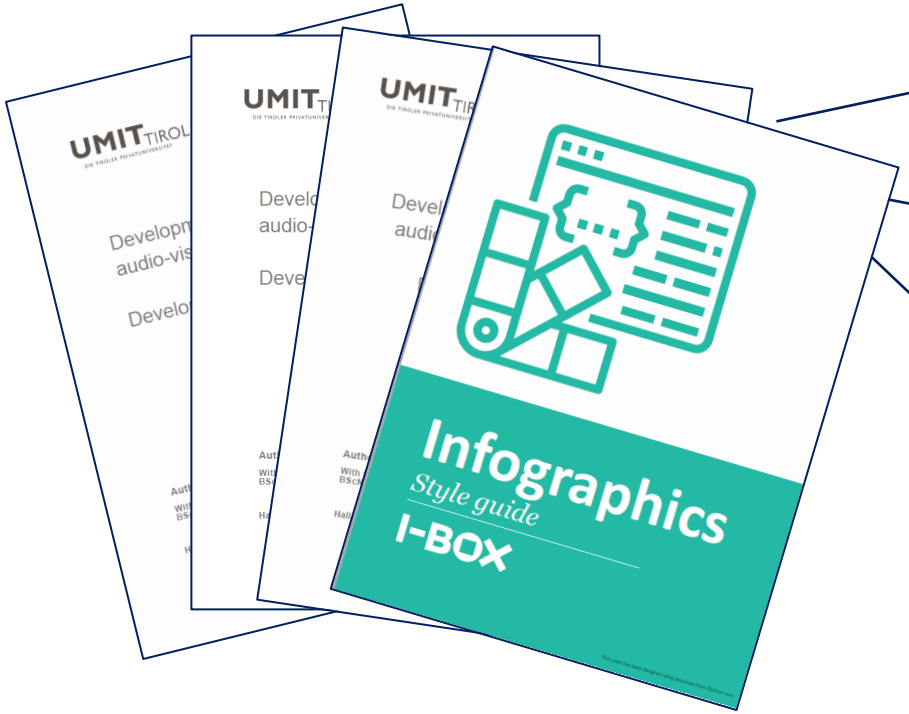
August 2022

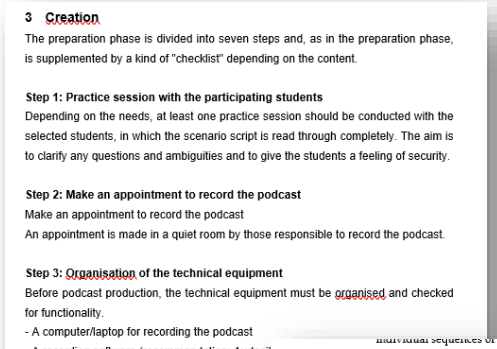
Development of the E-Learning Materials

Agreement on Topics & Blocks

1. Block: Standard and transmission-based precautions	Type	Who
Hygienic handwashing	Video	ESP
Antiseptic handwashing	Video	ESP
Applying and removing sterile gloves	Video	ESP
Transmission based precautions: droplet precaution	Video	ESP
Transmission based precautions: airbone precaution	Video	ESP
Transmission based precautions: contact precaution	Video	ESP
Placement and removal of complete Personal Protective Equipment (PPE)	Video	ESP
Impact and incidence of Nosocomial Infections	Podcast	ESP

Creation of Guidelines & Example Materials





3 Creation

The preparation phase is divided into seven steps and, as in the preparation phase, is supplemented by a kind of "checklist" depending on the content.

Step 1: Practice session with the participating students

Depending on the needs, at least one practice session should be conducted with the selected students, in which the scenario script is read through completely. The aim is to clarify any questions and ambiguities and to give the students a feeling of security.

Step 2: Make an appointment to record the podcast

Make an appointment to record the podcast

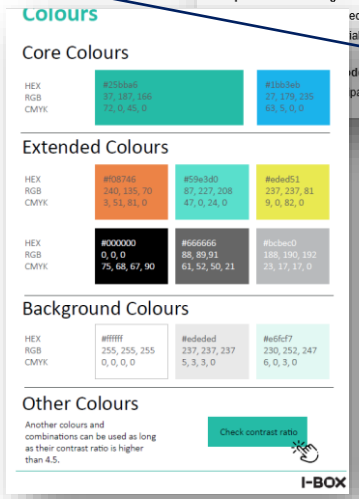
An appointment is made in a quiet room by those responsible to record the podcast.

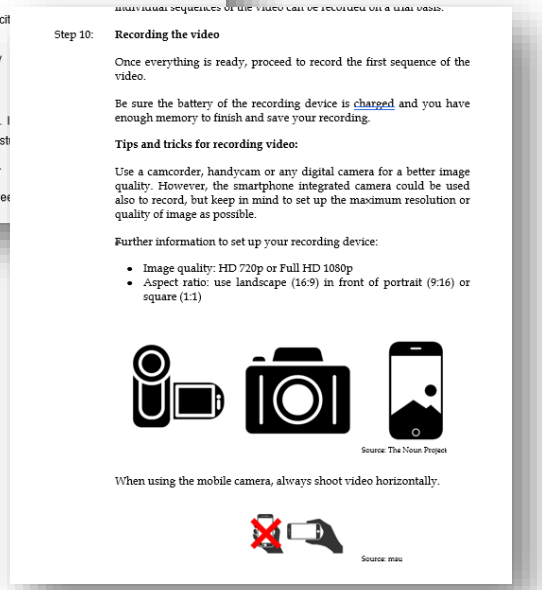
Step 3: Organisation of the technical equipment

Before podcast production, the technical equipment must be organised and checked for functionality.

- A computer/laptop for recording the podcast
- A recording software (recommendation: Audacit
https://www.audacityteam.org/download/)
- An external microphone for good audio quality

Step 4: Test recording of the podcast





Step 10: **Recording the video**

Once everything is ready, proceed to record the first sequence of the video.

Be sure the battery of the recording device is charged and you have enough memory to finish and save your recording.

Tips and tricks for recording video:

Use a camcorder, handycam or any digital camera for a better image quality. However, the smartphone integrated camera could be used also to record, but keep in mind to set up the maximum resolution or quality of image as possible.

Further information to set up your recording device:

- Image quality: HD 720p or Full HD 1080p
- Aspect ratio: use landscape (16:9) in front of portrait (9:16) or square (1:1)

Source: The Noun Project

When using the mobile camera, always shoot video horizontally.

Source: mau

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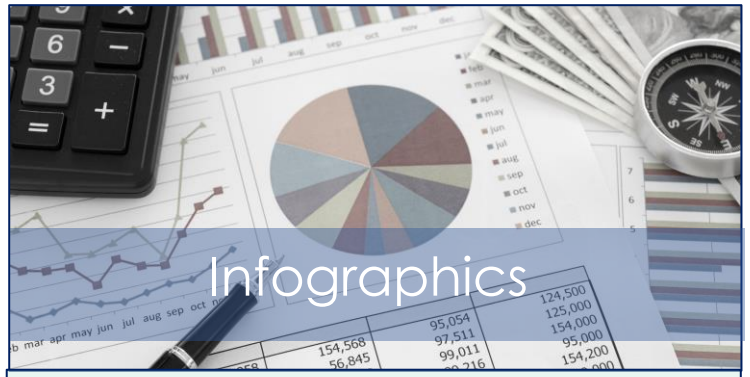
August 2022

Development of the E-Learning Materials
Production of Materials

- Manual with **technical advice**
- Max. **10 minutes**
- **Only Music**, no voice over or subtitles
- **No need for translation**



- Manual for **Piktochart**
- **Short texts accompanied by images** (real photos or animations)
- In native language – **translation necessary**

- Manual for **Audacity**
- Max.10 minutes
- **Dialogue or discussion** between experts
- In native language – **translation necessary**

Evidence-based → Students involved in the development of all materials → Ensure Corporate Identity → Documentation of all steps taken

Development of the E-Learning Materials
Interim Results

	Spain	Slovenia	Austria	Russia	Finland	**Total**
Videos	60	10	10	0	10	**90**
Podcasts	1	3	4	1	3	**12**
Infographics	1	3	3	2	3	**12**

Without translations

CONTENT

Introduction

Development of the E-Learning Materials

3 **Validation of the E-Learning Materials**

Integration of the E-Learning Materials into Nursing Education

Validation of the E-Learning Materials
Process of Validation

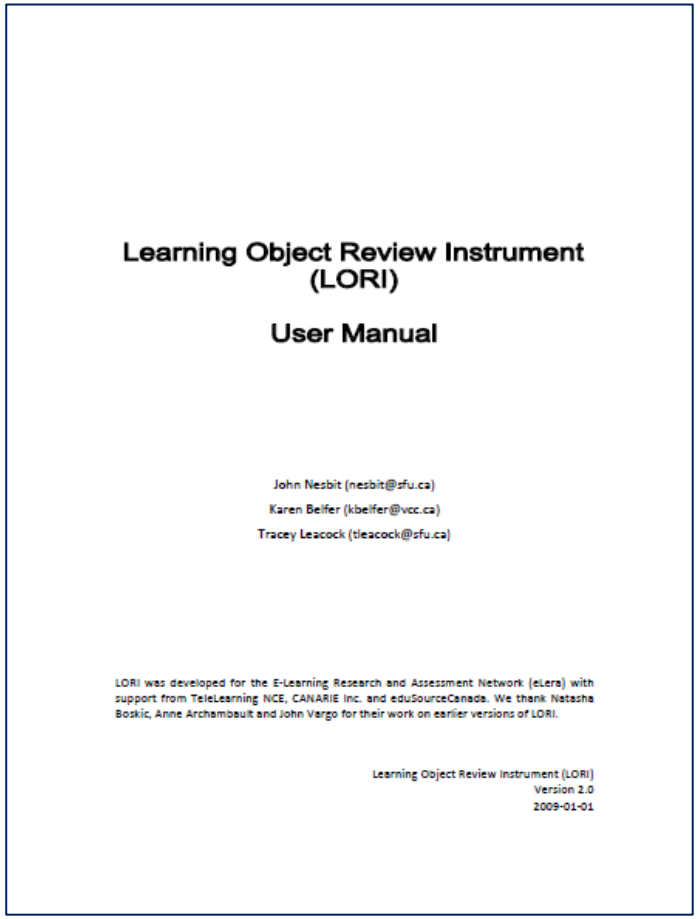
1. **Choice of** the Validation Instrument
2. **Adaption** of the Validation Instrument
3. Data **Collection and Analyses**
4. **Validation Results**
5. **Improve-ment & Translation**
6. **Results** (Final materials)

Choose the Validation Instrument

Literatur Research was performed

Several Instruments were checked for usabilitiy

Learning Object Review Instrument (LORI) was chosen



Learning Object Review Instrument (LORI)

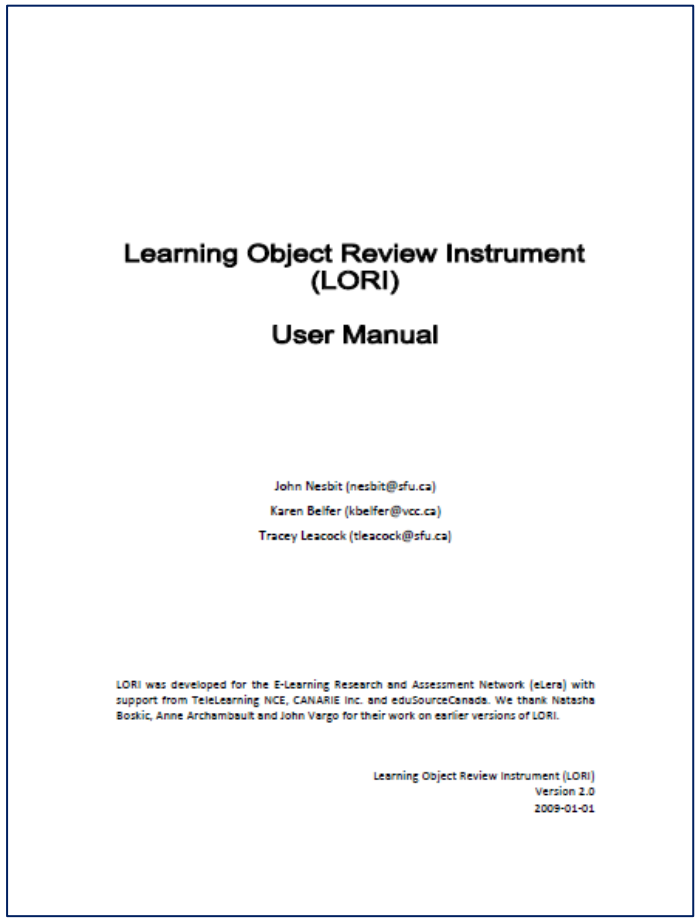
User Manual

John Nesbit (nesbit@sfu.ca)
Karen Belfer (kbelfer@vcc.ca)
Tracey Leacock (tleacock@sfu.ca)

LORI was developed for the E-Learning Research and Assessment Network (eLera) with support from TeleLearning NCE, CANARIE Inc. and eduSourceCanada. We thank Natasha Boskic, Anne Archambault and John Vargo for their work on earlier versions of LORI.

Learning Object Review Instrument (LORI)
Version 2.0
2009-01-01

Choose the Validation Instrument



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Learning Object Review Instrument (LORI)
Version 2.0
2009-01-01

Learning Object Review Instrument

Helps users to **assess the quality and suitability** of a learning object

Results for each item show **the averaged ratings accompanied by reviewers' comments**

LORI Reviewers can **rate and comment with respect to eight items** ★★☆

Validation of the E-Learning Materials

Choose the Validation Instrument

Learning Object Review Instrument
LORI 2.0

Scoring Sheet

Learning Object _____ Reviewer _____

General Remarks							

Low → High

1. Content Quality: Accuracy, balanced presentation of ideas, appropriate level of detail, and reusability in varied contexts	1	2	3	4	5		NA
2. Learning Goal Alignment: Alignment among learning goals, activities, assessments, and learner characteristics	1	2	3	4	5		NA
3. Feedback and Adaptation: Adaptive content or feedback driven by differential learner input or learner modeling	1	2	3	4	5		NA
4. Motivation: Ability to motivate and interest an identified population of learners	1	2	3	4	5		NA
5. Presentation Design: Design of visual and auditory information for enhanced learning and efficient mental processing	1	2	3	4	5		NA
6. Interaction Usability: Ease of navigation, predictability of the user interface, and quality of the interface help features	1	2	3	4	5		NA
7. Accessibility: Design of controls and presentation formats to accommodate disabled and mobile learners	1	2	3	4	5		NA
8. Standards Compliance: Adherence to international standards and operability on commonly used technical platforms	1	2	3	4	5		NA

Learning
Object
Review
Instrument

Low 1 2 3 4 5 High N/A Comments:

1. Content Quality
Veracity, accuracy, balanced presentation of ideas, and appropriate level of detail
>> more >>

2. Learning Goal Alignment
Alignment among learning goals, activities, assessments, and learner characteristics
>> more >>

3. Feedback and Adaption
Adaptive content or feedback driven by differential learner input or learner modeling
>> more >>

4. Motivation
Ability to motivate and interest an identified population of learners
>> more >>

5. Presentation Design
Design of visual and auditory information for enhanced learning and efficient mental processing
>> more >>

Figure 1. LORI as seen by a reviewer (shows only the first five items).

Adapt the LORI Questionnaire

Selection of LORI criteria for Validation

1. Content Quality
2. Learning Goal Alignment
3. Motivation
4. Design

Adapt the LORI Questionnaire

1. Content Quality	Error-free, detailed enough for audience
2. Learning Goal Alignment	Learning goal becomes clear from the content, appropriate for learners
3. Motivation	Motivates and Interests Learners
4. Design	Design is appealing, facilitates learning

Validation of the E-Learning Materials

Data Collection & Analyses

Recommendations for the Evaluators

Recommendation 1
At least 3 independent evaluators

Recommendation 2
Qualification: Clinical Expert

Recommendation 3
At least 5 years of experience in Nursing

Descriptive Analyses of average rating per item

Summary of comments per item

Validation Results

Title	Type of learning material	Average of expert scores				Total average	Comments
		1. Content Quality	2. Learning Goal Alignment	4. Motivation	5. Presentation Design		
Hygienic handwashing	Video	5,00	5,00	4,00	5,00	4,75	Timer with indication on how long each step would be helpful, also additional information on type of soap, and degrees of water. The title serves as the learning goal and aligns with the content.
Bedsores/ Pressure ulcers prevention	Infographic	4,75	5,00	4,00	4,25	4,50	Suitable as a training material, the information provided complies with the State standard; too much text, too much information to read
Intimate care Female	Podcast	4,80	4,60	4,20	4,00	4,40	In general, this nursing action is difficult to follow as a podcast if you have never performed this activity before. Overall, however, the podcast is easy to follow as an experienced caregiver

Validation of the E-Learning Materials

Improve and translate the materials

Improvements based on validation

Translation into English (Podcast Manuscripts and Infographic)

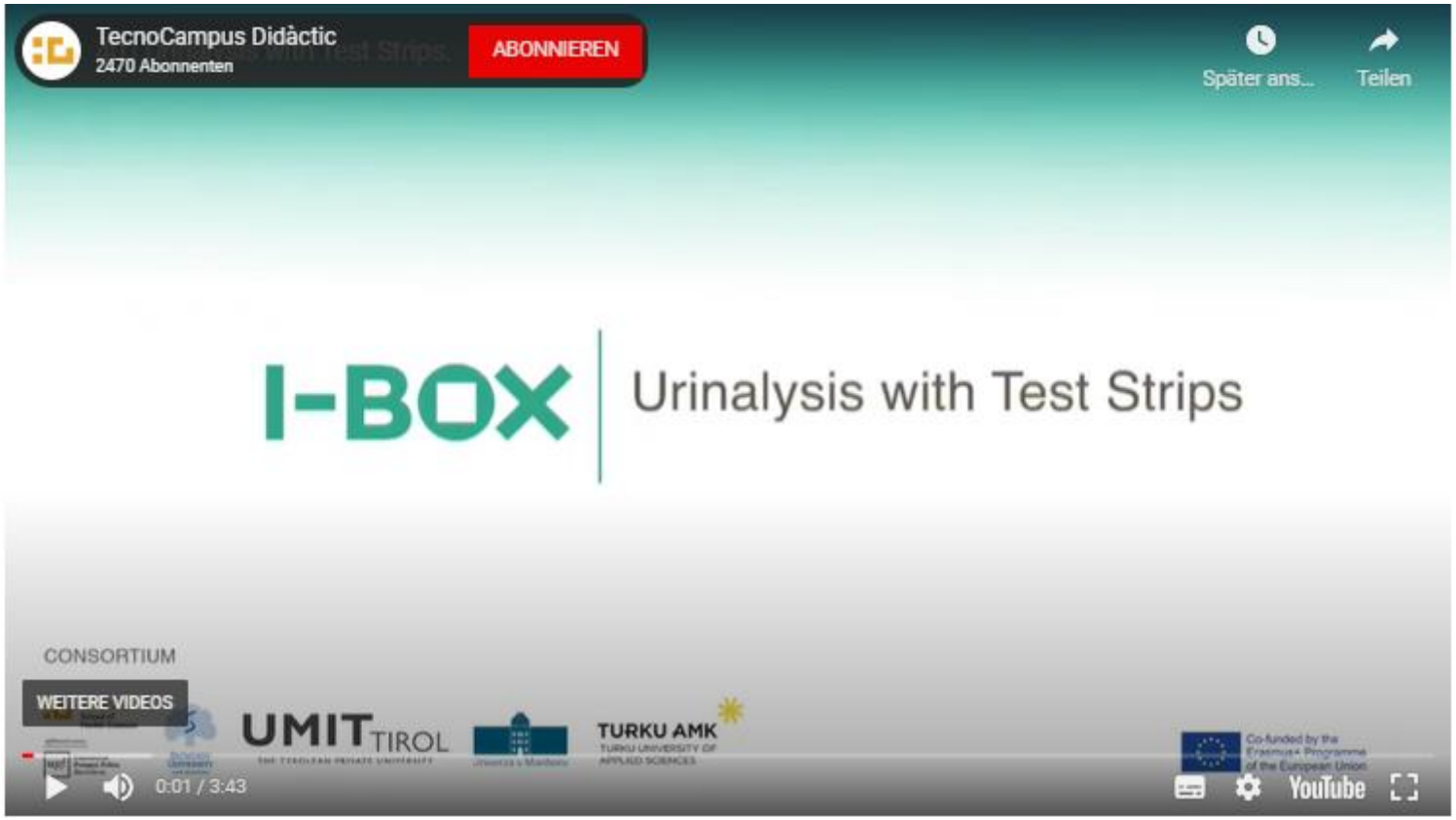
Retranslation and Production into native language

90 Videos

60 Podcasts

60 Infographics

Results – Final E-Learning Materials



CONTENT

Introduction

Development of the E-Learning Materials

Validation of the E-Learning Materials

4 **Integration of the E-Learning Materials into Nursing Education**

Evaluation
Integrating E-Learning Materials into Nursing Education

Background

- New technologies - **changes in traditional teaching**
- Best Practice of how e-learning materials can be **integrated into nursing education**

Focus

- **Previous experiences** with e-Learning
- **Experiences with I-BOX materials** - Successful integration of international developed materials into nursing education

Method

- **Online focus group interviews** via Zoom

  Students from the **simulation training**
- **Qualitative data analysis**

Integrating E-Learning Materials into Nursing Education
Methods

3 Focus group interviews

7 Students

26 Pages of transcript

1

Previous experiences with e-Learning

2

Experiences with I-BOX e-Learning materials

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August 2022

Integrating E-Learning Materials into Nursing Education

Previous Experiences with E-Learning

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**

Integrating E-Learning Materials into Nursing Education

Experiences with the I-BOX Materials

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

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TURKU AMK Turku University of Applied Sciences

Conclusions

Stronger integration of e-learning in nursing education necessary

Blended-Learning environment best variant

Learning styles of students are essential

International differences foster **collaboration** and encourage **critical thinking**

SUMMARY

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Development of the E-Learning Materials

Validation of the E-Learning Materials

Evaluation of the Integration of E-Learning Materials into Nursing Education

I-BOX

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Sechenov University Life Sciences
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Turku AMK Turku University of Applied Sciences

Thank you very much for your attention!

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