



## МЕЖДУНАРОДНЫЙ ОПЫТ ИНТЕГРАЦИИ ОБРАЗОВАНИЯ / INTERNATIONAL EXPERIENCE IN THE INTEGRATION OF EDUCATION

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Original article

### Integration of the ASSURE Model for Bachelor of Nursing Training: An International Project

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**Introduction.** The active integration of digital technologies into the modern educational process is an urgent task for the global education ecosystem. In this paper, within the framework of the joint international educational project “Digital Toolbox for Innovation in Nursing Education (I-BOX)”, conducted under the Erasmus+ Programme of the European Union, we present a new instructional design of the educational process using digital technologies on an electronic platform, based on the ASSURE model. The aim of the study is to design digital educational process using the ASSURE model with a view of its integration into electronic platforms.

**Materials and Methods.** The development of the ASSURE model for instructional design was based on three stages. The first stage involved the analysis of available instructional models in order to determine the feasibility of application for the project. The second stage included the adaptation of the ASSURE model for instructional design as consistent with the project objectives. The third stage covered the definition and integration of modern digital technologies in the process of instructional design following the ASSURE model.

**Results.** Based on the results of the study, the participants of the I-BOX Strategic Partnership Consortium developed an ASSURE model that can be applied for the instructional design in educational process when the use of digital technologies (video, audio, podcasts) and the placement of learning materials on an electronic platform are required. Project participants developed a guide “ASSURE MODEL: Conceptual Structure of the Project and Assessment” based on the results of the study with a step-by-step description of the ASSURE model for the e-learning process. The developed educational and audiovisual e-learning materials based on the ASSURE model will be available on the electronic platform.

**Discussion and Conclusion.** The materials of the paper will be useful when designing the educational process on an electronic platform or in an online format. The presented ASSURE model will increase the possibilities and effectiveness of teaching students from different countries using digital technologies on electronic platforms.

*Keywords:* instructional design, ASSURE model, e-learning, simulation, digital technology, education ecosystem, educational process, electronic platform

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Оригинальная статья

## Интеграция модели ASSURE в процесс обучения бакалавров сестринского дела: международный проект

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**Введение.** Активная интеграция цифровых технологий в современный образовательный процесс является актуальной задачей для мировой образовательной экосистемы. В статье в рамках совместного международного образовательного проекта «Цифровой инновационный инструментарий в области сестринского образования (I-Box)» представлена новая разработка педагогического проектирования образовательного процесса с применением цифровых технологий на электронной платформе, основанная на модели ASSURE. Цель исследования – спроектировать образовательный процесс на модели ASSURE с применением цифровых технологий для интеграции на электронные платформы с целью обучения бакалавров сестринского дела.

**Материалы и методы.** Разработка модели ASSURE для педагогического проектирования основывалась на следующих этапах: проведение анализа имеющихся педагогических моделей определения возможности применения в проекте, адаптация данной модели в соответствии с целями проекта, интеграция современных цифровых технологий в проектирование по модели ASSURE образовательного процесса на электронной платформе для обучения бакалавров сестринского дела.

**Результаты исследования.** По итогам проведенного исследования участниками Консорциума стратегического партнерства I-BOX разработана модель ASSURE, которая может быть использована для педагогического проектирования образовательного процесса. При его реализации требуется применение цифровых технологий (видео, аудио, подкасты), интегрированных на электронную платформу для обучения бакалавров сестринского дела. На основе результатов исследования участниками проекта подготовлено краткое руководство «ASSURE MODEL: Conceptual Structure of the project and assessment», содержащее поэтапное описание модели ASSURE, применяющей цифровые технологии в образовательном процессе с использованием электронной платформы для практического обучения бакалавров сестринского дела. Цифровой учебный материал, разработанный в проекте «I-BOX» на основе дизайна модели ASSURE впервые будет доступен на международной платформе электронного обучения для бакалавров сестринского дела разных стран мира.

**Обсуждение и заключение.** Материалы статьи могут быть полезны при проектировании образовательного процесса для реализации на электронной платформе или в онлайн-формате при обучении бакалавров сестринского дела. Представленная модель ASSURE позволит расширить возможности и эффективность обучения студентов разных стран с применением цифровых технологий на электронных платформах.

*Ключевые слова:* педагогическое проектирование, модель ASSURE, электронное обучение, моделирование, цифровые технологии, образовательная экосистема, образовательный процесс, электронная платформа



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### Introduction

Rapid development of digital technologies, systems and resources, designed, among other things, to be used in education, initiates rethinking of the learning process itself and encourages the development of new education concepts and paradigms [1]. However, traditional educational systems are not prepared for practical answers, challenges of complexity, uncertainty, diversity and unpredictability of the world order [2]. An example is the global problem of the 2020 pandemic – COVID 19, which has defined a special role for medical personnel and, in particular, for nurses. In this new challenging context, the requirements for the format of the educational process have changed, the whole world was forced to switch from offline education to e-learning. In this regard, online teaching requires application of a new instructional model, improvement of pedagogical technologies and use of digital technologies in education as a way of organising a modern educational environment, including when teaching nurses<sup>1</sup>. Nurses often need to provide emergency care. The ability to quickly and accurately draw up and implement an action plan is influenced by algorithms of both motor and mental actions, therefore, over time, the implementation of the algorithms should become automatic. The will, freed from the obligation to control every action, concentrates on the main direction of activity<sup>2</sup>. The effectiveness of training special practical algorithms can be achieved by introducing digital technologies into the educational process. Notably,

digital technologies in the educational process significantly change the approaches to teaching and independent work of students. The integration of such technologies into the educational process can contribute to a higher level of knowledge and greater interest of students in the learning process<sup>3</sup> [3]. A promising application of digital technologies in education is the creation of unified e-platforms for teaching students from different countries, which will expand the possibilities for absorbing knowledge, practicing and consolidating skills, which is especially important for bachelors of nursing. The transcultural educational environment created on the e-platform presupposes openness and mutual involvement of participants in the educational process [4]. This is a feature of e-learning platforms, where digital technologies can be used to teach students from different countries, and should be taken into account in the process of instructional design. In turn, e-learning involves the use of digital educational materials, which also imposes special requirements on the educational process. There are also some peculiarities in the preparation of educational materials using digital technologies for students in different areas of training, in different courses. In this regard, the emergence of modern opportunities for the use of digital technologies in order to exchange knowledge, educational materials and methods of mastering practical skills in the field of medicine, as well as the expansion of e-learning in the world imply the need for a general model and a design of training that would facilitate adaptation

<sup>1</sup> Digital Toolbox for Innovation in Nursing Education (I-BOX) Erasmus+ (No. 2019-1-ES01-KA203-065836). ASSURE MODEL: Conceptual Structure of the project and assessment. 2020. (In Eng.)

<sup>2</sup> Mukhina S.A., Tarnovskaya I.I. [Theoretical Foundations of Nursing: Textbook]. Moscow: GEOTAR-Media; 2009. 368 p. (In Russ.)

<sup>3</sup> Martins J., Baptista R., Coutinho V.F. Simulation in Nursing and Midwifery Education. World Health Organisation; 2018. (In Eng.)

of the necessary information and integrate it into the educational process on a unified e-platform, in a generally accessible form for students from different countries and different courses, including bachelors of nursing.

The subject discussed in the present paper is the joint educational project “Digital Toolbox for Innovation in Nursing Education (I-BOX)” within the Erasmus+ programme. The project coordinator is Fundació Tecno-campus, Universitat Pompeu Fabra (Spain), the project partners are Sechenov University (Russia), University of Maribor (Slovenia), UMIT University (Austria), Turku University of Applied Sciences (Finland). The paper represents the materials of the project on behalf of I-BOX Strategic Partnership Consortium. The study was aimed at developing an ASSURE model for designing the educational process of training for bachelors of nursing on an e-platform using e-learning educational materials.

### Literature Review

The impact of digitalisation on the priority areas of development of higher education signals the importance of adapting education to the requirements of digitalisation [5; 6]. Digitalisation implies the use of new models and pedagogical technologies for the formation of competencies when teaching students on an e-learning platform. The challenge in the formation of competence on a unified e-platform for students from different universities of the world is mastering the necessary international and contextual knowledge to overcome the influence of stereotypes and adapt to changing conditions in contact with representatives of different cultures [7]. Teachers need to understand how to adjust the educational process to the new conditions of e-learning. There is a significant need of standardising the methods used in simulation in terms of design and implementation [6].

In the last decade, the upward trend in the use of active educational methodologies that place the students at the centre of their learning has allowed the integration of simulation methodology in the training curriculum of the Nursing Degree. A simulation-based experi-

ence is characterised by an experimental, interactive, collaborative and learning-centred environment [8]. Simulation is widely used in clinical training of students and health-care professionals. It is a valuable strategy for teaching, learning and evaluating clinical skills at different levels of nursing and midwifery training. The increasing complexity of patient care, as well as digitalisation of care processes, require that nursing training programs incorporate instructional models that respond to the existing needs and new challenges of the 21<sup>st</sup> century<sup>4</sup>. To ensure their effectiveness, certain quality criteria must be considered, both in the design phase and in the development of the simulation [8]. It should be noted that the simulation experience can be affected by different attributes of the participant, such as age, gender, self-confidence, as well as preparation for the simulation. Teachers are challenged to implement strategies that promote critical thinking and self-directed, transformative learning for future nursing professionals [9].

The development of digital technologies creates a new approach to working with information, and society makes new demands on the ways of acquiring and transferring knowledge and the role that education plays in these processes [10; 11]. When technology is used with the aim of improving students’ knowledge of technical skills, it allows us to illustrate nursing procedures and techniques in a more realistic way, which facilitates their acceptability and effectiveness in their learning [12]. Under these conditions, there is a need to integrate digital technologies into the traditional instructional model for designing the e-learning process.

Traditional instructional design has a long history. Behaviourism, cognitivism and constructivism are the three major learning theories or psychological paradigms that underpin instructional design. The use of instructional design dates back to World War II when it was established as part of military training incorporating training videos for the U.S. Air Force and Army [13]. The development of this direction in the educational process using digital technologies is important for the

<sup>4</sup>Digital Toolbox for Innovation in Nursing Education (I-BOX) Erasmus+ (No. 2019-1-ES01-KA203-065836).



applied e-learning model. Bloom's taxonomy facilitates setting of learning objectives and differentiates between levels of cognitive skills, need for deeper learning at higher levels, leading to a greater transfer of skills and knowledge in different contexts [14].

Several studies show the use of instructional models as a conceptual framework for the development of simulation scenarios in the acquisition of practical skills in medicine, competencies in patient safety and communication<sup>5</sup>. The systematic use of instructional design is useful as a framework to guide the development of student-centred educational innovation<sup>6</sup>. The implementation of instructional design has also been tested in the creation of online guides so that nursing students have the opportunity to develop autonomous learning in the preparation of a clinical procedure<sup>7</sup> [15]. Instructional design models provide guidelines to help organise the design and development of educational activities. There is currently little research on exploring the effectiveness and efficiency of different instructional design methodologies appropriate for simulation [16]. The authors of the paper conducted a study of various models of instructional design and determined the most effective model for the implementation of the e-learning process using digital technologies.

#### Materials and Methods

The ASSURE model was taken as the basis for designing the materials for Digital Toolbox for Innovation in Nursing Education (I-BOX) for their integration into a unified e-platform.

The study was aimed at developing an ASSURE model for designing the educational process of practical training for bachelors of nursing on an e-platform using digital technologies. The research object is the instructional design of the educational process on the ASSURE model. The subject of research is the integration of the ASSURE model into the digital toolbox for innovation of the educational process.

In the first stage of the study several instructional design models such as Dick and Carey, ASSURE, and Rapid Prototyping Model were considered. Many of these have been identified as variations of the traditional ADDIE (Analysis, Design, Development, Implementation and Evaluation) model. It was revealed that the ADDIE and ASSURE models share great similarities in their stages of application. But the ASSURE model, with a total of six phases, incorporates one more phase with respect to ADDIE. The ASSURE model is one of the most widely used models in instructional design, based on the approach of Robert Gagné [17]: it has its theoretical roots in behaviourism, since it is oriented towards the achievement of learning objectives, at the same time we find typical characteristics of constructivism, giving importance to the active and committed participation of the student. The ASSURE model integrates student participation, making them more active in their learning process [18]. In the study, this was recognised as an important component of the educational process implemented through e-platforms. In the second stage of the study, it was determined that ASSURE is a model based on Information and Communication Technologies (ICT) that teachers can use to design, develop and improve learning environments adapted to the characteristics of their students [19]. The fourth phase in the ASSURE model is key for the application of digital technologies in the educational process, since it allows for the development and application of audio podcasts, video and infographics in teaching, which justified the choice of a model for instructional design for an e-platform. Thus, the ASSURE model was chosen for the development of the instructional design in the I-BOX project.

The name of the ASSURE model is the acronyms of the six phases in the instructional model. ASSURE has six phases. The first is to analyse learners' characteristics. The second is to formulate training standards and objectives to be achieved (state

<sup>5</sup> Ibid.

<sup>6</sup> Heinich R., Molenda M., Smaldino S.E., Russell J.D. *Instructional Media and Technology for Learning*. New Jersey Columbus: Ohio; 2002. (In Eng.)

<sup>7</sup> Ibid.

standards and goals). The third is to select methods, media and materials. The fourth is to use media and materials. The fifth is to involve students in the learning process (requires student participation). The last phase is to evaluate and revise (Table 1). All these components are aimed at focusing on teaching students to interact with the environment, rather than passively receiving information<sup>8</sup>.

The novelty of the instructional design lies in the fact that for the first time the implementation of the ASSURE model for e-learning of nursing bachelors focuses on

the implementation of nursing procedures, on a unified e-platform using digital technologies, taking into account the exchange of experience and knowledge between nursing teachers from different countries, participating in the I-BOX project. The short guide “Digital toolbox for innovation in nursing education (I-BOX) Erasmus+ (№ 2019-1-ES01-KA203-065836)” developed by the project participants can be used for instructional design of the educational process on an e-platform, using digital technologies in different fields of education.

Table 1. Step-by-step description of the ASSURE model<sup>9</sup>

Phases	Name	Description
1	2	3
1.	Analysis of students	A teacher needs to know the skills and abilities of the students they work with, in order to determine where they need to go. Any form of pre-assessment or communication with the students can provide information for analysing the students. If instructional media and technology are to be used effectively, there must be a match between the characteristics of the learners and the content of methods, media and materials. Several factors are critical for making good methods and media decisions: <i>General characteristics:</i> include broad identifying characteristics such as age, grade level, course or field of study, cultural or socioeconomic factors. <i>Specific Entry Competencies:</i> refer to knowledge and skills that learners either possess or lack: existing skills, target skills for a learning set-up. <i>Learning Style:</i> Refers to the spectrum of psychological traits that affect how we perceive and respond to different stimuli, such as anxiety, aptitude, visual or auditory preference, motivation, etc.
2.	State objectives	The standards and objectives need to be applied to see at what point the student is. In education, there is a balancing act between the needs of the students and requirements. This step creates awareness of this balancing act. What are the learning outcomes each learner is expected to achieve? What new capability should learners possess at the completion of course? The objectives need to be stated as specific as possible. The objectives may be derived from a course syllabus, stated in a textbook, taken from a curriculum guide, or developed by the instructor
3.	Selection of materials	With the ideas of the content settled, it is now time to determine the activities that will be used to facilitate learning. How this is done depends on the students’ needs and the requirements as well as the preferences of the teacher. What do instructors need to use for online/face-to-face teaching? <i>Choosing a Method:</i> any topic/section will probably incorporate two or more methods to serve different purposes at different points of the topic/section. <i>Choose media format:</i> flip charts (still images and text), slides (projected still images), audio (voice and music), video (moving images on a TV screen), computer multimedia (graphics, text...) <i>Obtain specific materials:</i> selecting available materials, modifying existing materials, designing new materials
4.	Use of media content and materials	Incorporating the use of technology is one of the distinct traits of the ASSURE model. How this is done is again up to the teacher’s preferences. You should plan how these materials will be used in the educational process: – Preview the Materials; – Prepare the Materials; – Prepare the Environment; – Prepare the Learner; – Provide the Learning Experience

<sup>8</sup> Ibid.

<sup>9</sup> Smaldino Sh.E., Russell J.D., Heinich R., Molenda M. Instructional Technology and Media for Learning, 8<sup>th</sup> Ed. Pearson, 2006.



1	2	3
5.	Requirement for student participation	Students are expected to be active learners. This implies that instructors should motivate and engage students in class activities. Active participation can be achieved through technologies or other teaching aids. In case of application of the most effective learning technologies students practice skills aimed at achieving educational goals. Students should receive feedback regarding their answers. Feedback can come from the instructor, or students can work in small groups and interchange feedback thoughts. Feedback can be gained through self-control, come from an instructor or be presented on a computer screen
6.	Evaluation and revision	The effectiveness of training and the quality of materials are evaluated after the training course. So, the instructor can see if the students have demonstrated mastery of the skills. The results depend on how the lesson and course material were designed. <i>Evaluation of students' proficiency:</i> assessment procedures should be consistent with the objectives. <i>Evaluation of teaching methods and media content:</i> discussion (online), face-to-face interviews and student observation are used for evaluation teaching methods and media. <i>Evaluation of instructor:</i> self-evaluation, student feedback, peer/colleague evaluation, instructor evaluation. <i>Revision:</i> Explore the assessment results, if your assessment results indicate deficiencies in any of these areas, go back to the wrong part of the plan and revise it

The ASSURE model has been applied to design educational materials using digital technologies for training nursing bachelors in the I-BOX project, as well as for the placement and application of the developed materials (videos, podcasts, graphics) on an international e-learning platform.

### Results

The participants of the I-BOX project conducted a joint research on the basis of the developed ASSURE model with using digital technologies in the educational process on an electronic platform, studied and identified the needs for educational materials for nursing bachelors, developed educational materials for integration into an e-platform for training nursing bachelors from different countries (Table 2).

Units of digital educational materials, developed for nursing students of bachelor's degree from different countries (Table 3). At

the first stage of the research, the developed materials will be tested by the students from the countries participating in the project.

The digital educational material developed in the I-BOX project for integration into the ASSURE model will be available on the international e-learning platform and will facilitate interaction between students and teachers in training of nursing bachelors.

*The phases of implementation of the ASSURE model in the I-BOX*

*Analysis of learners.* To apply the first phase of the ASSURE model, it is recommended to evaluate the general characteristics of students, as well as the academic aspects relevant to the educational activity of the instructor: the university study plan and the subject in which it will be implemented. The following characteristics should be evaluated: specific entry competencies (knowledge and skills) already acquired by students and learning style preferences.

Table 2. Digital educational materials (with using digital technologies) for integration into the ASSURE model for teaching nursing bachelors, developed by I-BOX project participants from various countries

Materials	Spain	Slovenia	Austria	Russia	Finland	Total
Video	60	10	10	0	10	90
Podcasts	1	3	4	1	3	60*
Graphics	1	3	3	2	3	60*

Note. \* Each material is translated into the participants' native languages.

**Table 3. Educational and audiovisual digital educational materials designed for nursing bachelors training on the e-learning platform of the I-BOX project**

Unit title (in English)	Unit title (in Russian)
Unit 1. Standard and Universal Measures	Блок 1. Стандартные и универсальные меры / процедуры
Unit 2. Placing and Removing Personal Protective Equipment	Блок 2. Применение (надевание и снятие) средств индивидуальной защиты
Unit 3. Care of the Bedridden Patient	Блок 3. Уход за прикованным к постели (маломобильным) пациентом
Unit 4. First Aid	Блок 4. Первая помощь
Unit 5. Physical Exam	Блок 5. Физикальное обследование
Unit 6. Medication Preparation and Administration & Oxygen Therapy	Блок 6. Подготовка и введение лекарственных препаратов и кислородная терапия
Unit 7. Puncture and Catheterisation	Блок 7. Пункция и катетеризация
Unit 8. Special Situation	Блок 8. Особая ситуация
Unit 9. Special Administration	Блок 9. Особые ситуации парентеральной терапии (цитостатики, трансфузионная терапия, парентеральное питание...)
Unit 10. Complex Airway	Блок 10. Ингаляционная терапия: общие вопросы
Unit 11. Maternal and Child Nursing Care	Блок 11. Материнство и детство: сестринский уход
Unit 12. Cardiac Monitoring	Блок 12. Кардиомониторинг
Unit 13. Wound Care and Treatment	Блок 13. Уход и лечение ран
Unit 14. Surgical Area	Блок 14. Операционное дело
An additional unit is offered (Nursing: Philosophy, History, Theoretical Foundations)	Дополнительный блок (Сестринское дело: философия, история, теоретические основы)

There are multiple tools to assess learning styles [20]. The I-BOX project offers two of the most widely applied tools:

1) The Kolb Learning Style Inventory: a 12-item inventory and one of the most widely applied learning style models, developed by David A. Kolb and revised in 2005; it was designed to help people identify how they learn from experience. The model defines four preferred learning styles: divergent, assimilative, convergent and accommodative<sup>10</sup>.

2) VARK: The VARK learning style model (Visual, Auditory, Read and Write, Kinesthetic) was extended from the VAK model by Neil Fleming in 2006 [21]. The model includes a 16-items instrument that assesses the learning style as a “characteristics” of an individual, determining his or her sensory preferences when it comes to learning.

It is recommended to evaluate all those aspects that are considered by the instructor as relevant for designing the instructional activity. Other characteristics can be included in this phase: determining the level of student motivation, exploring of learning habits, or assessing the perception of the educational environment.

*State objectives.* This phase is devoted to defining objectives in terms of observable and measurable acts of behaviour that each student is expected to acquire and master at the end of each learning experience. In general, the objective is to determine the knowledge (know-how), attitudes and values (know-how) as well as performance (know-how) which will be at the end of the training [22].

Bloom’s taxonomy is used as a tool to define learning objectives under the I-BOX project (Fig. 1)

<sup>10</sup> Kolb A.Y., Based E., Systems L., Kolb D.A. The Kolb Learning Style Inventory. Technical Specifications. Version 3.1. 2005. Available at: <https://clck.ru/WTyCL> (accessed 08.03.2021). (In Eng.); Kolb D.A. Experiential Learning: Experience as the Source of Learning and Development. FT Press, Ed.; Second Ed. 2014. Available at: <https://clck.ru/WTyZ9> (accessed 08.03.2021). (In Eng.)



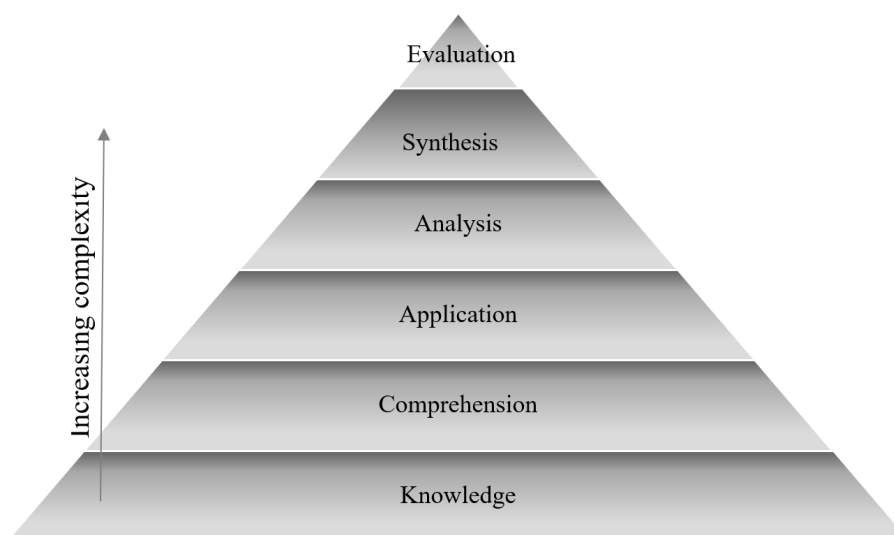


Fig. 1. Bloom's Taxonomy [22]

A standardised method for setting learning goals (Bloom's taxonomy) was applied in the development of digital educational materials for an e-learning platform according to the ASSURE model [22]. Due to this method it is possible to implement a differentiated approach to the development of educational materials based on digital technologies, since it contains six categories of cognitive skills, ranging from lower order skills with less cognitive processing (knowledge, understanding) to higher order skills (application, analysis, synthesis, evaluation) that require deeper learning and a greater degree of cognitive processing [23]. Materials and methods developed under Bloom's modified taxonomy provide clear and concise presentation of the structure of the discipline under consideration [22]. Bloom's taxonomy makes it possible to determine and classify learning outcomes, which is important for the development of educational materials with application of digital technologies, as well as to establish and test the relationship between learning outcomes, knowledge assessment methods and teaching methods, which is important in the development and application of educational materials on e-platforms.

*Selecting media and materials.* The discipline material transmitted through the main

teaching aids on an e-platform must contain actual standards of competence in the use of digital technologies.

In this respect, this project includes three types of learning objects (LO): video, infographics and podcasts. The characteristics of the materials included in the I-BOX are presented below (Table 4).

*Use of media and materials.* All materials were developed by partners in the framework of the I-BOX project, covered 60 topics and included 90 videos, 60 podcasts, infographics.

The application of short user guide is recommended.

*Require learner participation.* Digital educational materials will be tested for the first time during a practical simulation course for nursing bachelor's students from educational organisations of the project participants.

Recommended for use on the e-learning I-BOX platform.

*Evaluation and revision.* The Learning Object Review Instrument (LORI) was used in the I-BOX project. The term Learning Objects (LO) refers to any digital resource that can be reused to support learning<sup>11</sup>. The Learning Object Review Instrument

<sup>11</sup> Digital Toolbox for Innovation in Nursing Education (I-BOX) Erasmus+ (No. 2019-1-ES01-KA203-065836); Dávila-Judith A.A., Pérez F., Dávila A.A., Pérez J.F. Instructional Design of Online Education Using the Assure Model. Instructional Design of on Line Courses Using the Assure Model. 2001. (In Eng.)

**Table 4. Characteristics of the developed digital educational materials (learning objects (LOs)) included in the I-BOX**

Types	Characteristics	Technical aspects
Video	Based on nursing procedures and techniques	Pending development of this section as stated in Workpackage 3: Educational materials*
Graphics	Illustrative material: diagram, pictures, photos with a text description	
Podcasts	Patients, actors and healthcare professionals are involved to seek the highest level of fidelity*	

*Source.* Developed by the authors of the paper, participants of the I-Box project “Digital toolbox for innovation in nursing education (I-BOX) Erasmus+ (No. 2019-1-ES01-KA203-065836)”.

*Note.* \* Fidelity: The level of realism associated with a particular simulation activity<sup>12</sup>.

\*\* The following points for the application of the ASSURE model will be determined in the most advanced steps of the project<sup>13</sup>.

(LORI), developed by Nesbit, Belfer and Leacock, is a scoring tool for evaluating learning resources [24]. LOs in I-BOX are based on 9 basic principles of quality, assessed with the Learning Object Review Instrument (LORI): content quality; learning goals alignment; feedback and adaptation; motivation; presentation design; interaction usability; accessibility; reusability; standards compliance<sup>14</sup>.

The implementation of the LORI tool is recommended to assess the suitability of learning objects, the impact of the educational intervention on your students’ academic performance and the level of students’ satisfaction.

As a result of the implementation of the I-BOX project, the participants developed a short user guide for the realisation of the principles of designing curricula using the ASSURE model (Table 5).

**Table 5. Tools for integrating the ASSURE model into the education of nursing bachelors**

<b>A</b>	<b>Analyse learners</b>	Assess the general characteristics of students. Assess the prior knowledge and prerequisite skills of undergraduate nursing students on a digital platform. Analyse the subject curriculum. Analyse the learning style
<b>S</b>	<b>State objectives</b>	Establish a hierarchy of learning objectives with a help of Bloom’s taxonomy. Determine if you want to set lower order or higher order objectives
<b>S</b>	<b>Select media and materials</b>	Select the material required for the preliminary preparation of the student. Select the method (online, blended learning or face-to-face training) within which you will carry out the educational activity
<b>U</b>	<b>Utilise media and materials</b>	Make sure that the <i>Learning Objects</i> (LO): videos, infographics and podcasts are appropriate for use. Provide teachers and students with user guides and recommendations
<b>R</b>	<b>Require learner participation</b>	Use the e-learning platform of the I-BOX project to motivate students for learning
<b>E</b>	<b>Evaluate and revise</b>	Assess the suitability of learning objects based on LORI. Evaluate the impact of the educational intervention on the academic performance of your students. Evaluate the student satisfaction with the educational process

*Source.* Developed by the authors of the paper, participants of the I-Box project “Digital toolbox for innovation in nursing education (I-BOX) Erasmus+ (N° 2019-1-ES01-KA203-065836)”.

<sup>12</sup> Lopreiato J.O. Healthcare Simulation Dictionary. Rockville, MD: Agency for Healthcare Research and Quality. AHRQ Publication; 2016. No. 16(17):0043. Available at: <https://www.ahrq.gov/sites/default/files/publications/files/sim-dictionary.pdf> (accessed 01.10.2020). (In Eng.)

<sup>13</sup> Nesbit J., Belfer K., Leacock T. Learning Object Review Instrument (LORI). Available at: [https://www.academia.edu/7927907/Learning\\_Object\\_Review\\_Instrument\\_LORI\\_](https://www.academia.edu/7927907/Learning_Object_Review_Instrument_LORI_) (accessed 01.10.2020). (In Eng.)

<sup>14</sup> Ibid.



Thus, the digital educational materials developed by the participants of the I-BOX project on the ASSURE model includes the tools of The Kolb Learning Style Inventory and VARK for assessing learning styles, a standardised method of setting learning goals (Bloom's taxonomy) and LORI scoring tool, which can be applied in the educational process of nursing bachelors, implemented on an e-platform.

### Discussion and Conclusion

Application of the ASSURE model does not require high qualification of teachers in the field of instructional design theory. The model is friendly to use and provides the environment for promotion of effective e-learning. With this model of a process teachers apply instructional technology which meets the content standards of higher medical education while meeting the needs of training nursing bachelors. Applying the ASSURE model teachers and students can exchange publicly available materials and information (scientific papers, audiovisual materials, infographics, etc.). The educational process can be designed on the basis of the ASSURE model and implemented online with the use of digital technologies, which facilitates training practical skills of nursing bachelors on an e-platform.

The result of the project, ready for implementation, is the ASSURE model for teaching nursing bachelors, with developed digital educational materials and their characteristics (videos, podcasts, infographics), ready for integration into an international e-platform. Digital educational materials have been developed in various areas of training for nursing bachelors and tools for integrating the ASSURE model into their education have been presented. The presented result of the integration of the ASSURE model into the training of nursing bachelors is unprecedented in nursing education.

The joint international instructional experience of using the ASSURE model on a unified e-platform for the design of the educational process will expand the possibilities for integrating the best pedagogical practices into the global education ecosystem within the framework of international communication. Developed by the project participants "Digital toolbox for innovation in nursing education (I-BOX) Erasmus+ (No. 2019-1-ES01-KA203-065836)" short user guide "ASSURE MODEL: Conceptual Structure of the project and assessment" can be used for instructional design in various areas of the education ecosystem.

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S. Laaksonen – development of the part of the project presented in the paper; critical revision of the text.

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