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Best Practices

The following paragraphs include a series of practical tips that could help teachers to put into practice the theoretical frameworks presented in the previous sections. They are aimed at improving interaction and engagement in a Digital Learning Environment (DLE). These suggestions can help improve classroom-based, online, blended and hybrid education. The practical indications are conceived for a Moodle-based Learning Management System. Moodle has been chosen since it is free, open source and highly used in European higher education institutions. However, similar functionalities are also available in other Learning Management Systems. For detailed information on the various settings of a Moodle course and of the various resources and activities available, it is possible to consult the Moodle Documentation page,[3] the Moodle Academy web page[4] and other useful resources available on the web.

Basics of Docimology

From the Greek words meaning "evaluate, estimate" and "logos, thought, speech", the term "docimology" stands for the science which studies issues related to the measurement and assessment in education. Assessment can be performed at different times of the learning path:

- At the beginning, with a diagnostic function, to investigate students' starting point and identify gaps in their knowledge that could lead to learning difficulties. In Moodle, it could be carried out through an online quiz focused on prerequisite and initial knowledge.
- During the path, with a proactive function: it is the case of formative assessment, conceived to foster and support learning. It dynamically

1 University of Turin.
2 IT Army Education and Training Command and School of Applied Military Studies.
3 See https://docs.moodle.org/402/en/Main_page.
4 See https://moodle.academy/.

DOI: https://doi.org/10.36250/01238_03

provides teachers with data on students' understanding, useful for orienting and modifying the teaching action. In Moodle, it can be carried out through a variety of tools, such as online quizzes, surveys, assignments, workshops, lessons and many other kinds of activities. They can also be combined in order to achieve different goals.

– At the end, to check if students achieved the learning goals. It is the case of summative assessment. It could also have a certification function. In Moodle, it can be performed through an assignment asking the submission of a complex work (e.g. an essay or a problem-solving activity), or an automatically assessed quiz or test.

When grading students' activity, the choice of a suitable grading system is relevant. Grades can be numbers in a fixed range or a grading scale in words. It is necessary to decide and share with students the criteria through which their performance will be graded. In Moodle, all the grades are collected in the course gradebook, accessible through the "Grade" option in the navigation block. There, students can see their grades, and teachers have an overview of students' grades in all the activities. Moreover, teachers can edit the gradebook settings, set a method to compute the course total grade, evaluate group activities and choose the elements to be displayed. In the course gradebook, teachers can also define grading scales to be used for the various activities. To assess an activity through a scale, it is necessary to set "Scale" as the grade type in the grade section of the activity settings page. It will be possible to choose among the scales defined in the gradebook. In automatically assessed tests, a given number of points is assigned to each item, and the final score is the sum of the points earned. In Moodle Quiz, it is possible to edit the maximum number of points for the questions after inserting them into the quiz. For more complex tasks, assessment can be performed through rubrics. Rubrics are tables that include a set of indicators and, for each indicator, a proficiency level. Clear and objective descriptors should be provided for the various levels of each indicator. In a Moodle Assignment activity, it is possible to set a rubric for assessing the students' submissions. In the general settings of the activity, the "Grading method" should be set "Rubric". After saving the activity details, it is possible to create a rubric by adding indicators and levels as shown in Figure 1. The grader, when examining the students' submissions, will have to indicate for each indicator the level achieved, as shown in Figure 2. It is also possible to add specific feedback for each indicator. The total points will be computed automatically.

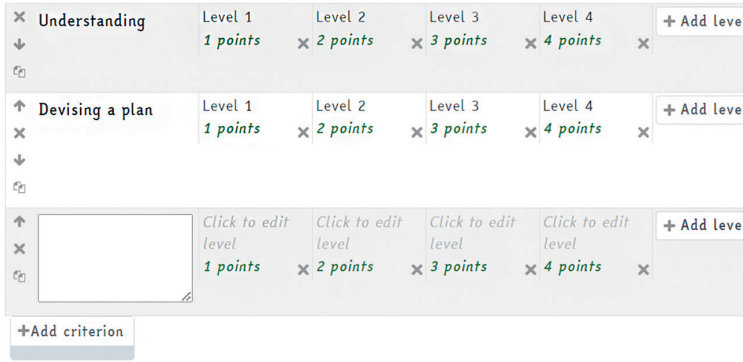

Figure 1: Setting an assessment rubric in a Moodle Assignment
Source: Compiled by the authors

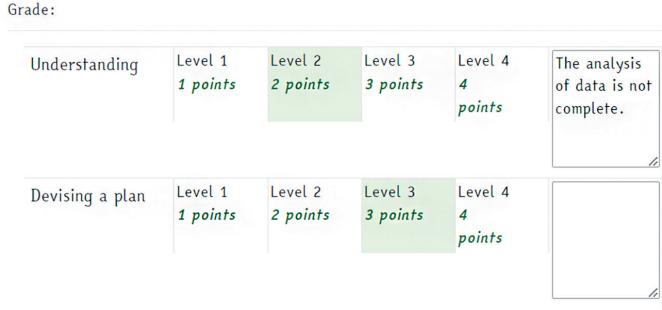

Figure 2: Assessing students' submissions through a rubric
Source: Compiled by the authors

Alternatively, it is also possible to use a marking guide, setting "Marking guide" as a grading method. Analogously to rubrics, it is possible to create a marking guide adding criteria with descriptors for students and for graders and a maximum grade for each criterion. Figure 3 shows how to set a marking guide with Moodle. In this case, during the assessment phase graders will have to select a number of points for each criterion and also give specific feedback. A marking guide may be preferable to a rubric when the score range that can be attributed to each criterion is wide.

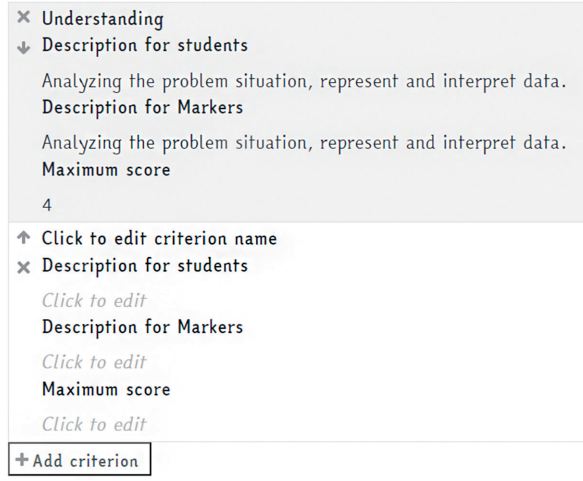

Figure 3: Setting a marking guide with Moodle
Source: Compiled by the authors

Whatever the grading system is, teachers should be transparent with their students and make them aware of the expected achievements. Useful tips on how to do this will be presented in the subsequent sections.

Description of learning outcomes: Knowledge, skills, responsibility and autonomy

Learning outcomes state what the learner will get at the end of the learning process. They refer to students' knowledge, skills, responsibility and autonomy. Writing the learning outcomes effectively facilitates the identification of the purpose of each learning activity and the alignment of the whole learning process, from learning to assessment. Learning outcomes can be written at course level, at module level, or even for every single activity. However, the general learning outcomes must be identified in the various activities that compose the course. Learning outcomes should satisfy these general features, the acronym *SMART* is useful for remembering these characteristics:

- Specific: clear and distinct from others. Learning outcomes should be well defined, they should not be vague.
- Measurable: identifying observable student actions, to let teachers and students know the level of their proficiency at each stage.
- Attainable: suitably challenging for students in the course. Learning outcomes should be realistic and achievable, adapted to the level of the target learners.
- Related: connected to other objectives and students' interests. Learning outcomes should be actionable, making learners able to use them afterwards for their future learning.
- Time-bound: likely to be achieved and able to keep students on task within the given time frame.

Moreover, as a general feature that is essential in every text, learning outcomes should be written in simple language in order to be understandable by the target learners. A general way to describe the learning outcomes contains three elements:

- Condition: what is required to reach the learning outcome, e.g. after completion of the whole course, or after attending the module, at the end of the learning activity.
- Action: active verbs that express knowledge skills or autonomy of the learners, for a list of useful verbs, one can refer to Bloom's taxonomy of learning objectives and its subsequent refinements.
- Eventual Criterion or Context: further specifications to show the learners the means by which the learning outcomes will be achieved (e.g. through an oral interview, by analysing samples, by writing a report), in which context is or will be applied (e.g. in the management of a complex system, to be applied in future experiments).

An example of learning outcome may be: "After the completion of the course, students will be able to interpret the results of a numerical simulation of a natural phenomenon in its different representations (graphical, numerical, symbolic)." Throughout the whole learning program, the teacher should always recall the learning outcomes for the design and delivery of a learning activity, in order to select the most suitable learning approach and digital tool: the DLE can provide teachers with a wide range of opportunities to make students, for example,

interact (lessons, quizzes, formative assessment), collaborate (forums, group projects submissions), peer-evaluate (workshop activity in Moodle) or any other active verb that can promote the achievement of learning outcomes. Moreover, one of the pillars of formative assessment is sharing learning outcomes and criteria for success with students. Being aware of what is expected from them and how their work will be assessed is crucial to focus on the activity, enhance motivation and foster self-regulation.

Customisation of the digital learning Moodle-based environment

In order to make the DLE more engaging and attractive for the students, it is advisable to customise the Moodle course on which the DLE is based as much as possible. When a course is created in Moodle, it is empty and has the default settings. Before filling it with materials and activities, it is advisable to make the general aspect of the course clear, so that students are able to orient themselves, feel supported and not confused. This allows students to start the activities with a positive attitude, which will benefit the final results. The course structure for teacher editing is organised as follows:

- *Administration block* – the "Administration" panel allows changes to be made to the structure and general settings of the course, such as managing users and assessments. By opening the "Edit settings" menu and expanding the first item "General", it is possible to set the title of the course, the visibility of the course (for example, it is possible to keep the course hidden from students and make it visible when it is finally ready). By expanding the "Description" part, an introduction to the course can be inserted, which will be displayed in the list of courses next to the title. It is advisable to write a short text summarising the objectives of the course. It is also possible to upload an image, which will be displayed as an icon under the title of the course (in the list of all courses on the platform). The description can also be included in the main page of the course, in the description block. The "Course format" section allows the teacher to choose the format of the course, i.e. the structure of the page and the sections in which the materials will be placed. For example, the course can be organised by topics, with a section for each topic of the course, or by week so that the course is divided into weeks and the

start of the first week is determined by the start date of the course. For school or university courses, the subject format is usually chosen or the weekly format; for example, for a semester course of 12 weeks, it may be appropriate to choose the weekly format. If the duration of the course is not too long, it can be organised by topic. Teachers can also choose to display the section on the same course page or on a different page. The second allows to have a specific section link. This setting is useful if teachers want to have links between sections, or perhaps to personalise some feedback and link it to specific sections. These course formats are available by default. However, many others can be found in the Moodle plugin repository; check out and try other course formats to find the one that works best for the students. In the administration panel teachers can also access filters. Some filters personalise the user profile fields within the materials or displayed in blocks. The multilanguage filter enables resources to be created in multiple languages. When turned on, teachers can insert a text block in different languages inside a span HTML tag (text in the selected language, where “xx” are two letter representing the language, “en” for English, “it” for Italian and so on). Then it selects and outputs the text in the user’s language (as set in their browser or in their preferences).

- *Navigation panel* – the “Navigation” panel contains links to the other courses in which the user is enrolled. It provides easy access to many of the platform’s tools (i.e. participants or sections of the course). It also contains the link to the list of participants or to the competencies, badge and gradebook. In the latest version of Moodle, and based on the chosen theme, the navigation panel will show all the sections, all the resources and activities within them, and their completion status.
- *Body of the course* – the “Body” of the course is the central part, containing all the resources and activities, and it is divided into sections. It may contain for example a discussion forum where students can interact and discuss resources such as text, video, audio and activities to put the acquired knowledge into practice and to consolidate skills. The sections can be customised by the teacher, not only by adding activities and resources, but also by inserting an image for each section to make it more attractive to the students. Sometimes it is useful to include an image in the section that shows the key words of the topic of the section, so that

students can easily find materials within the course. Any element included in the body of the course must be consistent with its learning outcomes. It is useful to include an "Announcements" forum where the teacher can easily post communications and messages for the students. It is possible to hide topics that have not yet been covered, or material that will only be available after a certain time or that is not yet final.

- *Later blocks* – the left and right columns of the course contain boxes called "Blocks", which allow the teacher to customise the layout and feel of the page. In edit mode, teachers can add or remove blocks and change their position. Some examples of blocks are the calendar, the recent announcements or the online user's block. As a teacher of the course, it is possible to decide which blocks students can see. The main side blocks are the standard administration and navigation panels.

Interactive learning: Synchronous or asynchronous resources and activities

Interactive learning materials are resources designed to teach a specific learning outcome and make students respond to different stimuli. They are composed of any combination of text, images, audio, video and are usually delivered via a DLE. There are several reasons to consider the use of interactive materials for students, among several others it is important to mention that interactive materials:

- allow learners to study autonomously
- are scalable (can be delivered to a large number of learners) and are flexible
- train students for lectures or lab work
- support distance learning
- enable students to practice the skills learnt in classes

Within a Moodle course there are several activities or resources to support learning. In edit mode, a teacher can add activities or resources using the "Add an activity or resource" button (Figure 4).

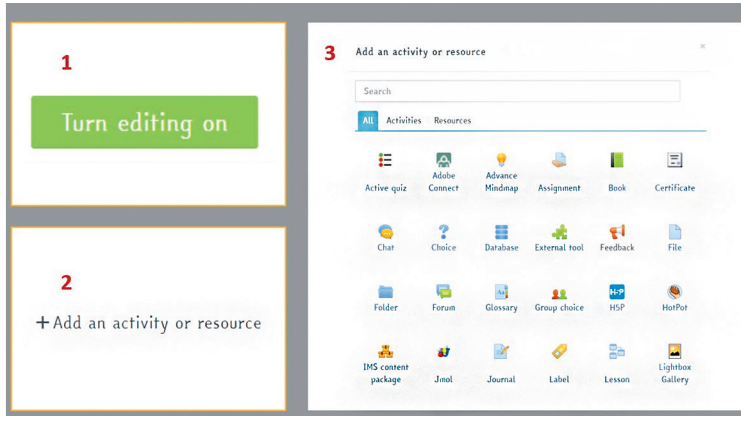

Figure 4: Steps to add an activity or a resource
Source: Compiled by the authors

A resource is something that a teacher can use to support learning by providing students with different kinds of materials. Moodle supports a range of resource types that teachers can add to their courses:

- video
- embedded file that can be viewed within the course
- link to external sites
- folder for collecting materials
- podcast

An activity is a generic name for a group of features in a Moodle course. Typically, an activity is something in which students interact with other students and/or the teacher, or collect feedback from the course. Moodle contains different kinds of activities that teachers can add to their courses, for example for synchronous activities:

- Integrated web conference tools, where the online meeting is directly accessed from the platform and students do not need to download any other applications.
- Chats for online discussions.

And for asynchronous activities:

- quizzes and tests with automatic feedback
- interactive resources (e.g. H5P,[5] rich HTML5 content)
- assignments and group submissions
- questionnaires and surveys
- forums for discussions between teacher and students or between peers; for example, a forum for doubts and questions can be included in the Moodle course so that students can discuss and compare and contrast a particular topic
- workshops for peer evaluation
- wikis for the collaborative creation of a net of documents
- databases and glossaries for a shareable collaborative collection of resources
- lessons for the customised and enhanced exploration of several pages

It is important for teachers to take into account the timing of the activity and whether the activity is intended to be synchronous or asynchronous. Most of the asynchronous activities can also be delivered during classes or meetings (which means during synchronous learning). It is also important to alternate synchronous and asynchronous tasks, in order to accommodate different learning needs, to take into account eventual connection problems, to let students choose the timing of their online learning, since it is tiring to spend many hours in front of a computer. Moodle activities may include evaluating, the previous sections may be useful in learning more about this.

Civilian and military collaborative learning

Learning in the security and defence field is not an isolated or exclusively individual process: it takes place in a multi-integrated and social dimension, where there are many forms of interaction and collaboration, among different kinds of actors (militaries, civilians) and in international contexts. This section focuses on organising collaborative learning activities with the involvement of civilian and military students at the same time. Every actor in the environment is considered a resource and an opportunity. The learning process, starting

[5] See https://h5p.org/.

from its individuality, is cleared through a process of reciprocity, surrounded by the possibility of a mutual exchange of knowledge, skills and competencies. Collaborative learning activities have a twofold effect:

- the development of teamwork skills
- the development of cooperation skills for future interactions between militaries and civilians

Both teamwork and cooperation skills form the basis to acquire and consolidate leadership, problem-solving and critical thinking skills. All these transversal skills are very useful for the career of an officer or civilian who wants to operate in the field of security and defence. Surely, in a long time, the basic training of civil–military cooperation with the creation of real collaborative learning laboratories could be the right investment for international institutions to make for the joint framework of the fight against hybrid threats. The processes for developing these skills are set out in a series of examples of collaborative learning activities that are described in the following paragraphs.

Group activities

Group work helps students to develop the following soft skills:

- communication: being able to communicate effectively
- critical thinking: a thought that is constructed by observing a phenomenon from various points of view trying to understand the reason
- decision-making skills: trying to consolidate the sense of choice and responsibility
- mediation and conflict resolution: in a group there is always a moment of controversy
- emotional and empathic intelligence

According to the Random Collaborative Learning model, groups should not be too numerous and large groups should be divided into subgroups. In each subgroup, a leader should be identified, which does not mean the person who shares and divides the tasks to guide the team, but one that possesses a charisma and social skills capable of guiding the other members. The leader can be chosen directly by the group's members, by the professor or following a task rotation among members. Groups should be heterogeneous: males and females, civilians

and military, different nationalities, soldiers of different specialties. During the practical activities, groups can change or not change their composition. This enables a better exchange of ideas, a better division of tasks, greater participation of all members, a co-built learning process, and students' awareness of their own strengths and weaknesses. It is very important to provide, at the end of the group activities, feedback from the group leader or from several participants in the group. It is important that the teacher provides feedback on group activities, too.

Team games

Team games allow for the introduction of gamification elements on the one hand and the creation of challenging situations on the other. These activities can be introduced to test students' acquisition of knowledge and skills. Having a team implies that students work to achieve "common goals". This situation creates a strong relationship between the participants sharing the team game experience. The presence of other individuals gives rise to a continuous debate among the members of the group on possible doubts, perplexities, uncertainties. The team can also be seen as an antidote to insecurities and low self-esteem. Through the team game and its challenges, students also develop intrinsic motivations for achieving the result. Moreover, a team game also means having rules, an excellent tool for the acquisition of a sense of duty and responsibility by students, especially in security and defence education.

Simulations and role-playing

The simulation of real situations entrusts different tasks to participating military and civilian students to allow them to better understand the dynamics studied in theory and put into practice what they learned during the lessons. Simulations can include the use of specific computer tools or virtual platforms that allow decisions in real time and interactions among participants. In addition to simulations, role-playing means acting the role of a character or person when partners take other roles. Role-playing can be based on simulations related to a real situation and structured in such a way as to be emotionally engaging. This activity provides multiple stimuli for learning through imitation, action, observation of the behaviour of others and the comments received on one's own.

Analysis of case studies

A case study is a detailed description of a specific subject or phenomenon. Case studies are used in security and defence education to face what has been studied at a theoretical level and understand its concrete applications. The analysis of a case study can be conducted by several military and civilian students with different backgrounds, individually or in groups, to grasp different perspectives and confront each other.

Debates

Before addressing a specific topic or after the topic has been addressed, it is useful to open discussion sessions that can allow military and civilian students to express, argue and defend their ideas. The approach to different styles of thinking, such as the civilian and military one together with the teachers' perspective, is an excellent fertile ground for understanding various points of view and approaches that in a homogeneous group of students would not have the same blooming. In this way, communication skills are developed, and civilian–military interactions are promoted. Transversally, students develop critical thinking and ask questions for a deeper knowledge and understanding of the topic.

Peer evaluation activities

Each actor within the learning environment is a resource and an opportunity. In the evaluation process in a collaborative learning environment, not only the teacher has an important role, but also the other students can assess. Peer evaluation activities especially between civilians and militaries acquires an added value: it means giving feedback on each other's work, or another group's work. It builds students' confidence in understanding and applying selected criteria. These activities are usually formative to reduce the focus on grading and scores. More detail on peer evaluation can be found in the Section *Assessment, peer assessment and self-assessment.* To increase the effectiveness of the activities, some points must be followed and kept in mind.

- Activities can be carried out face-to-face or remotely within a digital learning environment. This allows the teacher to develop the students' digital skills, and create areas for debate and exchange of opinions.
- Activities must be well designed by the teacher in terms of objectives to achieve, duration and tasks of the students.
- For constant updating and quality control, supervision of the teacher is essential to give individual or collective feedback with the aim of stimulating, helping, clarifying, correcting and gratifying.

Making short videos

Creating a video for multimedia learning is a great way to engage learners and enhance their educational experience. However, it can also be a challenge to create a video that is effective and engaging. In this section, some of the key points to consider when producing a video learning resource will be discussed and some suggestions on how to do so will be offered.

1. The first point is the purpose and focus of the video. It is important to have a clear purpose and focus on specific learning outcomes. This helps to ensure that the content is relevant and targeted to the intended audience, making it more effective in achieving the desired learning outcomes. This is a key point that will influence all other aspects of the video production, including the content, visuals and length of the video. It is important to include a short introduction in the first minute of the video, explaining its purpose and topic. This will help set the context for the content and provide a clear overview of what will be covered in the video. A similar description can be included in the video description or in the title. If the video is part of a Moodle resource, teachers can also add a description in the description field and display it on the course page.
2. The second point is length. When making a video, it should be remembered that attention span tends to decrease after 6 minutes, so keeping the video short will help to keep learners engaged. Research suggests that training videos should ideally be less than 10–12 minutes long and definitely not more than 15 minutes. In an online context, it is better to have 5 short videos than one long video. This also reduces the size of the files and avoids problems regarding the upload within the Learning Management System.

3. To keep the length of the video in check, planning is fundamental. It is important to plan the video in advance using storyboards and scripts to define the content and the images. This will help ensure that the video is well structured and flows smoothly, making it easier for learners to follow and understand the content. It also allows for any necessary revisions or edits to be made before filming begins. There are programs that can estimate the length of the video based on the script. Otherwise, it is generally estimated that 1 minute ≈ 150 words. There are also AI tools that can provide a basic script that can be extended. When writing the script, one must consider the language. Simple and clear language makes the content more accessible and understandable to learners. Technical terms or idioms that might be unfamiliar to the public should be avoided. If specialised terms are used, they should be clearly defined and examples or explanations may be added to clarify their meaning. When designing the language of the video, it is also important to consider the language level of the audience. Scripts also make it easy to translate the video into other languages, if necessary, or to add subtitles and provide a transcript.
4. The fourth point is the use of visuals. Visuals can be pictures, diagrams, animations, and other visual aids to illustrate concepts and ideas. Visuals can be used to enhance the content and make it more engaging for learners. Signalling techniques, such as highlighting or underlining, can be used to draw attention to important ideas or concepts.
5. The fifth point is the use of audio. Good audio quality is essential to ensure that the narration is clear and easy to understand. Poor audio quality can be distracting and detrimental to the learning experience. Audio editing software can be used to improve sound quality.
6. The sixth point is to use active learning. Videos can be placed in an active learning context by incorporating questions and interactive elements into the video. This encourages learners to actively engage with the content itself rather than passively watch the video. The H5P[6] Moodle plugin easily creates interactive videos. Videos can also be adaptive and provide feedback to students based on their responses to questions or interaction with interactive elements.

[6] See https://h5p.org/.

7. The seventh point is the use of accessibility. Videos should be accessible to all learners by including captions or transcripts. This will ensure that students with hearing loss or other accessibility needs can fully engage with the content.
8. The eighth point is reusability. Videos can be reused over time in different contexts. This can help maximise the return on investment in video production and ensure that the content remains relevant and useful for future learners. In order to achieve reusability, it is essential that the video is short in length and has a specific and clear purpose.
9. The ninth point is production quality. It is not necessary to have fancy equipment or software, but it may be worth considering using free or low-cost tools to enhance the educational effectiveness of videos. Simple production styles can be just as effective as high-budget studio productions, as long as the content is clear and engaging.
10. The tenth point is evaluation. To evaluate the effectiveness of a video, students can give feedback through questionnaires. In addition, student performance can be monitored by designing tasks related to the video content.

After designing the video, another important aspect is choosing the best tool to make it. For example, to make a video to explain a concept while having a presentation, it is possible to use the recording tool provided by PowerPoint.[7] The voice and the image (such as the webcam) are recorded, while the slides vary. While recording, presenter mode can be used to read the notes of each slide and to use other tools to enhance the presentation (such as a laser pointer or highlighter). At the end of the recording, the audio is inserted into each slide. Alternatively, it is possible to manually add audio to each slide. Then the presentation can be exported in video format, choosing the output quality. A similar effect can be achieved by recording video into a web conferencing system, like Zoom,[8] Teams[9] or Webex.[10] Most web conferencing systems also allow to automatically add subtitles based on the voice recording. Using software

[7] See https://www.office.com/.
[8] See https://zoom.us/.
[9] See https://www.microsoft.com/microsoft-teams/.
[10] See https://www.webex.com/.

such as PowerPoint (although the free software ActivePresenter[11] can also be used in the same way) allows teachers to have a source file that is easily modifiable compared to recording in a web conferencing system. Instead, to create a video that shows how to do something, it is possible to use some screen recording software. This type of software records everything that happens on the computer screen, including mouse movements and speech. For example, all new computers running Windows have a feature called the GameBar (Windows key + G) to do this. Alternatively, other software such as Camtasia,[12] ActivePresenter,[13] OBS Studio,[14] etc. can be used. The advantage of using this type of software is that the registration takes place in one go without having to modify it later. The downside is that the video cannot be edited later, for example to correct a mistake.

Assessment, peer assessment and self-assessment

When referring to "assessment", it is usually thought of a teacher evaluating the students. However, this is only a part of that practice, since students can also take advantage of being evaluated by other stakeholders. In fact, assessment can be performed by three different agents:

- External agents, such as the teacher or the computer. It is the case of assignments manually graded by instructors or online quizzes automatically graded by the computer, according to rules set by the teacher. These kinds of activities can be used for diagnostic, summative and formative assessment.
- Students themselves through self-assessment activities, that are usually included in formative assessment.
- Peer students, through peer-assessment activities, are generally used for formative assessment as well.

In this section, the reader will find suggestions for setting assessment activities of external assessment, self-assessment and peer assessment for summative and formative purposes.

[11] See https://atomisystems.com/activepresenter/.
[12] See https://www.techsmith.com/video-editor.html.
[13] See https://atomisystems.com/activepresenter/.
[14] See https://obsproject.com/.

Using online quizzes for summative assessment

Online quizzes are commonly used to check if students have achieved the learning outcomes at the end of a path. To adapt online quizzes to summative assessment, it is important to pay particular attention to the following hints. A particular reference must be done on the Moodle Quiz activity; however, it is possible to define similar settings also using different automatic assessment systems.

- Each item should be related to one and only one learning outcome.
- Each item should address only one question (avoid multiple requests in the same item).
- Items should be independent of each other: avoid creating items that rely on previous answers.
- It can be useful to limit the availability to the test through time constraints. They should be set in the "Timing" section of the activity details page.
- If the test needs to be completed in a fixed time, the time limit (in minutes) can be set in the "Timing" section of the activity details page. It is also possible to set different time limits for specific students or groups of students. This can be done through the Group or User override sections in quiz administration.
- To avoid cheating, it could be useful to make only one attempt available. In Moodle Quiz, the number of attempts can be set in the "Grade" section of the quiz administration. Through the Group or User override section it is also possible to specify different settings for single students or groups.
- To avoid cheating, it is useful to randomise the question order and elements of questions, such as the multiple-choice options, or questions themselves. To randomise the question order, the "Shuffle" option in the "Edit quiz" page should be flagged. To randomise question parts, such as the options of multiple-choice questions, the "Shuffle within questions" option in the quiz administration must be enabled, and the "Shuffle the choices" option in the question setting must be enabled. To add random questions from a set, the questions should be previously created in a category of the course question bank; in the "Edit quiz" page, click on "Add" and then choose "Random question". When using randomisation, it should be considered that a different order may affect student response or the perceived difficulty of the test.

- Also, numeric elements within questions can be randomised, provided that the difficulty of the question is preserved. In the Quiz activity, there are specific question types that allow this kind of randomisation, such as: calculated, calculated simple and calculated multichoice. Other tools also allow the randomisation of different parameters such as words, increasing the possibility of generating different versions starting from a single question.
- In multiple choice questions, try to avoid:
  - options that are too obviously wrong
  - including one option formally different from the others (for example, in length and elaboration of sentences)
  - high syntactic complexity
  - using terms such as "always" or "never", which makes the question obviously false
- Embed tasks in relevant contexts and real-world situations, in order to develop competencies.

Using online quizzes for formative assessment

Online quizzes can also be used to support and monitor learning during the path. The following list includes suggestions for making automatically assessed tests formative and offering students valuable feedback.

- Allow repeated attempts in assignments and questions, so that students can repeat the activities and monitor their progress.
- Use time limits only when it is relevant.
- When possible, randomise the various elements of the test: question order, options in multiple choices, numeric parameters (and other parameters such as words, if available), the choice of questions from a set. This helps to have different versions of the tests for each student and, for each student, different versions of the test at each attempt.
- Ask students to collaborate, in a synchronous or asynchronous way, to solve tasks. Using Moodle it is possible through collaborative activities such as forums, chats and web conference tools. It is particularly effective when they have random values in their questions, so that they have to compare processes and not results.

- Use open-ended questions whenever possible: completely open ones such as essays have the disadvantage of being generally not automatically evaluable, but alternatives such as asking for numbers or words without giving items from which to choose are often a good balance between evaluability and effectiveness. If there is no alternative to the use of multiple-choice questions, follow the relative suggestions provided in the paragraph above.
- Offer immediate feedback; if possible, let students check the correctness of their answer and the feedback during the quiz itself, not only at the end. The options to control when students can check their answers are in the "Review options" section in the quiz settings page.
- Embed tasks in relevant contexts and real-world situations, in order to develop competencies and to keep students' interest high: students are more eager to solve their tasks if they refer to something they perceive as familiar or related to their field of study, especially if practical applications are involved.
- Try to include feedback that is directed towards the students' activity, that gives details on the underlying processes, learning strategies, reflection on results and solving approaches. It is possible to add feedback to each question, and also to differentiate feedback based on the given answer.

Managing peer assessment

Since the peer feedback is usually effective for learning, it is possible to use the Moodle "Workshop" activity to create a peer assessment activity. The workshop is constituted by 4 phases:

1. Design phase: the teacher prepares the workshop by filling the activity settings page. Here it is possible to include time constraints for submission and for assessment, give instructions for the submission and for the peer assessment, and prepare an assessment form for the peer evaluation.
2. Submission phase: students submit their work.
3. Assessment phase: students assess their peers' submissions.
4. Conclusion phase: the teacher revises the submission grades and chooses a method to compute grades for peer assessment, which are automatically computed through algorithms.

The distribution of the submissions to the participants can be done both manually and automatically. It can be useful to assign a weight to the grades for peer assessment, thus students carry out this activity with attention. For this activity, it is essential to share grading criteria, better if in the form of an assessment rubric, with students, since the submission phase. The grading criteria can be implemented in the assessment form that students have to grade their peers' submissions.

Creating self-assessment activities

Including a subjective perspective in assessment helps students gain confidence with learning goals and assessment criteria, and develop metacognitive skills. Self-assessment is a complex competence and requires training to be mastered. In online courses, self-assessment questionnaires can be included after submissions that will be evaluated by teachers or tutors. Self-assessment activities should not be confused with automatic assessment activities: the latter (e.g. online quizzes) return feedback that can be useful to help students self-assess their learning level, but the assessment action is performed by the computer, not by students. "Self-assessment questionnaire" refers to a survey with reflective questions which guide students to self-assess their work. Using Moodle, it can be created through a "Questionnaire" or "Feedback" activity, using Likert scale questions, in which the items are formulated on the basis of the assessment criteria used for the assignment, previously shared with the participants. For example, if the submission is assessed through a rubric consisting of 4 indicators, the self-assessment questionnaire could include 4 items, each of which is formulated based on the 4 indicators, asking at which level students think they have achieved them.

Software suggestions for didactical use

Choosing the right software for digital education is quite important: both teachers and students have to feel comfortable with the technological tools, while at the same time all the stakeholders have to assure that the applicatives chosen are effective for teaching and learning. Technology should not complicate the didactic

experience for both sides of the desk, otherwise they could be discouraged from using it proficiently. Furthermore, the use of free software, while available and feasible under the support point of view, allows the users not to burden the coffers of their institution, making it simpler to implement inside an educational context. Some suggestions could be:

- *Web conference systems.* They allow for synchronous (live) interaction at a distance, which can be used for activities such as online sessions (also in a hybrid teaching framework) or consultancy calls. Two examples of such programs are BigBlueButton[15] and Zoom[16] (the latter free in a version with some limitations).
- *Screen recording.* Various applications allow to record the user's monitor (screencast) and its audio if needed, both for synchronous (live streaming) and asynchronous purposes, that can be used alternatively to or in combination with a web conference system. It could be useful recording for instance presentations making use of a slideshow, or expositions generated with personal software not easy to make available to students (e.g. because it is commercial and expensive). Two examples of such applicatives which are free are OBS Studio (Open Broadcaster Software)[17] and VLC media player (VideoLAN Client).[18]
- *Web content collaboration frameworks.* In the past, creating materials for being published on the Internet used to require dealing with the difficulty of having specific technical knowledge, such as being able to handle markup and programming languages requiring a dedicated training. Fortunately, over the years new solutions allowing the creation of resources for the Web, simpler from the technical point of view, have been developed, widening the potential to create without needing those skills. These solutions present themselves under the form of frameworks; an example of such a free framework is H5P.[19] It consists of a web-based content editor, able to add and replace multimedia and textual content in visual live editing, a website for sharing content types, plugins for management systems such as Moodle, and a file format of its own for bundling

15 See https://bigbluebutton.org/.
16 See https://zoom.us/.
17 See https://obsproject.com/.
18 See https://www.videolan.org/vlc/.
19 See https://h5p.org.

together these resources. It allows creating contents such as interactive videos, presentations, games and quizzes, which can be of great help in keeping the interest and the attention of students high.

– *Statistics.* This subject is actually multidisciplinary, since on the one hand it possesses hard scientific premises in terms of mathematical foundations, while on the other hand its applications encompass widespread areas such as social sciences, demographics and military. This implies that its use is important in the security and defence contexts, since the outcomes of statistical evaluations can give relevant bases to some decision-making processes. An example of a free applicative distinctly devoted to work with statistics is R.[20] It allows users to perform statistical computing at different levels, starting from simple computations of quantities such as indices, and arriving to use it as a true programming language with all the versatility of the case. Alternatively, if advanced features are not required and Microsoft Excel[21] is not available, OpenOffice[22] LibreOffice Calc can also be suitable for the needs, being up to a notable extent compatible with the well-known commercial spreadsheet application.

Tools to monitor and self-monitor progresses

All teachers working in DLEs can independently access and consult data and statistics about their students to understand and improve their teaching through Learning Analytics (LA). As an example, in Moodle platforms there are some analytics which are native tools and plugins that can enhance the capabilities of the Learning Management System. The reports in Moodle allow the teacher to consult:

– Logs and Live logs: all the interactions that are carried out by the user (accesses, deliveries, navigation, etc.). The live logs are those made simultaneously while the teacher is consulting.
– Activity report: it shows the number of accesses to individual activities and the number of people who have accessed them. It also includes the day and time of the learner's last access.

[20] See https://www.r-project.org/.
[21] See https://www.office.com/.
[22] See https://www.openoffice.org/.

- Course participation: like the previous one, it allows teachers to check participation in the activities, but the data is not aggregated, so it is possible to consult access by individual students (or groups of students).
- Activity completion: if completion progress is enabled, it shows a table for each student in which teachers can see students' completed activities. Teachers can also see a similar report via the Completion progress or Progress bar, two blocks that can be integrated into the course interface.
- Statistics: this feature shows graphs with the number of views or posts by students in a certain period of time.
- Gradebook: it allows teachers to view the student's final grade for each assignment.
- Student's personal overview: where the student's name appears, it is possible to select it to go and see their personal profile related to the course.

Beyond these basic analytic tools, there are several others that can be added to an Integrated DLE. In some cases, it is possible to write down one's own code or download the databases of educational data and perform other kinds of analysis, for those interested in performing customised analytics.

Open education resources: How to use the existing ones and to make available those produced under the right licences

Since previously Open Educational Resources (OERs) were cited, in this section, a more detailed explanation of how to use them will be delivered. When searching OERs, it is important to know which rights are granted to the final user. International laws on copyright generally recognise the rights of intellectual property to the authors, even if they lack to express their wills. When not specified, it is usually implied that the authors want to keep all their rights as reserved, which is not an appropriate choice if the resources are meant to be made open. Therefore, an international nonprofit organisation generated the Creative Commons (CC) licences,[23] a family of licences that grant the users various rights to author, share, edit and distribute materials. The licences are generated by four attributes:

[23] See https://creativecommons.org/.

- BY means that the resource needs attribution to the author, whenever reusing CC licensed works, one can use the TASL acronym, to remember the inclusion of Title, Author, Source and Licence.
- NC means that the resource cannot be used for commercial purposes.
- ND means that the resources can be used in unadapted form only, no derivatives or adaptations of the work are permitted.
- SA stands for Share Alike, adaptations must be shared under the same terms; for example, when originally commercial use is permitted, it is prohibited to forbid commercial use of the new or modified materials.

The combination of the four attributes generates licences as follows:

- CC0: the material lies in the so-called *public domain,* meaning that the authors give up their copyright. A resource licensed as CC0 can be redistributed and modified without any restriction, also for commercial purposes. This is the laxest licence.
- CC BY: the material can be redistributed and modified, also for commercial purposes, but it is mandatory to give credit to the authors, specify that this licence holds, and retain an indication of previous modifications to the work.
- CC BY-SA: the material can be redistributed and modified, also for commercial purposes, but it is mandatory to give credit to the authors, specifying that this licence holds, and stating explicitly any modifications with respect to the original. Furthermore, in case of modifications, the new or modified materials are required to be licensed in the same way (CC BY-SA).
- CC BY-ND: the material can be redistributed, also for commercial purposes, but it is mandatory to give credit to the authors and specify that this licence holds. However, the material cannot be modified.
- CC BY-NC: the material can be redistributed and modified, but it is mandatory to give credit to the authors, specify that this licence holds, and retain an indication of previous modifications to the work. However, the material cannot be reused for commercial purposes. No user can make a profit from materials licensed as CC BY-NC. Anyway, a person modifying the materials is not required to use the same licence for the derivative works.

- CC BY-NC-SA: the material can be redistributed and modified, but it is mandatory to give credit to the authors, specify that this licence holds, and retain an indication of previous modifications to the work. However, the material cannot be reused for commercial purposes. No user can make a profit from materials licensed as CC BY-NC-SA. In addition, in case of modifications, the new or modified materials are required to be licensed analogously to the original ones.
- CC BY-NC-ND: the material can be redistributed, but it is mandatory to give credit to the authors and specify that this licence holds. However, it is neither possible to reuse the material for commercial purposes, nor to modify it. No user can make a profit from materials licensed as CC BY-NC-ND, as it is to distribute new material based on materials having the same licence. This is the strictest licence of the Creative Commons family.

On the other hand, knowing these licences is also important when planning to use OERs other people produced. Indeed, depending on the situation, it could be appropriate to check specific attributes. First, for example, if a teacher wants their students to produce material starting from a base others gave, and to publish their production as user-generated content, a licence containing the ND attribute is inappropriate, since it forbids such a possibility. Second example, if someone needs OERs as part of a commercial product to be sold for money, they cannot rely on materials licensed with the NC attribute. Third example, in other contexts, for instance if someone is choosing background images or decorative elements, it may be better to look for CC0 resources in order to have a "clean" use, since giving attribution for those elements could make users think that the authors gave a relevant contribution, while in fact it is a secondary material. Whenever Creative Commons licences are not stated there could be other kinds of free or restrictive licences, and one should check the specific terms of use of the owner. With respect to this, there are several websites that function as repositories of OERs and are the best places to look for freely usable materials. One of them is represented by MERLOT,[24] a database of access to online learning materials and content creation tools, supported by an international community of educators, learners and researchers.

[24] See https://www.merlot.org/.

Creating a learning community: Tools to facilitate interactions, collaborations and peer discussion

Especially in online, hybrid and blended courses, creating a virtual community is crucial to keep students engaged and enhance motivation. Several activities can support the development of a learning community. The following list exemplifies some of them.

- Using forums for asynchronous communication. In forums, students can open new discussions and reply to the posts. When dealing with a forum, it is important to pay attention to the subscription mode that regulates if students are notified when a new post is published and if they have the possibility to subscribe and unsubscribe to the forum. Single posts can also be graded; this could be useful to stimulate participation.
- Creating a glossary to share a terminology in the discipline that is the object of the course. The Glossary activity allows the creation of a shared glossary to which students can contribute, adding and modifying entries. The glossary entries can be automatically linked to the course pages, so that whenever a concept word appears in a text, the corresponding glossary entry can be recalled in a popup window. The entries can also be graded.
- Using a glossary to introduce each other. In online courses, to enhance the sense of belonging to a community, it is possible to create a glossary for the learning community and, at the beginning of the course, ask participants to add an entry containing their presentation and a picture. The block "Random glossary entry" can be then added to the course homepage and linked to this glossary. It will show the picture and description of one different participant whenever the course page is refreshed.
- Adding synchronous activities. For synchronous communication, the "Chat" activity can be used. Moodle platforms are often integrated with web conference tools, which can be used to organise synchronous meetings. They enable interaction among participants and with the teacher.
- Creating shared repositories. Using the "Database" activities, students can add entries filling a predefined form, which can include: text, files, images, drop-down lists, radio buttons, checkboxes and other kinds of fields. Teachers have to define the fields to be included in the form and prepare templates for the add entry form and for the preview form. Similarly, the "Podcast" activity enables the creation of a shared podcast,

where students can add episodes. Differently from the Database, the "Add episode" form is predefined. These activities can be used, for example, to develop a shared research project or to share documents created by students.

- Using group activities. If a "Group mode" is enabled in the course settings, Moodle can also be used to carry out collaborative activities. Groups can be defined in the "Groups" settings (under "Users") in the course administration. Activities such as assignments can be designed as group activities. In this case, one student's submission and the relative grade will apply also to the other group members.
- Using wikis for collaborative projects. The Wiki activity allows students to create collaborative documents by building pages together. Students can edit pages, add comments and see the editing history.
- Administering students targeted questionnaires. It enables teachers to detect their expectations and take into account students' opinion in constructing the environment, allowing to put the students at ease and making them enthusiastic to participate in the activities and the community.

English Medium Instruction (EMI)

In nations where English is not the predominant first language, English medium instruction (EMI) describes the use of the English language to teach academic subjects besides English itself for internationalisation purposes, better acquisition of the English language and better career prospects. Given the increasing demand for using English for instructional purposes in higher education in L2 or multilingual contexts, it is now even more crucial to concentrate on and consistently update policies and best practices. The following list draws on both existing guidelines and the personal experience of the authors in the field, focusing on using EMI in synchronous and asynchronous online learning environments:

- Establish clear priorities and learning outcomes. Although the EMI practice certainly promotes linguistic development, disciplinary content is the primary learning outcome. Students' linguistic proficiency may be a pre-requisite to attend the course or an additional learning outcome itself: this must always be clarified in the course syllabus and course materials planned accordingly. Assessment should reflect this choice.

- Self-assess the language proficiency as a teacher and encourage students to do the same by using CEFR self-assessment grids.[25] Independent (B2), advanced (C1), or proficient (C2) learners may face different challenges and have different learning strategies. Especially in asynchronous contexts and in mixed-ability classes, create adaptive learning paths based on the students' different levels.
- Familiarise with the main theories of L2 vocabulary acquisition in order to gain awareness of your students' linguistic difficulties.
- Use and reuse OERs. Drawing on already existing English-language materials taken from OER repositories may diminish the need for designing a course from scratch. When this is not possible, asking colleagues or available language experts for assistance and support minimises the risk of mistakes or misunderstandings. Here are some examples of repositories with resources in English: Applied Math and Science Educational Repository,[26] Commonwealth of Learning,[27] Khan Academy,[28] GALILEO Open Learning Materials,[29] Merlot,[30] OER Commons,[31] Open University.[32]
- Provide clear and explicit instructions. Instructions should be provided possibly both in written and oral form, repeating and highlighting the most important details and avoiding the use of idiomatic language to prevent misunderstandings. Also, establish clear policies as to whether the students' L1 is allowed or whether an English-only approach should be prevalent. This issue is even more pressing in online contexts since often students ask their questions in a written form (using the chat in synchronous courses and the forum in asynchronous ones). According to the literature, the use of translanguaging practices such as allowing students to ask questions in their L1 during tutorials or forums may be beneficial to maximise interaction and help learners with lower language proficiency.

25 See https://www.coe.int/en/web/portfolio/self-assessment-grid.
26 See https://amser.org/.
27 See https://www.col.org/.
28 See https://www.khanacademy.org/.
29 See https://oer.galileo.usg.edu/.
30 See https://www.merlot.org/merlot/index.htm.
31 See https://oercommons.org/.
32 See https://www.open.ac.uk/.

- Simplify language without oversimplifying concepts. Using the specialised technical language of the field and at the same time non-technical language to unravel it both enriches students' vocabulary and helps them cope with the challenges of studying in a foreign language.
- Rephrase to repair communication breakdowns: in asynchronous courses, use your experience to anticipate points that may need to be rephrased and offer a variety of materials and exercises where the same concepts are explained in different ways.
- Use compensatory strategies: speak slowly and vary intonation; check the pronunciation of the most commonly used words in the specific field; use circumlocution when not remembering a word; make use of visual aids; avoid the excessive use of filler words (such as "hmm", "so", "like"); work on grammatical and lexical cohesion; use a thesaurus while preparing the lessons to look up synonyms and expand the repertoire. The same strategies can be applied when recording asynchronous videos.
- Structure the lecture (introduction, body, conclusion) and use set phrases and anchors in order not to get lost and to help students following the lecture.
- Provide language support. Although academic/content-related needs and specialised vocabulary should be the primary focus of language support, communication and effective interaction is key to keeping students motivated and engaged. In case of synchronous online courses, ask students questions and encourage them to do the same; use signposting phrases to anticipate lesson contents at the beginning and summarise them at the end; provide slides in advance; pre-teach technical vocabulary and provide glossaries and keyword lists. In the asynchronous environment, make up for the lack of interaction with review games and activities for vocabulary learning (Moodle offers a wide choice of quiz options); as mentioned before, design adaptive exercises.
- Provide scaffolding for independent study. One of the reasons EMI may be used is to give students access to publications in English. Especially in case of asynchronous courses, providing language scaffolding tools such as glossaries or vocabulary front-loading is essential. Students may also be prompted to install a free ebook reader on their devices and connect

it to a monolingual or bilingual dictionary, thesaurus or AI translation tool; in addition, they may also be encouraged to use free software that simplifies reading, such as Rewordify.[33]

- When giving a lecture or recording video lessons, focus on accuracy. The pronunciation may display L1 features, but it should generally be accurate in terms of intonation and stress. For a more natural pronunciation, remember that the English language tends to stress lexical words (nouns, verbs, adjectives and adverbs) instead of grammatical terms like articles, prepositions and auxiliaries; also components that need to be emphasised in a sentence are given prominence. When checking the pronunciation of a word, do not forget to check word stress too (using online dictionaries with audio pronunciation is of great help).
- Provide scaffolding in the 4 language skills. Be aware that the asynchronous learning environment tends to favour passive linguistic skills (reading, listening) rather than active ones (speaking, writing): provide templates to guide students; create brief quizzes to assess student understanding, such as multiple choice, cloze, matching and short answer questions; use sample assignments and rubrics to help students understand expectations; encourage students to learn how to self-assess.
- Adapt student engagement strategies. Depending on the student population, or target audience in open online courses, but also on the level of confidence with the English language, teachers may need to provide examples that are more culturally accessible, and decide whether to use anecdotes, humour and metaphorical language.
- Be consistent with the chosen variety of English. Avoid alternating between, for example, British English and American English spelling and pronunciation to prevent confusion.
- Make formative and summative assessment consistent with learning outcomes. As far as language mistakes are concerned, in EMI literature there is a general consensus that students must be given feedback throughout the course in order to help them use the English language more effectively. However, for written exams, content lecturers should only concentrate on communication as a goal and the use of specific terminology and discourse, ignoring the precise correction of grammatical errors. In oral

[33] See https://rewordify.com/.

exams, characteristics of multilinguals such as sporadic code-switching or non-standard language usage that does not interfere with communication or hinder comprehension should not be punished.

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