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Guidelines: how to create your own edutainment tool



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Foreword

The following guidelines are the result of the ECCE LUDUS project, an Erasmus+ initiative that aims to provide teachers with the necessary skills and knowledge to adopt innovative teaching methods through edutainment and emerging technologies. The project aims to develop an innovative cross-sectoral methodology integrating edutainment, artificial intelligence, and STEAM education. The aim is to promote effective and innovative pedagogies and assessment methods for secondary school students, while supporting the continuing professional development of teachers and educators.

The ECCE LUDUS project aims to equip teachers and educators with digital skills and tailor-made tools, thereby enhancing their ability to create engaging and interactive learning experiences. The project is funded by the INDIRE National Agency, it lasts 24 months (from the 1st of September 2023, to the 31st August, 2025) and includes a range of activities and resources aimed at transforming the project methodology into concrete actions in the classroom. Another crucial objective is to create a long-term alliance between schools and the edutainment sector, facilitating the exchange of good practices at European level.

To maximise the effectiveness of these guidelines, we recommend that teachers, educators and other stakeholders participate in the free MOOC offered by the project. This online course will provide an in-depth understanding of the ECCE LUDUS methodology and show how to apply it effectively in the creation of customised edutainment tools.

Introduction

In a rapidly changing world, there is a growing awareness of the need to move away from the traditional concept of learning as a controlled and institutionalized activity, where learning is seen as the acquisition of knowledge and the learning process is primarily about transmission. The current conception of “formal” learning does not adequately account for the fact that learning also takes place outside of formal educational settings. Therefore, a change towards a new educational paradigm is important, and it involves the transition from the traditional formality of formal education to non-formal and informal education. This shift towards a more flexible, technology-driven, and learner-centric approach to education represents a potential solution to the limitations of the traditional formal education system.

In this transitional context, the experiential learning theory gains importance and offers a promising pathway to improving the quality of education in all its forms. This theory encompasses various learning practices, ideologies, and policies aimed at learning from experiences through reflection and observation by asserting that individuals learn best from experiences with which they actively engage. Research emphasises the success of experiential learning in workplaces and communities, demonstrating its effectiveness in providing quality education. Customising education and delivery methods according to these learning styles significantly improves learning outcomes, making the schooling experience less formal and more personalised. In particular, Kolb's experiential learning theory emphasises that, while individuals encounter numerous experiences on a daily basis, effective learning comes from experiences in which learners build their knowledge by making discoveries and solving problems independently. This approach emphasises not only the acquisition of knowledge, but also the development of skills necessary to continue learning and to benefit from experiences. In this regard, one of the innovative teaching methodologies that is gaining more and more importance is Edutainment: this is an innovative

approach that combines education and entertainment, using playing as a tool for learning. This method makes learning more fun and engaging, helping students to develop essential skills such as critical thinking, problem solving, cooperation and creativity.

Edutainment can be defined as 'the use of entertainment activities to promote learning'. Edutainment activities transform traditional lessons into immersive experiences in which students are actively involved in the process of acquiring knowledge through direct experience and active interaction. For example, an interactive quiz can be used to promote active student participation, while a digital escape room can foster the development of critical thinking and collaboration. The Edutainment methodology promotes not only the educational but also the personal development of the students, enabling them to think creatively and differently. Edutainment also positively captures the students' attention, engaging multiple senses and thus enhancing their concentration and focus. At the same time, it offers students a safe and flexible space in which they can give free rein to their creativity. One of the most important aspects is the increased understanding of complex theoretical concepts and a more lasting retention of learning. Through a hands-on approach to activities that makes students more confident in their abilities, including those with learning difficulties by incorporating a personalised approach that facilitates expressiveness and awareness of their surroundings.

- To choose an educational theme that is interesting and engaging for the target audience, and that can convey knowledge in an entertaining and stimulating way. The theme should be relevant and able to capture the interest of the students.
- Establish the educational objectives and the practical skills to be achieved. These objectives and hands-on skills should be specific, measurable, realistic, and in line with the needs of the target audience.

- To choose an edutainment tool that can actively engage users through interactive activities, games and challenges that facilitate learning. Interactivity is essential to maintain students' attention and engagement. Moreover, well-designed activities can transform the learning process into a dynamic and engaging experience, encouraging students to actively participate and develop a lasting interest in the material.
- Carefully choose educational content to be accurate, up-to-date and relevant to the chosen topic. Use a variety of media, such as text, images, videos, and animations, to make the content more appealing and engaging.
- To integrate learning evaluation tools (such as quizzes, tests, feedback and data analysis) to monitor users' progress.
- Designing the edutainment tool so that it can be adapted to different learning levels and educational needs with the aim of making the program accessible to a broader audience.
- Collecting feedback from users during the development and implementation of the edutainment tool to make improvements and optimizations according to the needs and preferences of the audience.

These guidelines will be explored in the following paragraphs, providing practical guidance for teachers and educators who wish to use edutainment tools to enrich their teaching lessons.

Edutainment Tools

I. Interactive Quizzes

Material Needed:

- Online quiz platform ([Kahoot!](#))
- Projector and screen (if in classroom)
- Devices (computer for teachers, tablet and/or smartphone for students)

Quizzes are a key tool to test knowledge and foster learner engagement.

Furthermore, creating customised quizzes allows you to monitor their progress and can help you understand which notions have been learnt during training and which are missing. Making quality quizzes does not take much time with a digital tool. It is well-established that people tend to forget a significant portion of what they learn. Studies have shown that on average, people forget around 70% of the information they learn within 24 hours. One effective strategy to enhance information retention and strengthen long-term memory is the use of multiple-choice tests. In addition, the use of quizzes can be useful in improving both the creation and management of training content (on courses already delivered and those to be delivered) and the testing of knowledge and skills in lessons by stimulating comprehension, motivation and improving student engagement. Furthermore, a good multiple-choice questionnaire template generates quality data, which can be useful in identifying gaps in training. One of the best tools for generating quizzes is Kahoot! platform that allows you to play the quizzes simply by entering the quiz reference code in the appropriate section of the site, without requiring any registration.

Create a quiz with Khaoot! step by step.

To create a quiz on Kahoot!, you first need to register on the platform.

Registration is free and enables you to create quizzes, but it does not provide access to all the features available with a subscription. For example, the basic version allows you to use true/false and multiple choice answer modes, while access to additional options requires an upgrade.

Once inside the user area, you can start creating a quiz by clicking on the 'Create' button at the top right. This takes you to the section dedicated to creating quizzes. To insert questions, select the "Add Question" area from the column on the left of the page.

Kahoot! allows you to enter a title, cover image and description to your quiz and the possibility to decide where to save it, whether in the private area or to make it public. For each question, it is possible to choose the time for the answer: the platform provides different timers, from 5 up to 240 seconds.

In addition, images or videos can be inserted to illustrate the question by dragging the file from the computer desktop to the indicated area. The platform also provides an entire library of multimedia files to choose from.

1. Defining the type of quiz. Creating an online quiz is a bit like creating a course, although a quiz may require changes to the development cycle or process. The starting point for a quiz is the same: definition of the general objective and specific learning and/or assessment objectives. Quizzes can be divided into two categories, depending on their purpose:

- **Reinforcement quizzes** are models that serve to consolidate student's knowledge and push them to review the training material and the work done. Usually, online multiple-choice quiz templates are offered to users at regular intervals (at the end of the module or chapter) to practise and collect learning data. Generally, these quizzes do not have any specific requirements: the learner

is given several attempts on the platform and has the necessary tool to choose the correct answer choice in the quizzes.

- **Assessment quizzes**, on the other hand, are used to test students' knowledge. These generally involve time limits, a single attempt to choose an answer choice and no explanation for errors. Often, the scores to pass the course must be higher. In fact, the quiz shows what students have learned and the quality of work they have done by assigning them a score.

2. Choose the question type for quizzes. When creating a quiz with Kahoot! you can use different types of questions with rating or scoring. It should be noted that for each question it is possible to choose the time limit for the answer, the type of score that can be awarded: Standard, Double Points and No Points.

- **True or False** - In this type of customised quiz format, participants have to determine whether a statement in the quiz is true or false. This is the simplest scoring question format.
- **Multiple choice** - In these types of models, participants have to choose only one correct answer option from several alternatives proposed in the quiz.
- **Short answer** - Through this template the student has the opportunity to type in the correct answer. Is it possible to assign more than one correct answer or answer wording to the question.
- **Scrolling** - Answers within a certain margin that are considered correct. The closer the student's answer is to the correct one, the more points are awarded.
- **Answer with pointer** - Correct answers are to be found on the picture by placing the pointer over it.

- **Sequences** - Using this template, the student must select the answers in the correct order.

An online quiz, to be balanced and accurate, should follow the "30/40/30" rule, i.e. 30% should consist of open questions requiring answers with more than one word, 40% should consist of alternative questions, i.e. questions with several answer options from which one or two correct answers can be found and finally, 30% of closed questions that can be answered with "yes/no" or "true/false". Lastly, Khoot! is a tool that also allows you to present information through the creation of slides or to collect students' opinions through different types of questions.

3. Formulation of good questions. The effectiveness of all types of online quiz models depends largely on how the questions are formulated. If people do not understand the questions in a quiz, they will have little choice but to give random answers instead of relying on their own knowledge and skills acquired during lessons. For any teacher, mishandled questions mean losing the chance to accurately assess their students. Moreover, pupils distance themselves from questionnaires and quizzes that do not test the topics and information covered during a course. That is why every teacher must pay close attention to the wording of every single question on a graded evaluation form. Here are some tips for formulating good questions:

- Select **simple and clear questions** to be included in the quiz maker, avoiding complex and long sentences, and favouring the use of simple expressions: each quiz sentence should contain no more than 20 words, regardless of the pattern and type of scoring.
- **Avoid using negatives** in quiz questions and answers: this type of information often leads to confusion for participants. However, if you use this approach and

manner wisely in your quiz models, you can keep the participants on their toes: if you use this type of question in a quiz, it is best to write the negative particle in block letters or boldface so that it does not escape the student.

- **Avoid using** description words in questions such as '**approximately**', '**some**', '**at least**', etc. Asking inaccurate questions in a test increases the likelihood of receiving inaccurate answers. Instead, well-written questions should stimulate well-written answers. Open-ended quiz questions should start with "what," "how much," "when," "how" and "why."
- **Avoid** the use of **unnecessary hints** in test questions, which allow the student to deduce the correct answer from the context. If this happens, it is an indication of mental agility, and it is good, but it does not help to assess the users' knowledge of the subject.

4. Type of answers. Distractors can be used at this stage for each quiz question. A distractor is an incorrect answer in a quiz designed to attract the student's attention and mislead him/her. Here are some tips:

- Quiz answer options should be clear and concise, avoiding the creation of answers with many paragraphs.
- Use the same structure and length for test answers and distractors. Any inconsistencies in grammar or choice of language may provide the student with unwanted clues as to the correct answer on the quiz.
- Make sure the quiz answers are totally correct and the distractors absolutely wrong. Any form of inaccuracy with the subject matter or the language of the answer options can lead to confusion when reading the questions in students and, in the long run, dissatisfaction and frustration.

5. When to take a quiz. Quizzes should be taken at two points in time: after each course and before the learning moment. In the first case, it is a test to assess how

well students are able to transform knowledge into action, in real time. In the second case, the results will give a clear picture of what the pupils already know: it will then be possible to use this data to set the direction of the subject you want to teach.

In conclusion, Kahoot! proves to be an extremely versatile and intuitive tool for creating online quizzes, offering teachers and trainers an effective tool for testing knowledge and actively engaging students. The platform makes it easy to create customised quizzes, choosing from different question types that can also be enriched with multimedia content, such as images and videos, to make the experience even more engaging. One of the key aspects of Kahoot! is the ability to define the time available for answers and the scoring system, allowing the creation of both reinforcement and assessment quizzes, depending on the learning objectives. In addition, the possibility to take quizzes at different times (during and at the end of the course) allows teachers to constantly monitor students' progress and adapt the content according to their needs. The platform proves to be an extremely powerful and intuitive tool for creating online quizzes, which can effectively support teachers in assessing and engaging students, helping to improve the effectiveness of learning processes.

2. Digital Escape Room

Material Needed:

- Online platform ([Genially](#))
- Projector and screen (if in classroom)
- Devices (computer, tablet, smartphone)

Genially is an interactive and multimedia content creation platform that allows users to realise a wide range of digital projects without the need for programming skills. This tool has an intuitive interface similar to presentation tools such as PowerPoint or Keynote that permit users to easily navigate between the different features and tools available. In addition, Genially presents an extensive library of pre-designed templates and arrays for different types of content, such as presentations, infographics, quizzes, and interactive maps that users can choose and customise according to their needs. The Genially platform also provides a range of creation tools, such as text editors, drawing tools, image and video insertion, animation and interactivity. One of the key features of the platform is the ability to add interactivity to content, such as links, clickable hotspots, quizzes, polls and more. The combination of the various elements makes it possible to create more engaging and interactive learning experiences, presentations or multimedia content. In addition to these features, Genially allows real-time collaboration, enabling multiple users to work on the same project simultaneously; content created can be easily shared via links, embedded in websites or posted on social media.

Genially is a powerful tool for creating virtual escape rooms, offering users an immersive and interactive learning experience. One of the elements most appreciated by those who use the platform to create educational activities is the advanced interactivity of the game environment in which clickable elements, animations, video and audio can be included and the possibility for students to interact with objects and

obtain clues, receive information or solve puzzles within the virtual escape room.

When it comes to Escape Rooms, graphics are a very important element because they must be consistent with the chosen theme and eye-catching to create a visually engaging experience: with Genially it is possible to use images, backgrounds, icons and other graphic elements to fully succeed in this direction. The structure of the escape room can be organised logically and fluidly, with links between different rooms or areas. Users can move easily within the experience through buttons, maps or other navigation elements.

Creating a digital Escape Room step by step.

- 1. Define the theme and the narrative.** The narrative is the beating heart of the story that brings the escape room to life: it is therefore important to choose an engaging and coherent theme for the activity that can capture the users' attention and motivate them to solve the puzzles. The narrative provides an overarching theme that - if respected - can support the consistency of the experience and promote immersion and involvement.
- 2. Create a visually appealing and immersive environment.** Incorporate interactive elements such as hotspots, buttons and links to allow users to explore the virtual space.
- 3. Implementing the puzzles and challenges.** Implement a series of puzzles and logic challenges that students will have to solve to progress in the escape room. These include, for example, finding objects in a room, decrypting a code, translating sentences, solving mathematical problems, building objects from their components, programming, etc. Linking puzzles to learning objectives is often the greatest challenge in designing an educational escape room. Furthermore, puzzles should be clear: for instance, they should appear as

interlocking games and quizzes that require a solution and provide explicit feedback when hypotheses (correct or incorrect) are tested.

Finally, when an escape room is designed as an educational activity, there are two elements to take into account, namely: the intended learning process, which is the reason for the existence of an educational escape room. This involves:

- a. **Targeted learning outcomes** in terms of curricular and extracurricular content, disciplinary or inter/multidisciplinary competences and soft skills.
- b. **The desired learning process**, i.e. how the acquisition of content and competences should take place. Should the content be learnt as part of the background story? Are the skills developed through the solving of puzzles?

Lastly, one of the most important but often overlooked phases following the game is the debriefing (or final reflection), in which the learning cycle is completed. In particular, players are made aware of the learning that occurred during the course of the game and they are helped to make connections with prior knowledge and in general with the learning process in which the escape room is embedded.

4. **Incorporate multimedia elements.** The aim is to enrich the playful educational experience with video, audio, animation and other multimedia content to make the activity more engaging.
5. **Test and iterate.** Conduct regular tests with a pilot user group to identify and resolve any usability or difficulty issues and use the feedback to improve and refine the escape room, making it more engaging and effective.
6. **Create an experience according to the specific needs of the students.** Finally, defining the level of difficulty, theme, narrative according to the user's

specific needs are very important to create a tailor-made and successful experience.

In conclusion, Genially proves to be an extremely versatile and powerful tool for the creation of virtual Escape Rooms, offering an immersive and interactive learning experience. The platform allows users to create multimedia and interactive content without requiring programming skills. One of the key elements that makes Genially particularly suitable for the design of virtual Escape Rooms is the advanced interactivity that can be embedded within the content enabling users to interact with clickable objects, animations, video and audio, obtaining clues, solving puzzles and progressing within the game experience. The platform allows the Escape Room to be realised in a fluid and logical manner, with links between different rooms or areas, allowing users to move easily within the experience. Finally, the ability to test and iterate the project, gathering feedback from participants make the escape Room more effective and in line with the specific needs of the students.

3. Escape Box

Material Needed:

- Box or container (wood, cardboard, plastic, etc.) of adequate size to hold the game elements.
- Locks, padlocks or other locking mechanisms for the box.
- Clues, riddles and puzzles to put inside the box.
- Objects, tools or decorative elements to set the box.
- Instruction sheets for players or manuals for facilitators.
- Stationery (paper, pens, pencils, etc.) for writing down clues.

Escape Box originates from the Escape Room methodology: it is an activity based on riddles and clues, in which participants must solve a series of challenges in order to 'escape' from a hypothetical situation. These challenges can take the form of riddles, codes to be deciphered, brain teasers or puzzles. The objective is to work together as a team to solve all the clues and find the final solution within a set time limit. Escape Box requires strong collaboration between team members: each puzzle or challenge needs a logical and creative approach and participants must communicate effectively, exchange information and ideas, pool their skills and work towards a common goal. Participants must analyse details, connect information and find the key to overcome each challenge: these activities stimulate critical thinking and encourage team spirit and collaboration among team members to seek innovative solutions. As in the Escape Rooms, an important element of the Escape Boxes is the time limit to complete the challenges: this helps create a pressure and stressful situation, requiring participants to manage time efficiently and avoid wasting precious time.

As we have seen, Escape Boxes pick up on aspects of Escape Rooms with the only difference being that the whole game is enclosed in a few boxes or any 'container' that can enclose everything the game offers. Escape Boxes therefore allow them to be taken anywhere and this aspect becomes extremely functional.

Creating an Escape Box step by step.

1. **Define educational objectives:** identify the skills or topics you want to reinforce through play (e.g. problem solving, logic, knowledge of a specific subject) and establish the learning outcomes you want to achieve.
2. **Design the structure of the Escape Box:** divide the game into different boxes or levels to be overcome by inserting clues, riddles and puzzles for the students to solve in order to continue.
3. **Link the puzzles to the previously defined educational objectives through the creation of the content:** this step involves preparing the necessary materials (boxes, locks, clues, etc.) and developing puzzles and riddles in line with the educational content.
4. **Test the game:** the objective of this phase is to test its functionality and difficulty through the involvement of the students: their input is important in order to gather feedback.
5. **Evaluate the experience:** in this last step, the comments collected from the test phase are analysed to understand the strengths and weaknesses of the game and to analyse the learning outcomes achieved by the students. This last step allows any changes and improvements to be made for future editions of the game.

Focus on puzzle creation.

Puzzles are the essence and also the main stimulus for learning within an educational Escape Box. Through the escape boxes, students will have the opportunity to practise their problem-solving skills, work in groups and explore educational content in an engaging and fun way. The puzzles are how players find clues to unlock locks, unravel secrets and generally progress towards the end of the game. From an instructional point of view, puzzles are the elements that test and challenge learners' knowledge and skills; they are the concrete motivations to learn: they should pose a challenge, while being solvable and fun, but above all they should give players a new or deeper understanding of the topic at hand. The puzzles are the practical part of the game, closely related to the game experience and its flow. It is crucial that they are neither too simple, lest the game not be a real challenge, nor too complex, lest players struggle and fail to advance. This balance can be achieved by carefully considering the players and testing the game. When using puzzles, it is always necessary to test them and define objectives for each one, so that players can know and understand the rules from the beginning. Once the rules have been identified, it is advisable to use the same format for each puzzle in order to make the experience consistent. To guarantee that all puzzles are solvable, a solution sheet could be given to the game master or facilitator, along with clues for the players if needed. An alternative puzzle could also be provided to help players progress if they get stuck.

The physical attributes of puzzles are just as important as their design. The durability and resilience of the puzzle pieces or components are crucial considerations, as puzzles can be subjected to unpredictable handling and physical stress during use. Puzzles should be designed to withstand misuse and the application of physical force, ensuring they remain intact and functional even when manipulated in unexpected ways. In addition, it is important to consider accessibility and inclusiveness, e.g. for visually

impaired people or people with different abilities, ensuring that texts, images and audio clues are easily accessible.

Escape Boxes can be used in different ways in the context of learning. They can be used to introduce new topics and provide opportunities to build competencies and skills, but also to serve as a review and evaluation at the end of a teaching unit. Instead of using a 'conventional' question-based assessment in a written test, Escape Boxes could be an alternative and fun way to test students' understanding.

There are simple ways to turn test questions into puzzles to be solved inside an Escape Box. In general, it is easier to turn puzzles from closed questions than from open ones. The essential idea is to move from questions to clues and then to numerical codes. The original question format remains, but when the task is completed correctly, a clue is generated to solve the puzzle. With a little imagination and a few combinations, participants will be able to grasp the clue and arrive at the final solution.

Using technology in the creation of puzzles.

In addition to traditional concrete and logical puzzles, technology offers numerous opportunities to expand and make the Escape Box gaming experience even more immersive. There are several ways to integrate technology into puzzles, depending on the desired level of complexity. One of the simplest approaches is the use of QR codes that allow access to online quizzes or additional information needed for game progression. This solution can be easily implemented without requiring any special programming skills. Another interesting possibility is the use of augmented reality (AR). Through the use of devices such as tablets, smartphones or wearable devices, players can interact with digital objects embedded in the real environment. This allows the game experience to be enriched with virtual elements that integrate with the physical world of the Escape Box. Finally, technology can also be integrated through the use of robotics and electronics solutions. Tools such as Micro:bit

programmable boards, Arduino or Raspberry Pi allow the creation of electronic puzzles of varying complexity, offering an opportunity to learn or teach programming principles. These different technological solutions expand the creative possibilities in the design of puzzles, making the gaming experience even more engaging and stimulating for participants.

In conclusion, the design of an Escape Box requires a structured approach, including the definition of the educational objectives, the design of the game structure, the development of content and puzzles, testing and final evaluation. The puzzles represent the essence of the experience, having to be balanced in terms of challenge and fun for the users. In addition, technology offers numerous opportunities to further enrich the Escape Box experience through the integration of solutions such as QR codes, augmented reality and electronic and robotic components. These technological integrations make the gaming experience even more engaging and stimulating for participants. Ultimately, the versatility of Escape Boxes and the constant technological development open up new possibilities for implementation in educational and training contexts.

Conclusions

Through these guidelines, some of the possibilities of using edutainment tools to enrich the teaching curriculum and make lessons more dynamic were explored. In particular, the basic characteristics of three easily realisable tools were presented, as well as the steps necessary for the realisation and implementation of these tools. With a bit of practice, it will be possible to gain the confidence to create innovative educational and highly interactive content that will not only foster better retention of the information learnt by the students, but also be an excellent tool for the development of students' transversal skills.

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