EUROPEAN UNIVERSITIES ALLIANCE FOR SUSTAINABILITY:
RESPONSIBLE GROWTH, INCLUSIVE EDUCATION AND ENVIRONMENT

GUIDELINES FOR DIGITAL PROVISION OF MODULES FOR UNDER-REPRESENTED LEARNERS

Task 7.3

EDITURA UNIVERSITĂȚII DIN ORADEA

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- Maximum **one file** per deliverable should be uploaded (the allowed formats for the file are doc, docx, odt, rtf, pdf, csv, zip). If you wish to upload several files, please create a zip and upload that zip.
- The first section of the deliverable shall be an **abstract** of 500 characters maximum.
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- During the elaboration of deliverables, it is essential to consider the rules on **data protection and data management**.

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TABLE OF CONTENT

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ABSTRACT

The EU GREEN Alliance aims to enhance access to sustainable development education for underrepresented learners within Work Package 7 (WP7: Access, Diversity, Inclusion). One milestone to achieve this aim is to develop ***Guidelines for the digital provision of modules for underrepresented learners***. The guidelines will provide practical recommendations for creating accessible and inclusive digital learning materials, including Massive Open Online Courses (MOOC), that cater to the specific needs of underrepresented learners.

This guide is developed based on the *Inclusion and Diversity Chart* (2023), which aims to identify under-represented categories of learners at the level of EU GREEN Alliance and the *EU GREEN's Educational Strategy and Guidelines*, which is focused on developing a recognized learner-centered and research-inspired education hub on sustainability, developed in Work Package 2, in 2023-2024. The Education Commission will provide the EU GREEN educational framework and its macro educational principles, developed in 2023-2024 in the Educational Strategy of the EU GREEN alliance and the Guidelines for the MOOC.

For developing the *Guidelines for the digital provision of modules for underrepresented learners*, after documenting and consulting the ID Chart (WP7) and the EU GREEN Educational Strategy (WP2), the description of the underrepresented groups of learners and the macro educational principles were included. The focus of this guide is to describe the needs of underrepresented learners in an online context and to identify the specific principles regarding the accessibility of digital materials and the inclusion of underrepresented students in learning activities in the digital environment. Also, specialists in inclusive education and instructional design from the alliance will provide recommendations and concrete examples regarding the development of educational objectives, learning content, and assessment methods that are accessible to underrepresented learners, illustrating them as a model of good practice in the development of targeted MOOCs towards the SDGs, addressed to all categories of learners.

Definitions Key

- *Under-represented categories of adult learners (UDLs)*: They include diverse groups, such as immigrants, people with disabilities, low-income categories, etc., who have limited access to education and vocational training for various reasons.
- *Digital modules or digital materials* refer to learning resources designed to be delivered electronically. These can include online courses, interactive tutorials, videos, and other digital content. They offer a flexible and accessible way to deliver instruction and can be customized to meet the needs of diverse learners.
- *Sustainability* refers to the ability to meet society's current needs without compromising the resources and opportunities of future generations. It balances economic development, environmental protection, and social welfare.
- A Massive Open Online Course (MOOC) is a free online course aimed at unlimited participation and open access via the Web. MOOCs provide access to high-quality educational content, often from renowned universities and institutions. They typically consist of video lectures, readings, quizzes, and assignments.
  Key characteristics of MOOCs:

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- Massive: They can accommodate a large number of learners.
- Open: They are freely accessible to anyone, regardless of background or location.
- Online: They are delivered online using various digital tools and platforms.
- Course-based: They follow a structured curriculum with specific learning objectives.

General Objective:

These guidelines aim to empower educational professionals and curriculum developers to create a more inclusive and accessible digital learning environment that fosters the active participation of under-represented adult learners (ULRs) in achieving a sustainable future. This will be achieved by providing practical guidance aligned with the EU GREEN Alliance's educational strategy and guidelines.

The Sections of the Guide and the Specific Objectives:

Section 1: Understanding Under-represented Learners Needs and Challenges in Digital Education

- Enhance the understanding of educational professionals and curriculum developers regarding the diverse categories of ULRs and the unique challenges they face in digital learning environments.

Section 2: Accessible & Inclusive Digital Materials for Under-represented Learners

- Guide educational professionals in developing digital learning materials that adhere to accessibility standards, ensuring ULRs with disabilities can fully participate.
- Promote the creation of inclusive content that resonates with the diverse backgrounds and experiences of ULRs.

Section 3: Developing MOOCs on SDGs for Under-represented Learners

- Provide educational professionals and curriculum developers with a practical framework for designing and developing MOOCs (Massive Open Online Courses) focused on Sustainable Development Goals (SDGs) that are specifically relevant and engaging for ULRs.

A**nnex: Instruments and Tools for Adapting Digital Materials for ULRs:**

- Equip educational professionals and curriculum developers with valuable resources and tools to adapt and customize digital materials for improved accessibility and inclusivity for ULR learners.

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METHODOLOGY USED

Please, in this section do not forget to answer the following questions:
- What qualitative indicators are covered in the report?
- What quantitative indicators are covered in the report?
- What is the impact of the achievement in terms of sustainability and SDGs?
- How does this deliverable interact with other tasks, milestones, and deliverables with EU GREEN?
- What is the structure of the report?

Key steps of the methodology:

1. *Needs analysis:*

- Review of specialized literature: We will analyze the existing studies and documents that refer to:

- The educational needs of adult learners from under-represented categories.
- The specific challenges these learners face in digital learning.
- Effective strategies for developing digital materials and digital inclusion for adults from under-represented categories.
- Current trends in adult education, especially regarding skills training needed for the green and circular economy.

- *Expert consultation:* We will collaborate with the experts from the WP2 and WP3. Experts will contribute to the following:

– Aligning with EU GREEN Educational Strategy: WP2 will ensure that this guideline is aligned with the macro-principles of the EU GREEN Educational Strategy, promoting 1. alignment with education for sustainability, 2. transformative teaching and learning, 3. transnational and pluricultural learning, 4. ethical and value-driven learning, 5. technology to enhance learning, and 6. learning for employability, entrepreneurship, and social impact.
– Providing the Guidelines for the digital provision of MOOCs
– Evaluating the Guide from the perspective of experts in education and research.

2. Development of the framework:

- *Identification of key principles:* The fundamental principles underlying the creation of accessible and effective digital materials for adult learners from under-represented categories will be defined. The principles will include:

- Alignment with the EU GREEN Education Strategy: Integrating the key principles of the EU GREEN Education Strategy (e.g., education for sustainable development, transformative teaching, and learning) in developing digital materials.
- Incorporating UDL principles: Universal Design for Learning (UDL) principles are applied to create flexible materials that adapt to diverse learning styles and learner abilities.
- Using different content formats to increase their accessibility for under-represented adult learner categories: Adapting materials to the educational needs of students from

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under-represented categories by integrating text, images, audio-video materials, case studies, and other multimedia formats to create attractive and accessible content.

- *Development of a practical guide*: A detailed guide will be developed to provide clear and easy-to-follow instructions to teachers and curriculum developers for creating digital materials for under-represented adult learners. The guide will include:

- A presentation of the fundamental principles identified.
- Resources and concrete recommendations regarding the choice of strategy and content adaptation in developing digital materials for different categories of under-represented learners.
- Examples of good practices from partner universities.
- Useful resources for deepening knowledge in digital materials development for under-represented categories of learners.

3. Dissemination:

- Publication of the guide: The guide will be freely available to teachers, curriculum developers, and other interested parties.
- Monitoring and evaluation: The guideline will be adjusted based on feedback.

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SECTION 1

UNDERSTANDING UNDER-REPRESENTED LEARNERS' NEEDS AND CHALLENGES IN DIGITAL EDUCATION

This section provides a comprehensive overview of underrepresented students, focusing on their distinctive challenges in accessing digital education. The analysis will address the challenges encountered by these students, including the digital divide, insufficient digital literacy skills, and various accessibility issues. Additionally, this section will explore how underrepresented learners (URLs) confront obstacles in digital education and how the EU GREEN Alliance promotes inclusive and sustainable learning. This initiative seeks to identify effective strategies for fostering inclusive and sustainable learning environments through a comprehensive literature review and consultations with experts from the EU GREEN Alliance. Furthermore, we will examine how the EU GREEN Alliance's initiatives can effectively address these challenges and enhance online learning opportunities for URLs.

1.1 Defining Underrepresented Learners

Who are Under-represented Learners (ULRs)?

Under-represented learners (URLs) are adults who face systemic barriers to participating in education due to factors such as race, ethnicity, socioeconomic background, disability, language, gender, age, or geographic location. These learners can often be marginalized in traditional learning environments and benefit significantly from inclusive digital educational strategies. The 2023 ADI CHART report identified several under-represented student groups in the university:

1. Students from different cultural backgrounds enrolled at the university

    1.1. Students belonging to national and ethnic minorities

    1.2. Refugees/Migrants

    1.3. International students

2. Students with different medical conditions (disabilities/disorders) enrolled at the university

    2.1. Motor and Sensory disabilities (i.e., Hearing and Visual disabilities)

    2.2. Mental disorders (i.e., neurological impairments, clinical disorders)

    3. Students enrolled at the university whose access is hampered by socioeconomic factors

    3.1 Low-income individuals in different situations (Single parent; Orphan; Low-income in family who lack technological means for digital transition)

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3.2. Students whose training opportunities are limited by geographical factors enrolled at the university (located in remote or rural areas or areas not sufficiently serviced by public transportation)

4. Students from families with no history of third-level education, namely first-generation students enrolled at the university

5. Students from underrepresented genders who are subject to gender-based inequality, harassment, or discrimination (i.e., students identifying on the LGBTQIA+ spectrum, girls, and underrepresented genders to pursue STEM education)

6. Senior students enrolled at the university (aged 50 and above).

1.2 Needs and Challenges Faced by Underrepresented Learners in Digital Education

What are URL's Needs and Challenges in digital education?

Each of the above categories of under-represented students faces specific needs and challenges in the context of digital learning. For example, students with disabilities may need adapted teaching materials or technical assistance, while students from disadvantaged backgrounds may need access to digital devices and internet connections.

Knowing their challenges has a key role in creating digital materials that meet their needs and in developing specific inclusion strategies through digitalization for each group. The table below provides an overview of the different challenges, needs, and inclusion strategies for each under-represented category of students. When feasible, challenges, needs, and inclusion strategies have been grouped based on the following topics: skills for digital education, content of learning and assessment, and social, emotional, or financial support.

Table 1. Challenges and needs for under-represented categories of students

Under-represented categories of students	Challenges	Needs
1. Students from different cultural backgrounds enrolled at the university	Language barriers in learning	To understand digital content predominantly in a single language (e.g., English).
	Adaption to a foreign academic environment	To reduce differences in expectations regarding participation, self-directed learning, and communication with instructors
	Understanding expectations for assignments	To meet assignment expectations, especially in a digital setting where they might not have direct access to instructors for clarification.

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	Financial Aid Accessibility	Emigrants and international students may also have difficulty accessing scholarships or financial aid programs that could help them cover the costs of online education.
	Fewer opportunities for direct emotional support	To reduce stress and mental health issues which arise from the pressure of studying in an unfamiliar environment. To feel accepted and secure.
2. Students with different medical conditions (disabilities/disorders)	Physical difficulties such as mobility problems, deafness and hearing impairment, blindness and visual impairment	To have digital accessibility compliant with WCAG, access to assistive technologies (e.g., text/files in alternative formats, sign language interpreter, text enlargement software, screen readers, exam note-taker, Braille transcription of subjects, specialized keyboards and mice), individualized support tailored to needs and adapted teaching strategies.
	Mental and psychological difficulties	To have individualized support and teaching strategies, flexibility in completing courses/classes, e.g., more time to learn, more time during exams, and access to psychological counseling.
	Specific learning difficulties related to neurodiversity, e.g., autism spectrum, ADHD, dyslexia, dysgraphia, dyscalculia, dysorthography	To have individualized support and teaching strategies, flexibility in completing courses/classes e.g. more time to learn, more time during exams. The possibility of using a learning assistant. Using Easy-to-Read Language
	Lack of access to assistive technologies	To have financial support to get access to education.
	Emotional or psychological problems	To have psychological and emotional support,

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	connected with disabilities	individualized path of studies, and flexible time of studies.
3. Students with limited access due to socioeconomic issues	Lack of financial resources, difficulty accessing technology, limited time for study.	Free or affordable educational resources, scholarship and grant programs, and flexible learning opportunities.
	Lack of access to internet due to a place of living (i.e., remote or rural areas)	Possibility of using computer equipment and the internet, free travel to the place of studies
4. First-generation students	Lack of familiarity with the academic environment in general, difficulties navigating the educational system	To be counseled to understand the academic system and develop academic study skills.
	Lack of digital literacy and navigation skills	To get familiar with using digital tools effectively
	Paucity in finding a model in family	The need to be familiar with academic expectations, particularly around how assignments and projects are graded
	The lack of academic mentorship or role models.	To get a support system for success
	Lack the intrinsic motivation that comes from family expectations or prior academic experience	To maintain their interest in digital education.
5. Underrepresented genders - subject of gender–based inequality, harassment or discrimination	Gender stereotypes, gender-based discrimination.	Non-discriminatory teaching materials and programs should be provided to promote the participation of women and girls. Using inclusive language
	Social and cultural barriers	Materials, graphics, etc., should include equal gender representation. Inclusive language in communication should also be used to avoid stereotypes.

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	Psychological problems, lack of security	To have access to psychological support. It is possible to report undesirable behavior in a safe environment.
6. Senior students	The lack of basic computer skills	To get familiar with using digital tools and platforms
	Difficulties in online communication	To learn how to communicate using emails, discussion forums, and video conferencing tools
	Time management	To perform tasks on time.
	Evaluation of Online Resources	To synthesize digital content for assignments and exams
	Active engagement	To stay engaged with the material, including participation in forums, completing assignments, and collaborating with peers.
	Self-motivation for self-directed learning	To build skills in motivation, goal-setting, and independent learning

It is important to note that no one strategy is universal and that the specific needs of each under-represented student group may vary.

1.3. Creating Inclusive Learning Environments for Underrepresented Learners

This subsection aims to guide academic staff in creating inclusive learning environments for underrepresented learners using various activities. Activities can be classified as follows:

1. Activities related to the teacher`s role (icebreakers, setting rules, giving feedback)
2. Activities implemented by teachers but related to colleagues' roles, such as peer support networks for learning (group work) or opportunities for students to share their identities and personal experiences, which can enhance understanding and inclusivity.
3. Activities with everybody involved (i.e., Celebrate cultural events)

Below, we provide key examples of activities concerning each typology:

Activities related to the teacher`s role

- Collaborative introductions: instead of individual introductions, have students work in small groups to create a presentation or video showcasing their backgrounds, interests, and learning goals for the course.
- Virtual breakout rooms: utilize breakout rooms in video conferencing platforms to facilitate small group discussions, brainstorming sessions, or collaborative projects.
- Online games and polls: incorporate online games, polls, or quizzes related to the course content that also allows students to learn about each other's backgrounds in a fun way.

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- Develop a digital code of conduct: create a code outlining expected online behavior, including guidelines for respectful communication, academic integrity, and addressing potential issues like cyberbullying.
- Utilize anonymous feedback channels: provide students with anonymous channels (e.g., anonymous polls, online surveys) to report any concerns about online interactions or potential bias in the course.
- Active online presence: instructors should monitor discussions, respond to questions promptly, and intervene in disrespectful interactions.
- Develop clear reporting procedures: establish clear procedures for students to report any incidents of discrimination or harassment online. Ensure a fair and supportive process for addressing these issues.
- Setting rules: provide a set of clear rules:
    - Use inclusive and respectful language
    - Use an individual approach depending on the needs of the student
    - Plan the activities, mixing and adapting approaches and materials to the needs and inclinations of the students, facilitating and supervising the process.
    - Provide digital devices if necessary to enable all students to participate equally or avoid using personal devices if they accentuate differences and create discrimination.
    - Create multimedia content that is accessible and inclusive for all and choose a website and digital tools that allow everybody to participate fully.
    - Adapt the time available and the level required to the possibilities of your students and diversify tests and materials.
    - Get informed and use digital tools to support students with special educational needs and learning disorders.
    - Apply tutoring activities and cooperative learning methods to support students and meet their needs and possibilities.
    - Provide alternative forms of communication with students, e.g., chat.
    - Respecting equality in teaching materials (due to gender, race, ethnicity, disabilities, etc.)

Activities implemented by teachers but related to colleagues` roles:

- Building peer support networks (Peer Learning and Group Work) - (related to colleagues` direct involvement)
- Incorporate diverse perspectives and experiences by including multimedia content like videos, podcasts, and articles created by scholars and experts from underrepresented backgrounds.
- Showcase student work that reflects diverse backgrounds and perspectives. This could be done through online presentations, student blogs, or the course website's feature of student work.
- Constructive/Positive Feedback Mechanisms (related to the teacher's direct involvement)

Activities with everybody involved:

- Celebrate cultural events
- Integrate online discussions or activities celebrating cultural holidays or traditions.
- Emotional Support (Counselling Services) involving professionals and senior peers

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1.4. The Role of the EU GREEN Alliance in Promoting Access, Diversity, and Inclusion in Digital Education

The present section describes some good practices adopted by the EU GREEN Alliance to support underrepresented learners in digital education. Below is a list of EU GREEN services supporting Access, Diversity, and Inclusion in digital education.

- Dedicated Support Offices: Many universities have established dedicated offices or centers for URL support. These offices provide a range of services, including personal assistance, technical aids, and coordination of exam accommodations.
- Assistive Technology: access to assistive technologies such as screen readers, Braille devices, and specialized software is commonly provided to support students with visual or learning disabilities.
- Accessible Stations: availability of equipped accessible computer workstations with internet connection, adjustable tables with remote control, screen readers, computers with wireless keyboards and mice, vision-impaired keyboards, desktop video magnifiers, poet compact, and software for DSA
- One-to-one learning support, learning support tutors and academic tutors, and many other supports: 'Quiet Rooms' for neurodivergent students, targeted transports, Education Support Workers for students with physical or sensory disabilities, examination support and examination accommodations, electronic and class note-takers, alternative print format, assistive technology and assistive technology training, personal assistants, interpretation services.
- Inclusive Learning Environment: efforts to create inclusive learning environments include adaptations to physical spaces, alternative print formats, quiet rooms for neurodivergent students, and customized learning materials.
- Scholarships and Financial Support: special scholarships and financial aid programs are available for URLs to help cover additional costs related to their education and living expenses.
- Laptop loans and access to digital resources for academic and digital Support: Laptops and internet access are provided to bridge the digital divide.
- Academic workshops, tutoring, study groups, and personalized study plans for digital courses.
- Offering scholarships, grants, and reduced tuition fees for senior students.
- Availability of flexible course schedules, including evening and online classes, to accommodate diverse lifestyles and commitments.
- Develop part-time and modular study options for senior students to progress independently.
- Develop lifelong learning programs and courses tailored to the interests and needs of senior students.
- Availability of contact forms to report digital assets that do not comply with accessibility principles
- Plug-ins that can check the degree of accessibility of online content made available both for teachers and students

Each service listed above is available in at least one of the EU GREEN Alliance universities. Several listed services can support students in digital and "offline" education.

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CONCLUSIONS

The present section has highlighted six categories of URLs: students from different cultural backgrounds enrolled at the university; students with different medical conditions (disabilities/disorders) enrolled at the university; students enrolled at the university whose access is hampered by socioeconomic factors; students from families with no history of third-level education, namely first-generation students enrolled at the university; students from underrepresented genders who are subject of gender-based inequality, harassment or discrimination; senior students enrolled at the university (aged 50 and above).

Per each of the above categories, challenges, needs, and inclusion strategies have been identified. Activities related to the above inclusion strategies have been described and classified to address those challenges and needs based on the role of the teachers and other actors involved.

Finally, the activities currently implemented by the EU GREEN universities to support URLs in digital education have also been listed to define an overview of the Status quo in the Alliance. The following section will provide specific and applied guidance on designing accessible and inclusive digital materials for URLs.

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SECTION 2

ACCESSIBLE & INCLUSIVE DIGITAL MATERIALS FOR UNDER-REPRESENTED LEARNERS

OBJECTIVES:

1. Guide educational professionals in developing digital learning materials that adhere to the six macro-principles of Educational Strategy in the EU GREEN alliance, the Universal design of learning (UDL), the Universal design of assessment (UDA), and accessibility standards, ensuring that underrepresented learners (ULRs) can fully participate.
2. Encourage the development of inclusive teaching strategies in digital education that resonate with the diverse backgrounds and experiences of underrepresented learners.

This section guides on developing or adapting existing digital materials to be more accessible and inclusive for under-represented learners (ULRs) within the EU GREEN educational macro-educational principles, Universal Design for Learning (UDL) and Universal Design for Assessment (UDA) framework.

2.1 EU GREEN Macro-educational Principles and Digital Material Design for Underrepresented Learners

The EU GREEN initiative outlines six macro-principles for education, providing a framework for organizing educational processes within the alliance. This EU GREEN initiative outlines comprehensive educational principles that foster sustainability, transformative learning, transnational collaboration, ethical conduct, and technological advancement. These principles provide a robust framework for developing educational programs that address global challenges and prepare students for the future. By adapting these principles to the specific context of digital material development, we aim to create inclusive and compelling learning experiences for URLs, such as students from different cultural backgrounds, students with different medical conditions (disabilities/disorders), students whose access is hampered by socioeconomic factors, students from families with no history of third-level education, students from underrepresented genders who are subject of gender-based inequality, harassment or discrimination, senior students enrolled at the university (aged 50 and above). This section offers a framework for designing digital resources that align with the EU GREEN's vision of sustainable, equitable, and innovative education.

Figure 2.1 will explore how each principle can be applied to the development of digital materials, focusing on addressing the challenges URLs face. This figure illustrates the six core macro-principles outlined in the EU GREEN initiative and their implications for designing inclusive and

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accessible digital materials. Each principle is associated with specific strategies and considerations to ensure that digital resources cater to the diverse needs of underrepresented learners.

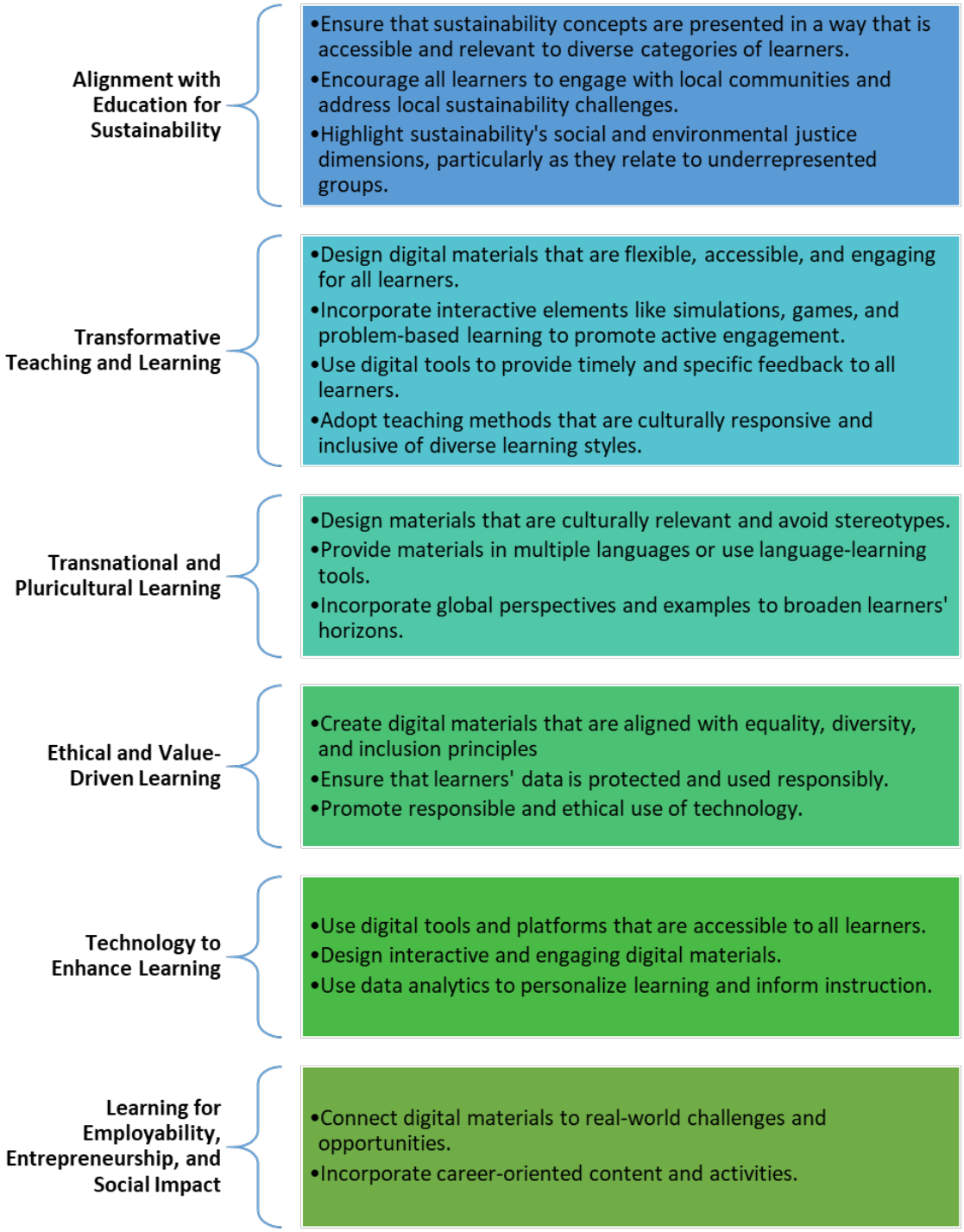

Figure 2.1. Framework for developing inclusive and accessible digital materials based on EU GREEN macro-principles in education

The figure highlights the key areas where these principles can be integrated to create engaging and effective learning experiences for underrepresented learners. Key principles include:

- ✓ Ensure accessible content addresses social and environmental justice.

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- ✓ Create flexible, engaging materials promoting active and personalized learning.
- ✓ Develop materials that foster global perspectives.
- ✓ Focus on accessibility, data privacy, and ethical practices.
- ✓ Use technology to enhance engagement and inclusion.
- ✓ Link materials to employability, entrepreneurship, and social impact opportunities.

2.2. Digital Accessibility and Universal Design for Learning

2.2.1. Digital Accessibility

Context

Digital accessibility ensures all users can access and use information and related technologies.

The European Directive (EU) 2016/2102 (WAD – Web Accessibility Directive) requires public service institutions to produce digital content that is accessible to all users, including people with disabilities. Therefore, the European Directive (EU) 2016/2102 (WAD) is the applicable regulation for the European EU GREEN project.

For the production of MOOCs, specifically videos/audio, we are choosing the WCAG (Web Content Accessibility Guidelines) as a framework. The WCAG is the most widely recognized and used guideline for designing accessible web content. The WCAG defines three levels of compliance: A (minimal), AA (recommended), and AAA (optimal). We choose to comply with level AA of the WCAG, which is a reasonable compromise between accessibility and feasibility.

For MOOCs to comply with WCAG, they must meet the four principles of digital accessibility. A resource is accessible if:

- It is perceivable (can we see it or hear it?)
- It is operable (can I interact with it?)
- It is understandable (do I understand what is expected of me?)
- It is robust (is it compatible with assistive technologies?)

Specification for multimedia resource production

To comply with current regulations, we must provide the following for each video:

- ✓ Synchronized subtitles (text displayed on the screen that corresponds exactly with the spoken words in a video).
- ✓ A full transcript (a written version of the spoken words in a video)
- ✓ Audio description (a narrated description of the visual elements in a video intended for people who are blind or have low vision). This requirement can be bypassed if the video is scripted to ensure all visual elements are described.

Other rules to consider when scripting videos:

- Provide redundancy (providing information in multiple formats to ensure understanding) for sensory characteristics
- Avoid triggering seizures (avoid fast-moving visual sequences)

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- Make subtitles legible (easy to read with sufficient contrast with the background)
- Describe visual information (including on-screen text)

Beyond these obligations, some elements should be considered to promote access and understanding for all audiences. To do this, we must consider the principles of Universal Design for Learning (UDL).

2.2.2. Universal Design for Learning (UDL)

Definition

UDL is a pedagogical approach that promotes learning for all. It reduces barriers that can cause cognitive, emotional, or sensory obstacles in the learning environment. UDL is a theoretical and practical framework rooted in neuroscience, cognitive psychology, and special education. It was developed by David Rose and Anne Meyer, whose significant contributions have shaped the current UDL model. It is the foundation of inclusive education.

UDL aims to anticipate, during the design phase of instructional content, the approaches and strategies that will enable "all students to learn to the best of their ability" without the need for adaptation. It does not exclude functional adaptations that are essential for certain irreducible specific needs.

Relying on digital accessibility and UDL, we can create inclusive MOOCs that meet the needs of the broadest possible audience, particularly those most distant from learning.

Principles of UDL:

UDL is based on three main principles:

1. Provide multiple means of representation (aligns with digital accessibility)
2. Provide multiple means of action and expression (variation in interaction methods, communication)
3. Provide multiple means of engagement (optimize authenticity, for example, emphasize the importance of learning objectives, develop the capacity for self-assessment and reflection)
   (More info on the UDL website)

Recommendations for MOOCs production

Plan from the design stage of MOOCs:

1. Take into account digital accessibility requirements
2. Provide multiple resources and means to convey information (videos with transcripts and captions, clear visuals with an alternative text, reading materials with clear language…)
3. Give clear objectives and instructions
4. Provide multiple means of expression and assessment
5. Encourage exchanges between learners or between learners and teachers
6. Ensure pedagogical alignment between learning objectives and how they are assessed

Summary and objectives

To best anticipate the production of MOOCs, the EU GREEN alliance wishes to:

- ✓ Integrate digital accessibility requirements into all informative content or pedagogical support production (video and audio production, office file production, etc.) from the design stage of MOOCs

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- ✓ Consider the principles of Universal Design for Learning from the design stage of MOOCs to better meet the needs of "underrepresented learners".
- ✓ Avoid a logic of adaptation by designing inclusively to meet the needs of the widest possible audience.

2.3. Universal Design for Assessment (UDA)

Providing inclusive education requires offering flexible and adaptable assessment methods. This includes incorporating alternative formats, such as audio recordings or multimedia presentations, alongside traditional written exams. Students should be able to demonstrate their learning in ways that align with their circumstances and abilities, especially for those with disabilities or specific learning disorders. For instance, accommodations like extended time, assistive technologies (e.g., speech recognition software, screen readers), or adjustments to assessment formats (e.g., enlarged fonts, increased contrast) can ensure accessibility.
Online tools, such as interactive quizzes, online essays, and digital portfolios, can also diversify assessment methods, enabling students to showcase their understanding in formats that suit them best. While adaptability is essential, it must be emphasized that modifying teaching and assessments does not mean lowering academic standards. As outlined in course syllabi, knowledge requirements must remain intact to ensure equitable and high-quality education for all.
Providing sufficient human and financial resources for adapting teaching and assessments is essential. Universities should take responsibility for this rather than leave it to individual teachers without the necessary support.
While most assessments can be adapted, certain practical elements, such as laboratory work or school-based training for teacher education programs, may present challenges to full adaptation. These situations require careful consideration to balance accessibility with maintaining the integrity of the learning objectives.
Under-representation caused by limited accessibility, whether due to geographical distance or incompatibility with relocation, should also be addressed. Digital tools can play a significant role in enabling students to participate in teaching and examinations remotely, reducing barriers to access. Ultimately, an inclusive approach to assessment must support flexibility while maintaining high academic standards, ensuring all students can succeed without compromising the integrity of their education.

2.4. Recommendation for designing instruction through digitalization to support under-represented learners

This section will explore the effective design of digital modules and materials tailored to the specific needs of underrepresented learners. Digital modules and materials refer to online resources learners can access and use independently. They offer a flexible and accessible way to deliver instruction and can be customized to meet the diverse needs of underrepresented learners.

The framework of a digital module encompasses four essential elements (see Figure 1):

1) Educational objectives and intended learning outcomes
2) Scientific content tailored for effective learning and accessibility

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3) Engaging teaching strategies
4) Assessment methods and grading criteria

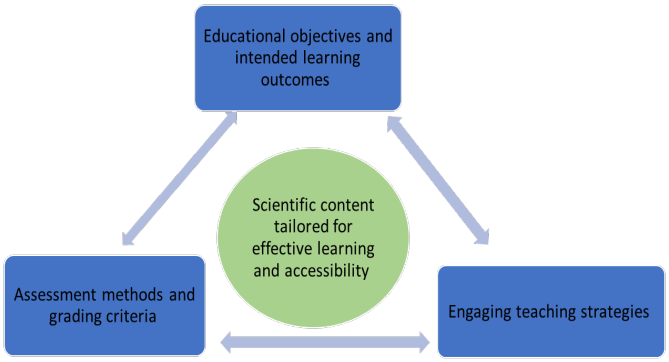

Figure 1. Core Components of a Digital Module

This section will present recommendations for five key questions regarding learning objectives, learning content, teaching strategies, and assessment methods. The aim is to create more inclusive and equitable learning through digitalization to support under-represented learners.

1. ***What are the key considerations for designing inclusive learning objectives for underrepresented learners in digital materials?***

Teachers should consider at least three criteria when crafting learning objectives for a module, particularly in a digital learning context (see de figure 2). The learning objective should be:

- ✓ *Clear and specific* so learners know exactly what is expected of them.
- ✓ *Cultural relevance and inclusivity* to ensure that all students feel valued and represented.
- ✓ *Relevant to real-world issue*s to motivate students and prepare them for future challenges.

These criteria ensure that the learning objectives are clear, relevant, and inclusive for all categories of learners.

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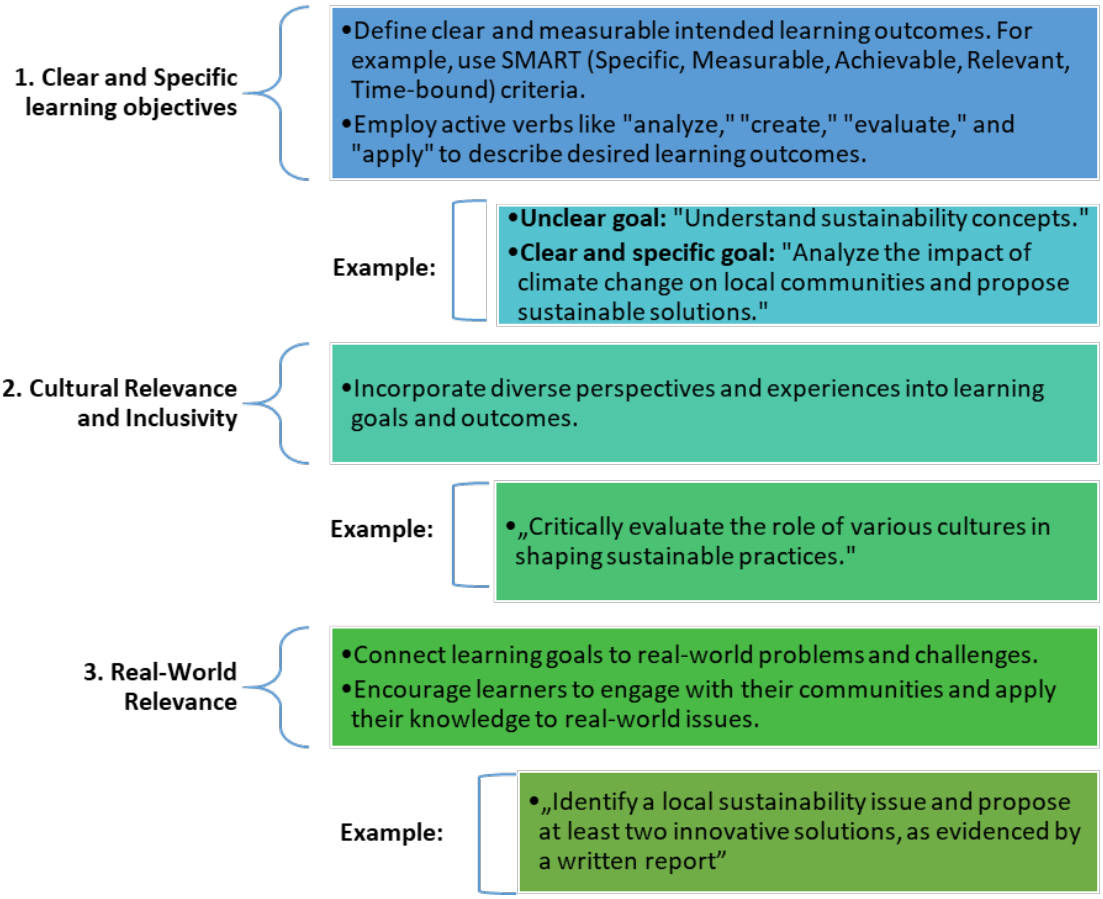

Figure 2. Ensuring Clear, Inclusive, and Relevant Learning Objectives

Educational objectives must be specified at the beginning of the training period. Participants should receive a clear overview of the module's overarching goals and specific learning outcomes for each unit. These objectives should be clearly articulated to ensure learners understand the skills and knowledge they are expected to acquire.

Various assessment methods will be employed to monitor progress and ensure accountability. These include formative assessments to gauge ongoing learning, summative assessments to evaluate final understanding, and self-assessments to encourage reflection and self-directed learning. This comprehensive approach will support participant development and enhance the overall learning experience.

2. ***How do we adapt learning content in digital materials for underrepresented learners?***

The strategies to adapt the learning content will incorporate universal design principles for learning and accessibility. This ensures that the digital module is both accessible and inclusive for underrepresented learners. Figure 3 outlines several general recommendations.

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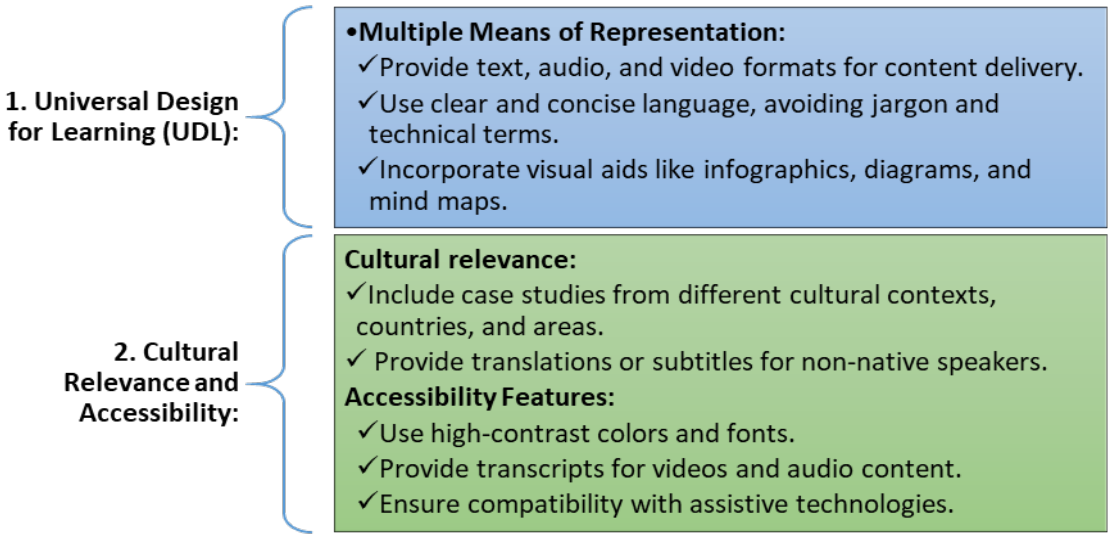

Figure 3. Applying Universal Design Principles and Cultural Relevance and Accessibility to Digital Learning

Implementing these strategies can create more inclusive and equitable digital learning experiences for all learners. However, when considering the specific needs and challenges of students in learning digital materials, we must take into account the needs of underrepresented students and develop and make learning content accessible according to these needs:

Implementing these strategies can create more inclusive and equitable digital learning experiences for all learners. However, when considering students' specific needs and challenges in learning digital materials, we must consider the needs of underrepresented students and develop and make learning content accessible according to these needs, as described in Section 1.

Implementing the above strategies can also foster more inclusive and equitable digital learning experiences for underrepresented learners. Incorporating the principles of Universal Design for Learning (UDL), prioritizing accessibility, and addressing the specific needs of these groups will ensure that digital learning materials are effective and engaging for all participants.

3. What digital tools can be used for underrepresented learners?

A range of digital tools can enhance accessibility, engagement, and the overall learning experience to support the diverse needs of underrepresented learners. Figure 4 synthetically illustrates a few free digital tools that URLs and teachers could use if needed.

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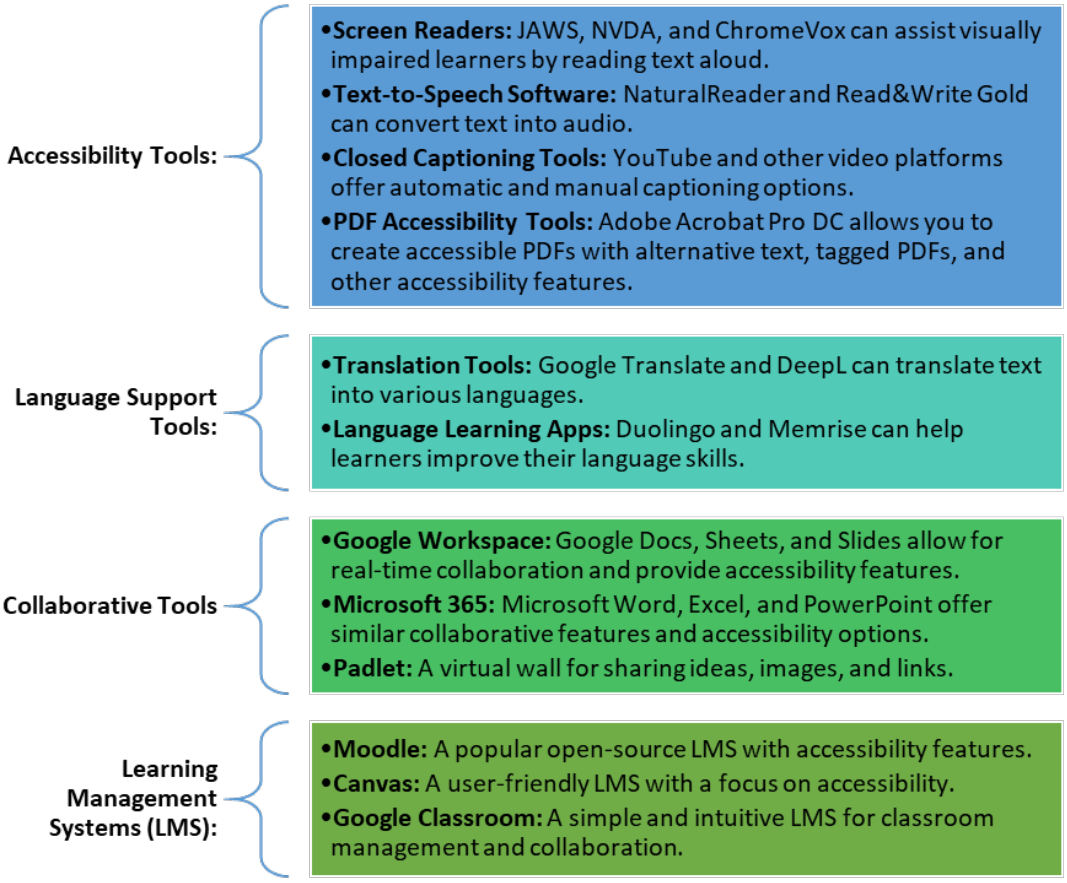

Figure 4. Enhancing Accessibility with Digital Tools

An additional list of digital tools can be found in the annexes.

4. ***How do we adapt the teaching methods for underrepresented learners in a digital module?***

To effectively adjust teaching methods for underrepresented learners in digital modules, we can leverage the principles of Universal Design for Learning (UDL). UDL offers a framework for developing inclusive learning environments that address the diverse needs of all learners. Consider these UDL principles:

- ✓ *Multiple Means of Action and Expression:* Offer diverse ways for learners to demonstrate their understanding.
- ✓ *Multiple Means of Engagement:* Use strategies to motivate and engage all learners, such as real-world examples, collaborative activities, and gamification.

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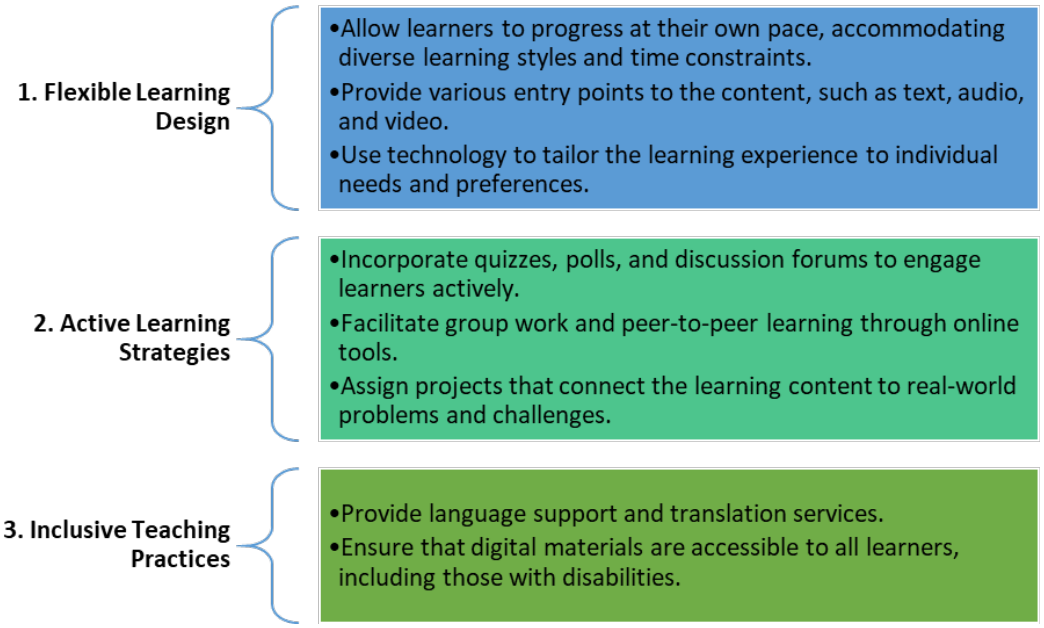

Figure 5. Tailoring Instruction for Diverse Learners

5. ***How can we ensure that digital assessments promote equity and inclusivity while maintaining high academic standards?***

To foster equity and inclusivity in digital assessments while upholding rigorous academic standards, teachers must prioritize flexible assessment formats, accessible assessments, authentic assessments, and equitable grading practices. Moreover, using adaptive technologies can tailor assessments to individual student needs, ensuring that all students are challenged appropriately. For example:

- ✓ Computer with text-to-speech and spellcheck software for examination that does not assess language skills
- ✓ Audio recording of answers instead of writing answers
- ✓ Individual assessment instead of group assessment for examination that does not assess teamwork

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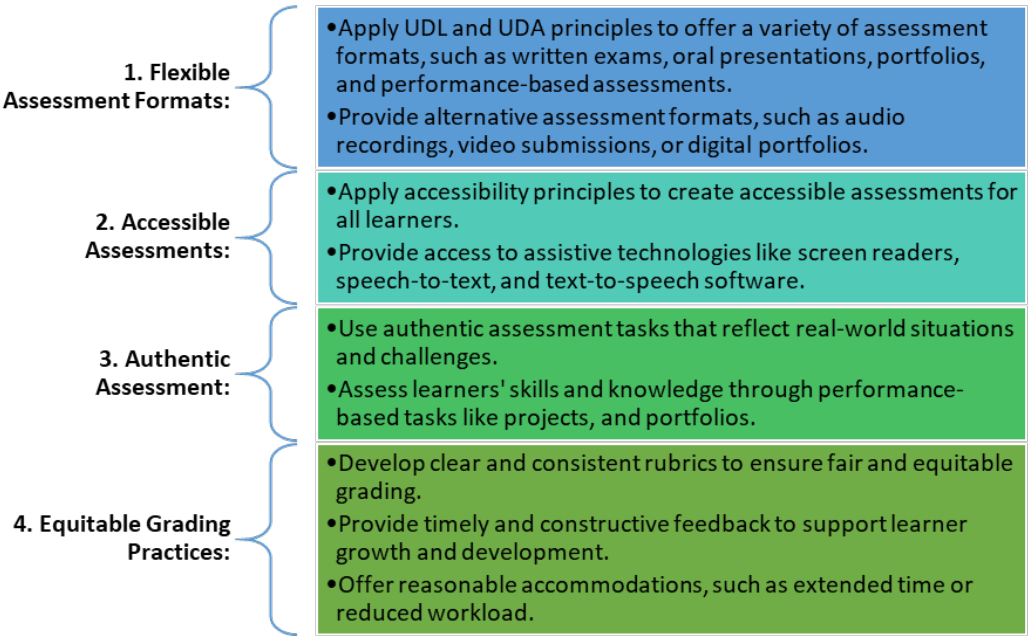

Figure 6. Balancing Rigor and Inclusivity in Digital Assessments

CONCLUSIONS

This section outlines a strategy for developing inclusive digital learning materials that address the diverse needs of underrepresented learners. By integrating Universal Design for Learning (UDL), Universal Design for Assessment (UDA), and digital accessibility principles, we can establish equitable and effective learning environments. The EU GREEN macro-educational principles provide a strong foundation for designing digital materials, prioritizing sustainability, equity, and innovation. Additionally, adhering to digital accessibility standards and implementing UDL ensures that materials are accessible and understandable for all learners. Inclusive assessment practices, such as UDA, allow all learners to demonstrate their knowledge and skills equitably. By carefully designing the core components of digital modules, including learning objectives, content, teaching strategies, and assessment methods, we can create learning experiences tailored to the diverse needs of underrepresented learners.

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SECTION 3

DEVELOPING MOOCs ON SDGs FOR ALL CATEGORIES OF UNDER-REPRESENTED LEARNERS

OBJECTIVE:

Provide educational professionals and curriculum developers with a practical framework for designing and developing MOOCs (Massive Open Online Courses) focused on Sustainable Development Goals (SDGs) that are specifically relevant and engaging for ULRs.

INTRODUCTION:

Building upon the foundation laid in previous sections, this section delves into practical recommendations for developing a MOOC (Massive Open Online Course) on the Sustainable Development Goals (SDGs) that cater to all categories of learners, including underrepresented learners (ULRs), within the EU GREEN Alliance framework.

3.1 Adaptation of MOOC format, content, teaching and learning methods, and assessment for ULRs

Adapting MOOC content for under-represented students starts with identifying the needs of under-represented learner categories. The following guidelines provide a general overview of key considerations for developing MOOC content that is accessible to all learners.

1. Course Structure & Navigation

- **Organised Content**: Use a consistent layout and structure with clear headings.
- **Simple Navigation**: Use clear menus and provide a guide to navigating the course.

2. Text & Font Use (In General)

- **Readable Font & Size**: Use easy-to-read fonts (e.g., Arial, Tahoma, Verdana) at 12-14 pt size minimum.
- **Text Hierarchy**: Use heading styles (H1, H2, H3) in order to organise content.
- **Left-Aligned Text**: Always align text to the left for easier reading.
- **Accessible Lists**: Use bulleted and numbered lists to break down information as appropriate.

  Tip: Create a 'Style Guide' before starting your first MOOC to ensure consistency in exact font choice, header formatting, bullet point styles, and more across all content.

3. Color & Contrast (In General)

- **Sufficient Contrast**: Ensure good contrast between text and background (4.5:1 ratio recommended).

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4. Multimedia (Video, Audio, Images)

- **Video Captions & Transcripts**: All videos should have captions; provide transcripts for audio content.
- **Alt Text for Images**: Add short, descriptive alt text to all images and graphics.
- **Accessible Media Players**: Use media players that can be controlled with options for play, pause, stop

Video Production

- **Length & Engagement**: Keep videos concise. Where possible, 2-10 minutes to maintain attention and focus. (If necessary, consider 'chunking' or adding interactive breaks to longer videos)
- **Resolution & Format**: Use 1280 x 720 HD (720p) resolution with a 16:9 aspect ratio for widescreen displays or 2:1 for smartphones. Preferred file formats: MPEG-4 for video, MP3 for audio, PDF for text, and PNG/JPEG/GIF/SVG for graphics.
- **Camera & Framing**: Position the camera at eye level; ensure the teacher is centered; avoid bright light behind the teacher
- **Lighting & Background**: Illuminate the face at a 45° angle to avoid shadows, and ensure the background is simple and non-distracting.
- **Audio Quality**: Before sound recording, make sure that the microphone is properly configured; after recording, adjust the sound to reduce noise.

5. Interactivity (Quizzes, Discussions, Activities)

- **Clear Instructions**: Provide clear steps for all interactive content (quizzes, discussions, scenarios, etc.).
- **Time Flexibility**: Offer multiple attempts or options to complete activities without a time limit (if adding gamification timed elements, allow for multiple attempts).

6. Links & Buttons

- **Descriptive Links**: Use meaningful text for links (e.g., "Download Lesson Plan" instead of "Click Here").
- **Clear Button Labels**: Label buttons with their exact function (e.g., "Submit," "Start Quiz").

7. Accessible Content Presentation

- **Multiple Formats**: Present content in different ways (text, audio, visual) to meet varied needs and maintain engagement
- **Short Paragraphs & Sections**: Use short paragraphs, bullet points, and subheadings.
- **Plain Language**: Use simple language and explain technical terms (a glossary may be beneficial).

Power Point Presentations

- 1 use a simple PP template in a horizontal arrangement
- 2 use a dark font color on a light background, or vice versa

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- 3 limit the number of slides
- 4 limit the information on the slide (for readability, less is better than more)
- 5 use short equivalents instead of whole sentences
- 6 focus on the readability and transparency of graphics
- 7 use simple tables, pie and bar charts
- 8 use the same sans serif font and its size, e.g., Arial, Tahoma, Verdana
- 9 use simple transitions between slides.
- 10 **Use High-Quality, Relevant Images**: Use images that support the content and avoid overly decorative visuals that don't add to the understanding of the material.
- 11 **Avoid Flashing Content**: Flashing content can be problematic for those with photosensitive epilepsy, so avoid rapidly blinking elements
- 12 **Check for Accessibility**: Use the built-in accessibility checker in PowerPoint to identify and fix any accessibility issues before finalizing your presentation.

8. Testing & Feedback

- **User Testing**: Trial and test before full release to find and fix issues.
- **Accessibility Review:** Test with assistive technologies (e.g., screen readers, keyboard navigation) to ensure all elements are accessible.
- **Gather Feedback**: Include a way for users to provide feedback on accessibility and usability issues during the course.

Resources – Click the title to open

Official:

Universal Design for Learning

WCAG Accessibility Guidelines

Informal:

Writing Tips (MOOC Development resource from ATU)

Video Production Tips (Still under construction but may be useful)

3.2. Case Study: Development of MOOCs on SDGs in an accessible format according to UDL principles

As part of the ATU Higher Ed. 4.0 project, a range of digital learning resources focused on the United Nations Sustainable Development Goals were developed. This included four special purpose awards (short credit-bearing courses), four micro-credentials and 17 MOOCs.

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The development team consisted of lecturers and instructional designers from across ATU. These principles were used by the MOOC team to design a series of MOOCs, 17 in total, each one focused on a single SDG.

The MOOCs are available at Course: Sustainable Development Goals (HE4.0) | ATU

UDL Principles employed by the team

The CAST UDL Framework The UDL Guidelines is built around three core principles:

- 1. Multiple Means of Engagement (the "why" of learning)
- 2. Multiple Means of Representation (the "what" of learning)
- 3. Multiple Means of Action and Expression (the "how" of learning)

The development of the MOOCs applied these principles across multiple aspects of course design and development.

1. Introduction Section

At the beginning of the MOOCs, an overview of the course, instructions on how to complete it, and information about the lecturers who developed the content are provided. These elements help clarify objectives, set expectations and ensure clear navigation. Interactive bios of each lecturer, including "interesting facts," are included to build rapport and motivate learners to engage with the course.

2. Mixed Formats

Multiple Means of Representation: The course provides information in varied formats (videos, text, visuals), ensuring all learners can perceive and comprehend content.

3. Clear and Consistent Navigation

The course follows a consistent structure within each section and across all 17 SDG MOOCs. This predictable format helps reduce distractions and cognitive load, enabling learners to focus more effectively on the content.

4. Quote Activity for Prior Knowledge Activation

At the beginning of each MOOC, a thought-provoking quote is provided to activate prior knowledge and engage learners. The quote encourages learners to form opinions related to the specific SDG and make connections to their own experiences, fostering personal relevance and deeper engagement.

5. Varied Video Types and Content

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Multiple Means of Representation: A variety of different types of videos have been included which offer diverse ways of presenting information (animations, interviews, documentaries etc.) This helps keep learners interested through variation and novelty.

6. Chunking Content

Multiple Means of Representation: The content has been broken down into manageable chunks to aid understanding, long videos have been broken into smaller sections or include interactive activity breaks. Readings were chosen that were relevant and impactful yet not long or overly academic. All of which helps learners to maintain focus by minimising cognitive overload.

7. Glossary of Terms

Multiple Means of Representation: Each MOOC includes a glossary for terms to provide support for vocabulary and language comprehension. Difficult to understand terms have also been set to 'pop-up' with written explanations in videos (learners have agency over using these or not).

8. Exploratory Activities & Collaborative Boards

Multiple Means of Engagement: Each MOOC provides learners with a guided opportunity to explore other resources, data and case studies further. This encourages curiosity and active exploration.

Multiple Means of Action and Expression: Alongside these exploratory activities, optional collaborative sharing spaces have been provided for learners to share their findings/thoughts. This offers learners the opportunity to share and express ideas flexibly in an autonomous and anonymous way. The collaborative boards also offer multiple means of engagement by allowing for various formats (e.g., video submissions, written reflections, or infographics).

9. Accessible Design Standards

Multiple Means of Representation: Efforts were made to ensure

- Transcripts were provided for all videos.
- Text and graphics were designed with high-contrast colours for accessibility
- Alt text was provided for non-decorative images/graphics
- All content is immersive and reader-compatible
- The course was developed using Articulate Rise, where mobile responsiveness was tested and ensured throughout the development process

10. Diverse Case Studies

Multiple Means of Representation: A range of international case studies has been selected for each SDG, providing diverse examples from varied cultural and social contexts. This approach

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ensures that learners from different backgrounds can relate to and better understand the content.

11. Critical Thinking and Reflection

Multiple Means of Engagement: Throughout the course, learners are prompted and encouraged to think critically and reflect on the information related to each SDG. This encourages deeper cognitive engagement through reflective questioning and provides opportunities for learners to articulate their understanding in meaningful ways.

12. Multiple Means of Sustaining Effort and Persistence:

Each MOOC provides a clear pathway for progress, including a task graphic at the top of each section and a progress tracker in the navigation menu. These features help learners monitor their learning journey, promoting engagement and motivation by transparentizing objectives and progress.

13. Formative Knowledge Checks: Multiple-choice questions (MCQs) and Scenarios

Short MCQs at the end of each section help consolidate learning, fostering motivation and a sense of achievement. "Apply Your Knowledge" tasks, often presented as scenarios, provide diverse, real-world contexts that cater to varied learning preferences. These tasks also offer constructive feedback for incorrect responses, supporting learners in refining their understanding and skills.

14. Feedback Opportunity for Learners

At the end of each MOOC, learners are invited to provide feedback to course designers, fostering learner agency and engagement. This feedback allows course designers and lecturers to ensure learners' voices contribute to shaping inclusive learning experiences by identifying and removing barriers and continuously improving accessibility.

EDI Principles

Efforts were made to apply Equity, Diversity, and Inclusion (EDI) principles, focusing on creating an inclusive environment where diverse learners feel represented, respected, and supported. While some aspects overlap with UDL principles, specific examples of EDI implementation are outlined below:

1. **Inclusive Content and Representation:**

By including content from numerous authors, organizations, and diverse case studies, the course aims to ensure that learners see their own experiences reflected, aligning with EDI best practices in representation. Incorporating exploratory activities, such as encouraging learners to explore and compare countries of their choice, allows them to connect the content with their unique

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perspectives. Together, these elements foster cultural awareness and critical consciousness, enriching the learning experience for all participants.

2. Accessibility:

Aligned with UDL principles, the course was designed with WCAG (Web Content Accessibility Guidelines) standards in mind for color contrast, font sizes, and images, ensuring digital accessibility. Alt text has been applied to non-decorative images, while clear headers and section breaks provide a logical structure throughout. Automatic video playback is disabled for multimedia items, and detailed instructions accompany each element, ensuring learners can navigate, understand, and engage effectively with the content.

3. Encouraging Community and Respecting Learner Autonomy:

Discussion spaces and quote activities encourage collaboration and highlight the value of diverse perspectives, while respecting that not all learners may feel comfortable sharing. These activities are optional to accommodate this. Additionally, the course design allows learners the freedom to explore the content at their own pace and in any order they choose, with no restrictions, fostering a flexible and inclusive learning environment.

4. Reducing Barriers:

Efforts were made to reduce barriers by providing resources such as glossaries and transcripts to meet diverse learner needs and promote accessibility. Additionally, texts that were not overly academic were selected, fostering inclusivity for diverse learners. As mentioned above, the course is also designed to be self-paced and exploratory, meaning learners can complete stand-alone activities in small amounts, accommodating those with limited availability.

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ANNEX: INSTRUMENTS AND TOOLS FOR ADAPTING DIGITAL MATERIALS FOR UNDER-REPRESENTED LEARNERS

OBJECTIVE: Equip educational professionals and curriculum developers with valuable resources and tools to adapt and customize digital materials for improved accessibility and inclusivity for ULR learners.

A wide range of tools and technologies are available to facilitate the creation of accessible and interactive digital materials. Some examples include:

- Screen reading software: This software allows visually impaired people to access information on the screen by converting text to speech.
- Subtitles and Transcripts: Make audio information accessible to the hearing impaired or those who learn better by reading.
- Textual descriptions for images: Provide information about the content of images for visually impaired people.
- Accessibility verification tools: Enable identifying and remedying accessibility errors in digital materials.

Choosing the right tools will depend on the type of content you're creating, the specific needs of your target audience, and your available resources. Some examples include:

Online Accessibility Checkers: Tools that scan web pages and other digital content to identify potential accessibility problems and provide suggestions for remediation.

- WAVE Web Accessibility Evaluation Tool: https://wave.webaim.org/ —This is a free tool that scans web pages and provides detailed feedback on accessibility issues.
- aXe: https://www.topwebaccessibilitychecker.com/topchecker/automated-accessibility-testing-tools-axe-vs-a11y/ - Another free tool that analyzes HTML, CSS, and JavaScript accessibility.
- Browser Developer Tools: Most modern web browsers include built-in accessibility debugging tools.

Accessible Publishing Platforms: Online platforms that enable digital content creation (e.g., documents, presentations, and e-learning) with built-in accessibility features.

- Google Docs: https://www.google.com/docs/about/ - Enables the creation and editing of documents online with built-in accessibility features such as spelling and grammar checking, read-aloud options, and reader compatibility of the screen.
- Microsoft Word: https://www.microsoft.com/en-us/microsoft-365/free-office-online-for-the-web —This program provides various accessibility features, including accessibility checking, navigation options with keyboard, and compatibility with screen readers.

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- Adobe InDesign: https://helpx.adobe.com/indesign/user-guide.html —This professional graphic design tool has accessibility features such as PDF accessibility checking and export options for accessible formats.
- Text-to-speech software: Software that converts written text into synthesized speech, providing an access option for the visually impaired or for people who prefer to listen to the content.
- Microsoft Narrator: https://support.microsoft.com/en-us/windows/complete-guide-to-narrator-e4397a0d-ef4f-b386-d8ae-c172f109bdb1 - A free screen reader included with Windows that converts text to the screen in speech.
- Apple VoiceOver: https://www.apple.com/newsroom/2023/05/apple-previews-live-speech-personal-voice-and-more-new-accessibility-features/ - A screen reader pre-installed on Mac devices that convert screen text to speech.
- Google Text-to-Speech: https://cloud.google.com/text-to-speech is a cloud service that converts text to synthesized speech and offers various customization options.
- Assistive Technologies: Software and devices specially designed to help people with disabilities access and use digital technologies.
- Screen Readers: Software or hardware devices that convert on-screen text into synthesized speech, enabling visually impaired people to access digital information.
- Voice recognition software: Allows people with motor or dexterity disabilities to control the computer and enter text through voice commands.
- Alternative input devices: Adapted keyboards, touchpads, and joysticks can be used by people with reduced mobility or difficulty using a standard keyboard and mouse.

Additional resources:

- W3C Web Content Accessibility Guidelines (WCAG): https://www.w3.org/TR/WCAG21/
- UNESCO ICT Accessibility Toolkit: https://www.unesco.org/en/digital-competencies-skills/ict-cft
- CAST UDL Guidelines: https://udlguidelines.cast.org/

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TARGET AUDIENCE

The target audience for the EU GREEN project's guidelines on digital modules for underrepresented learners includes:

Primary Target Audience:

- Educational professionals and curriculum developers: University professors, lecturers, and instructional designers who create educational content.
- Policymakers in higher education: Individuals influencing the direction and implementation of inclusive practices.

Secondary Target Audience:

- Technical staff: IT support, web developers, and multimedia specialists responsible for the technical implementation of accessible materials.
- Students and learners, especially underrepresented groups

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