

ADULT EDUCATORS GUIDE FOR DIGITAL INCLUSION OF ADULTS WITH FEWER OPPORTUNITIES

AI SMM

www.euaismm.com

This is an adult educators guide developed under the framework of the Piloting Artificial Intelligence for integration and prosperity through social media marketing education - AI SMM project co-funded by the European Commission and Erasmus + Programme under the agreement number 2023-1-DK01-KA220-ADU--000154600.

The guide is published electronically in the European Union in english language as a first edition.

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May 2024

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Introduction

The project is inspired by the recent advancements in artificial intelligence (AI) and social media marketing (SMM) and their exponential power to significantly transform the lives of adults with fewer opportunities. AI technology has the capacity to enhance the effectiveness of SMM campaigns by providing highly targeted and personalized content to individuals based on their interests and preferences. This has the potential to increase engagement and reach with specific target audiences, including adults with fewer opportunities who may not have had access to traditional adult education pathways.

Through the use of AI-powered algorithms, SMM campaigns can be tailored to specific demographic and geographic factors, as well as individual behaviors and interests. This can enable organizations to more effectively reach individuals who are historically underserved and underrepresented. The use of AI technology also allows for the optimization of marketing efforts based on real-time data, enabling organizations to make data-driven decisions and adjust strategies as necessary. Moreover, AI-powered chatbots and virtual assistants can provide personalized support and assistance to individuals with fewer opportunities, helping them navigate through complex systems and resources. This can include assistance with job searching, resume writing, and accessing educational resources. Here we respond to the digitalisation as a horizontal and Improving the competences of educators and other adult learning and guidance staff as field specific priority. The use of SMM can also provide adults with fewer opportunities with a platform to connect and engage with others, allowing them to build networks and communities to support their personal and professional goals. Social media platforms can also provide opportunities for individuals to showcase their skills and talents, potentially opening doors

to new opportunities and careers. Here we respond to all generational adult specific priority where we promote intergenerational learning, including learning opportunities and exchanges of experiences of all age groups, especially refugees and migrants, with a view to building better understanding of the European Union and its values, and strengthening European identity. The project is aimed at creating a clear and precise strategy for digital and quality updates in the field of adult education. We enhance the commitment and the role of adult education in the integration and social inclusion of adults with fewer opportunities.

The AI SMM project stems from a thorough analysis of the needs of adult learners with fewer opportunities in various countries mainly based on the The Adult Education Survey (AES) produced by Eurostat that covers adult participation in education and training (formal, non-formal and informal learning) representing of the main data sources for EU lifelong learning statistics. Digitalisation and entrepreneurship are recognised as the two narratives of the future. Artificial Intelligence is the most prominent set of technologies that could be included and considered as innovation in todays adult education. As a result, this project focuses on piloting AI driven tools to foster individual learning approaches, with the aim of promoting social inclusion and the transition to full and independent habitation in a society. The European Association for the Education of Adults (EAEA in its Manifesto for Adult Learning in the 21st century, focused on the two narratives as well. The digital upskilling of adults has become increasingly important in the context of the modern knowledge-based economy. There are several reasons for this. Firstly, digital technologies have become ubiquitous in many aspects of work and life, and are often essential for participating fully in economic and social activities. This means that individuals who lack digital skills may face significant barriers to employment, education, and social participation. Here we answer a need in the intergenerational challenge opening adult education for all. Secondly, the pace of technological change is accelerating, and many jobs that were once considered safe from automation are now at risk. As a result, individuals who lack digital skills

may face long-term unemployment or be forced to take on low-skilled, low-paid work. Thirdly, digital technologies have the potential to increase productivity and innovation, which are essential for driving economic growth and competitiveness. By upskilling adults in digital technologies, organizations and individuals can benefit from increased efficiency, new business opportunities, and improved competitiveness. In addition to these needs, there are also significant benefits to upskilling vulnerable adults in digital technologies, particularly in terms of promoting a stable economic situation. Digital upskilling can increase employability and earnings potential for vulnerable adults. By gaining skills in areas such as digital marketing, data analysis, or web development, individuals can access a wider range of job opportunities and command higher salaries. Here we also address the needs of adult educators and staff working in adult education centers, by providing the necessary tools (AI SMM pathway) to respond to the needs of adult learners with fewer opportunities and facilitate their transition to a better life. Digital upskilling can lead to greater job security and stability for vulnerable adults. By developing skills in areas that are in high demand, individuals are more likely to be able to adapt to changes in the labor market and maintain employment. Thirdly, digital upskilling can promote social inclusion and reduce inequality. By providing vulnerable adults with the skills and knowledge they need to participate fully in the digital economy, they can access a wider range of economic and social opportunities, reducing the risk of marginalization and exclusion. With this partnership we are also addressing another important challenge which is bringing together representatives from the Public, Business and NGO sector to create a solution rather than recommendation.

The overall objective of the project is to initiate an AI driven strategic digital transformation initiative in the field of adult education centered on social inclusion and future proof employment through social media marketing. The project also aims at the creation of AI driven upskilling pathways, since it promotes the practical use of AI to enhance the life of adults with fewer opportunities. Another innovation that this project brings is the direction to increase the inclusiveness and accessibility of adult education through the free and very high quality OER. The OER promotes an AI powered holistic approach in the creation of digital SMM educational material and e-learning platform as a concrete result. Another concrete result will be the creation of a strategic network that will generate new projects. The project offers concrete results and innovation by developing high-quality learning materials for specific target groups, such as adult educators that work with refugees, migrants, minorities and adults with fewer opportunities at risk of social inclusion. . The unique configuration of partners involved in this project brings essential value and promotes cross-sectoral partnership on a European level. The challenges addressed by this project are transnational, and EU collaboration will increase the impact on all levels. Overall, this project is a significant step towards a more digitalized and inclusive approach to adult education, promoting resilience and social inclusion for all generation of people in Europe

Methodology

The activities undertaken by the partner organizations employed a set of actions centered around researching, analyzing, and evaluating both digital and non-digital resources related to four main topics of this guide, incorporating methods and materials derived from practical experiences, such as workshops and resources from SALTO and the Compass manual. The project partners developed and integrated a comprehensive set of digital educational resources, including written materials and stories within the framework of the four different topics, keeping a domain agnostic approach to increase the targeted audience and facilitate an easy downloading, transferability, and reproduction functionality. This methodological approach enhanced with the domain relevant testing and feedback allowed the partners to identify gaps and opportunities for improving the quality of educational materials in the European Union.

The four different topics are elaborated through provision of information on existing digital and non-digital resources and an analysis of the strengths and weaknesses of the existing resources. To complement the research and analysis within a constructive critical perspective, a set of recommendations for the development of high-quality digital educational materials based on the existing resources was included in the elaboration. This guide also could be seen as a digital toolkit for adult educators, staff and other practitioners, including educational materials, guidance on their use, and recommendations for implementation.

Part 1

AI in adult education

At this point it is more than evident that the implementation of Artificial Intelligence in the field of adult education represents more than a transformative shift in the way educational content is delivered, understood, and assessed. As the world progresses at a very fast pace towards an increasingly digital future, the role of AI in reshaping adult education is one of the most important phenomenological observations. This part of the guide examines chapter the current state of AI integration in adult education, highlighting both the potential benefits and the challenges that lie ahead alongside a comprehensive list of tools that could be implemented immediately with evaluation of their usability.

Adult educators are aware that AI powered technological solutions disrupt the delivery of education and the way that learners and teachers interact. These technologies, although not yet totally autonomous, range from adaptive learning systems that tailor educational content to individual learners' needs, to AI-driven chatbots providing support and guidance. The benefits are immediate and visible, saving precious time and effort from the side of the educator and the learner. An important point to make is that these technologies facilitate greater accessibility for learners with diverse needs, in particular to adult learners with fewer opportunities. As we claim disruptiveness, we could not claim a totally full advancement as the integration of AI is still in the very beginnings. Many AI systems, despite the greatness of the technology, lack the sophistication to fully understand and adapt to the nuanced needs of adult learners, who often juggle educational pursuits with professional and personal responsibilities. The technology is not perfect and it is not nearly as effective as a good adult educator. This is a claim around which

most of the evaluators of adult education and experts could agree and come together.

Despite the imperfections of the technology at the current state of the art, the potential of AI to uplift the field of adult education is immense. AI-driven platforms at a later stage can provide highly personalized learning experiences, adapting to the needs and preferences of learners. One could claim that this will allow for adult learners to achieve their educational goals more efficiently, making learning more engaging and less time-consuming. The role of AI-powered adult education is quite important in the dedication and the pressing need for European communities driven by lifelong learning, as a critical component of professional development in a rapidly changing digital EU job market. By continuously assessing learners' progress and adapting content accordingly, AI systems prepare individuals for every transition by keeping their skills up-to-date and relevant. On another note and very important note, AI can play a pivotal role in supporting educators in creating new programmes and automating administrative tasks. AI can also create a performance panorama of the and insights into students' performance, allowing adult educators to focus more on teaching and mentoring.

As mentioned before AI is not a perfect technology while the benefits of AI in adult education are clear, several challenges and ethical considerations must be addressed as well. The GPT revolution increased the opportunities but one could claim that it decreased the quality of educational products. AI is a data driven technology therefore privacy and data security are naturally very significant concerns. The data storing, gathering and exploitation is one of the biggest challenges that an AI driven education might have from a different perspective. It could be said that protecting learners' privacy and ensuring data security is crucial to maintaining trust in AI systems. Ethical considerations also extend to

the potential biases embedded in AI algorithms, although the European Union is making a significant effort with the GDPR and the AI Act. .

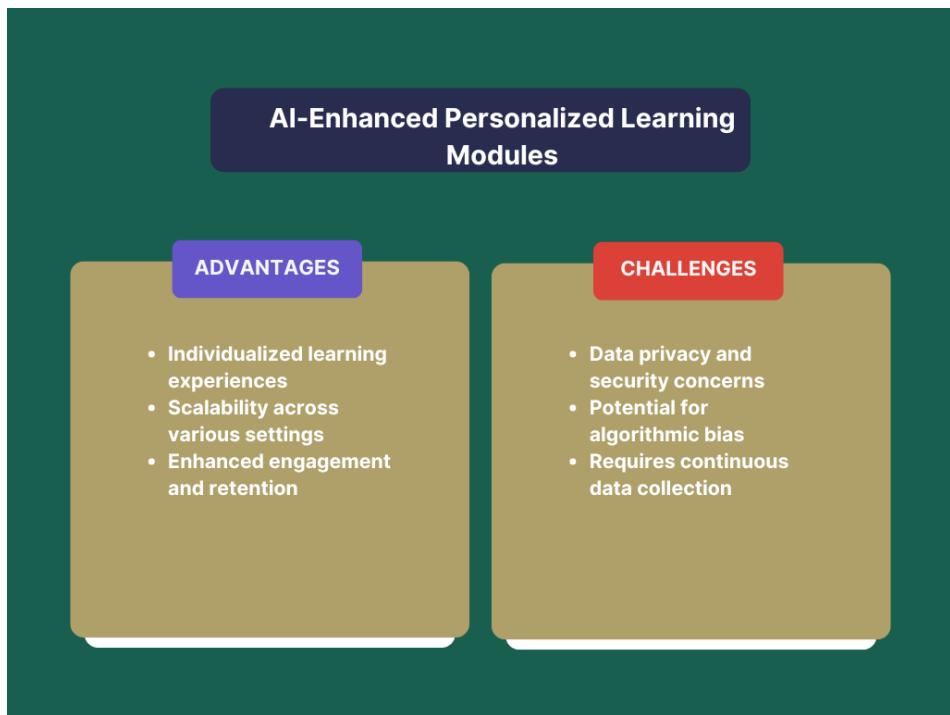
Another major challenge that is recognised also by the European Commission is the digital divide. The amount of Europeans lacking digital skills is very big and therefore the role of adult education is very important. Ensuring equitable access to AI-driven educational tools is paramount to prevent future inequalities, as the ability to understand the technology could be a very serious matter in an AI-driven digital world.

AI is a very promising technology that could bring another level of human experience, translated in the world of education, it could completely reinvent education. Research and development in AI and AI education must follow and complement each other with a special focus on creating systems that are not only effective but also inclusive and fair. This includes creating educational frameworks for transparent and accountable AI usage in education and teachers training components in every possible direction and level of education.

We have taken three main use cases that the adult educators will interact with in an everyday scenario. Our team considered that the individualisation of learning and teaching, the administration of education and the tutoring implementation will be the most important focus points for applied AI solutions in the learning environment.

1. AI-Enhanced Personalized Learning Modules

The development of personalized learning modules powered by the technology and AI in particular have the potential to elevate educational experiences by providing tailored educational content that adapts to the learning pace and style of each student. The basic interpretation of this approach leverages data on student performance and preferences to dynamically(real-time) adjust educational material, making it more or less difficult based on the student's real-time needs. Such systems can positively influence and greatly enhance student engagement and comprehension by delivering content that is challenging and relevant. In the table below we have highlighted the advantages and challenges of this approach:



This concept is supported by research (ref 1) showing that AI can significantly improve personalization in education, enhancing learning retention and engagement. In terms of implementation, to effectively implement AI in personalized learning, education centers should establish robust data governance frameworks and data management systems alongside policies to protect student privacy and ensure data security. As any AI drive system, the consideration of biases should be imperative.

2. AI-Assisted Administrative Tools

The reality of administrative and documents related workload could be considered as one of the first steps towards a more efficient education management system. AI-assisted administrative tools can significantly reduce the workload by automating routine tasks such as grading, scheduling, and attendance management. Relocating time dedicated to administrative tasks to student interaction and pedagogical refinement could increase the quality of adult education. From a purely managerial side, the correct implementation of AI can optimize resource allocation,

manage adult education centers operations more efficiently, and even predict future trends in learners enrollment and staffing needs.

The efficiency of AI in streamlining educational administration tasks is well-documented, (ref 2) allowing for more effective and efficient educational processes. In the table below we have highlighted the advantages and challenges of this approach:

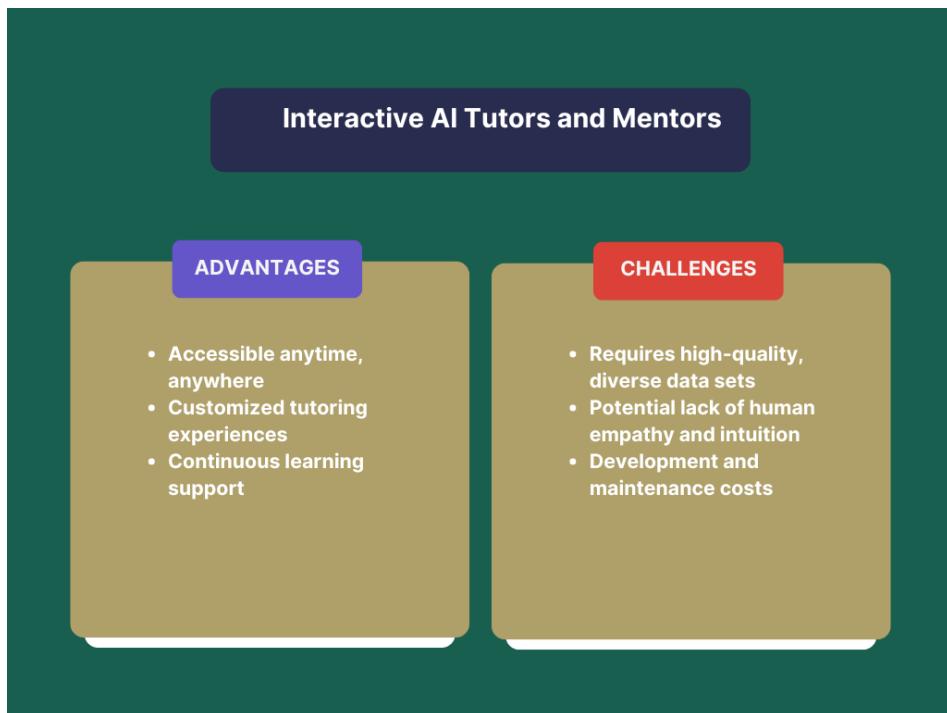
AI-Assisted Administrative Tools	
ADVANTAGES	CHALLENGES
<ul style="list-style-type: none">• Time savings for educators• Reduced human error• Enhanced operational efficiency	<ul style="list-style-type: none">• Resistance from educational staff• Integration complexities with existing systems• Cost of implementation and maintenance

While implementing AI-assisted tools, the adult education centers and the adult educators should consider comprehensive training. Additionally, a clear and precise strategy needs to be established, allowing time for troubleshooting and adjustments based on user feedback.

3. Interactive AI Tutors and Mentors

One could claim that the real future of AI education is in the applied capabilities of Interactive AI tutors that provide additional support outside classroom hours by simulating one-on-one tutoring sessions and significantly improving the performance of learners.. These systems, if programmed in the correct way, could use natural language processing to interact with students in a conversational manner, offering explanations, guiding problem-solving, and adapting to the student's learning progress in a real-time teacher fashion.. They can significantly extend learning

opportunities and offer immediate academic support without the logistical limitations of human tutors. Intelligent tutoring systems represent a significant application of AI in education, providing customized support and enhancing student learning experiences as demonstrated in the research (ref 3). In the table below we have highlighted the advantages and challenges of this approach:



It could be said that the success of AI tutors depends on their ability to offer not only academically accurate but also pedagogically sound advice. Thus, the development of these systems must involve subject matter experts alongside AI developers to ensure content validity and instructional effectiveness.

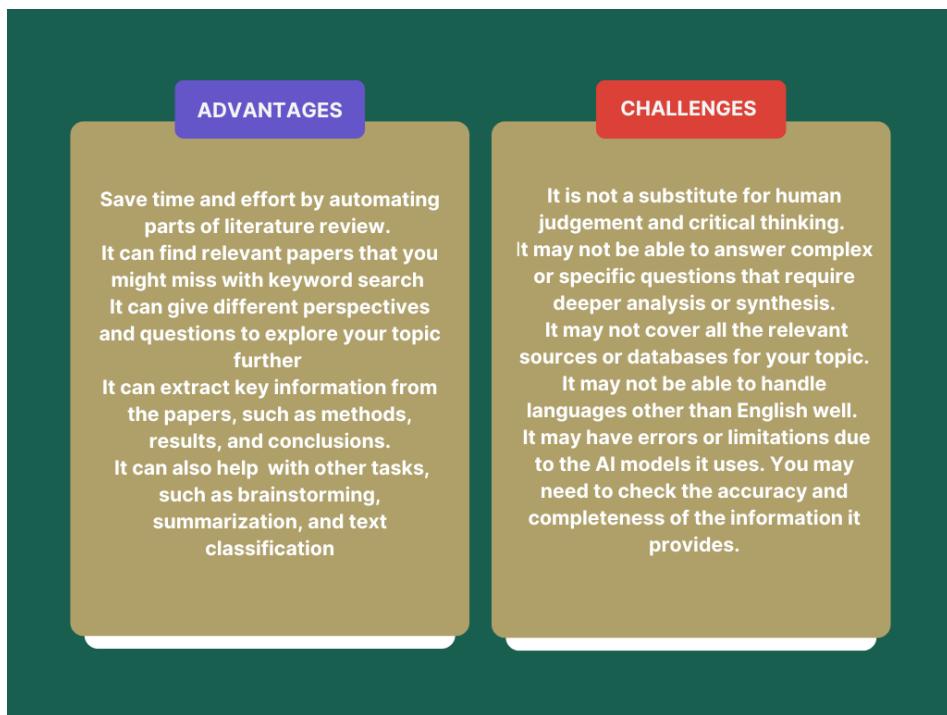
Our team has developed a framework of existing digital and non-digital resources complemented by an analysis of the advantages and the challenges of the same resources. This framework is intended for adult educators as an applied introduction to the already established mechanisms for management of the process of learning. In creating this list we have consulted a few sources(references) and invested our own experience in the presentation and evaluation of different aspects. This framework should facilitate the process of AI implementation in the adult education process. The presentation flow is the following: first we

present the tool and later we present the evaluation. We have hyperlinked the access to the official websites to further increase the convenience for the readers.

ROWS is the first tool we would like to present. Thanks to its ChatGPT interface, this spreadsheet editor uses artificial intelligence to handle and analyse data quickly and accurately. Students can ask it to construct a table, study a portion of the data in it, or complete a certain calculation in a matter of seconds. Everything on autopilot. Additionally, users can choose to load data directly from other programmes and applications (like Google Translate, Slack, and Gmail) to work with. It allows spreadsheet sharing, which promotes cooperation and teamwork. While there is a premium version that increases the number of operations enabled by each sheet, it is free to use.



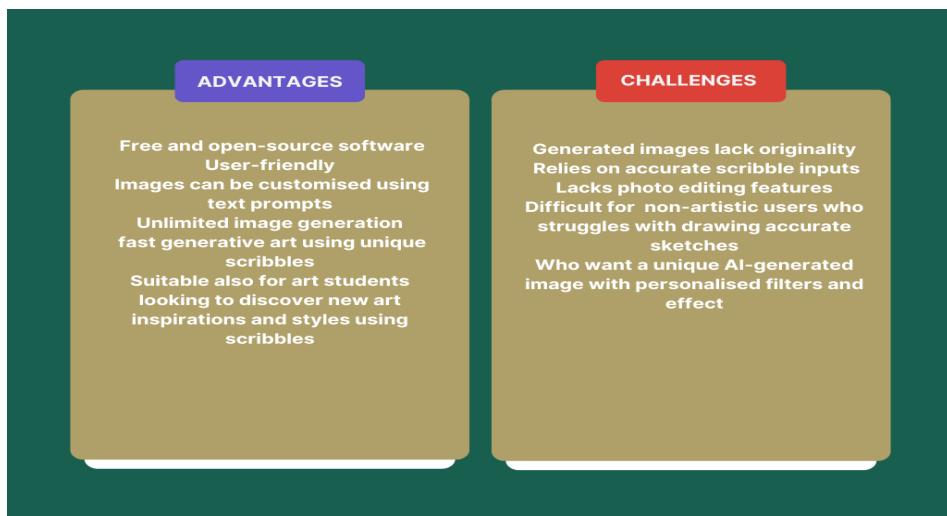
ELICIT This tool is usable in advanced research related tasks. By asking a simple inquiry, users can gain access to a database containing over 125 million academic articles. It also enables users to extract key concepts and get summaries of these texts in a table format that could be very helpful in the preparation of individual learning curriculums . It provides the source of the information shown in order to guarantee the accuracy of the responses. It is available for free and in two paid versions designed for people who want to project a more polished image.



WOLFRAM ALFA tool is designed to offer more than just responses to queries regarding society, science, technology, and culture like ChatGPT. It is capable of data analysis and mathematical computations for well-known mathematical issues including differential equations, linear algebra, logic, and set theory. It also includes a problem generator to assess the knowledge of the students helping educators in another time consuming task. It may be utilised with mobile devices running iOS and Android as well as computers. There are three options available for it: a basic or free plan, a Pro plan with step-by-step solutions, and a Pro Premium plan that grants access to all of the tool's functions.

ADVANTAGES	CHALLENGES
<p>Teachers can maximise the use of Wolfram Alpha by using the wealth of knowledge contained in the program as they search for ways to improve their lessons.</p> <p>Other ways of maximising the pros include using Wolfram Alpha in a lesson to save time on difficult problems that require tedious calculations, and using the program to allow students to do some mathematical exploration</p>	<p>Copying answers without an understanding of concepts, the time consuming distractions with content containing non mathematical topics, and students not paying attention during instruction with the intention of just looking up the answer later.</p> <p>These cons can be be minimised by delaying the introduction of Wolfram Alpha until the students have a relational understanding of the material; and once introduced, teachers can limit the amount of time their students can actually use the program.</p>

SCRIBBLE DIFFUSION: This artificial intelligence application is completely free, but it works differently from the others. To be able to access the capabilities of this tool you have to first use the mouse to sketch the image you want and provide a brief description before it will "return" the work it has produced. It could be helpful for fast scratches of work plans and art.



PLUS AI: This application is different from the others as it is a Chrome browser extension, not a separate interface that requires installation on your PC. It allows you to edit and create presentations in Google Slides, which you can export to PowerPoint. The user gives Plus AI a brief synopsis of the presentation, and the AI will offer a framework that could be edited or modified. Learners can customise the look and generate presentations in many languages; the rewrite function allows them to translate one or more of these slides, for instance, from English to Spanish. The 'Live Snapshots' feature, which lets you add automatically updated photographs from any website, is one of its most intriguing features. There is a limited free version.

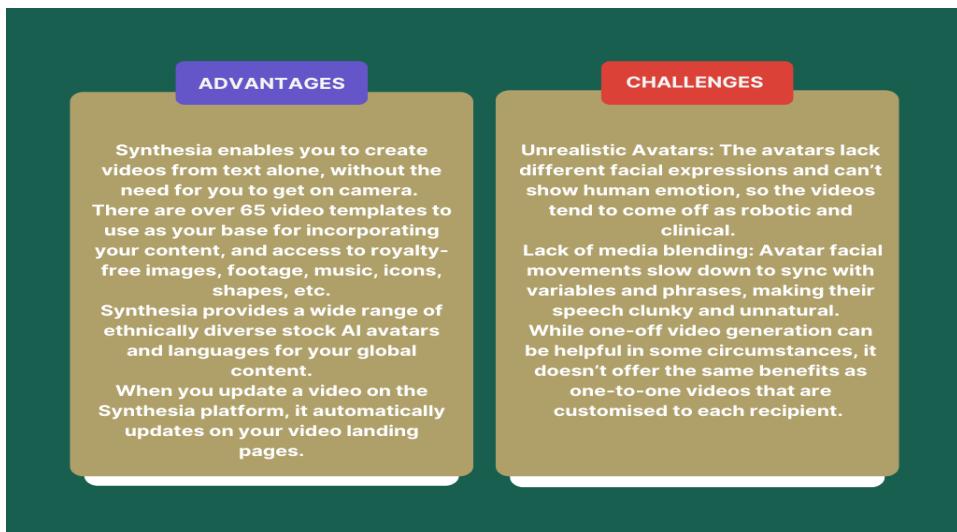
ADVANTAGES	CHALLENGES
<p>It is easy to use Users need to enter the extension and then enter the topic in the prompt Auto select a theme and generation of entire content. Confirmation of topics to be added before generation of ppt itself with slides limit. Basic version is free of cost to install</p>	<p>It is not interactive It has many options of editing the ppt further but it is included in paid version In its basic version only three slides can be generated which is a limit for the user.</p>

JASPER AI: This AI is quite special since it could be considered quite ethical with capabilities to produce entirely original, copyright-free material quickly and efficiently, covering any subject with well-structured grammar in multiple languages, and it can be customized with keywords. There is a free trial but not a free version of this software.

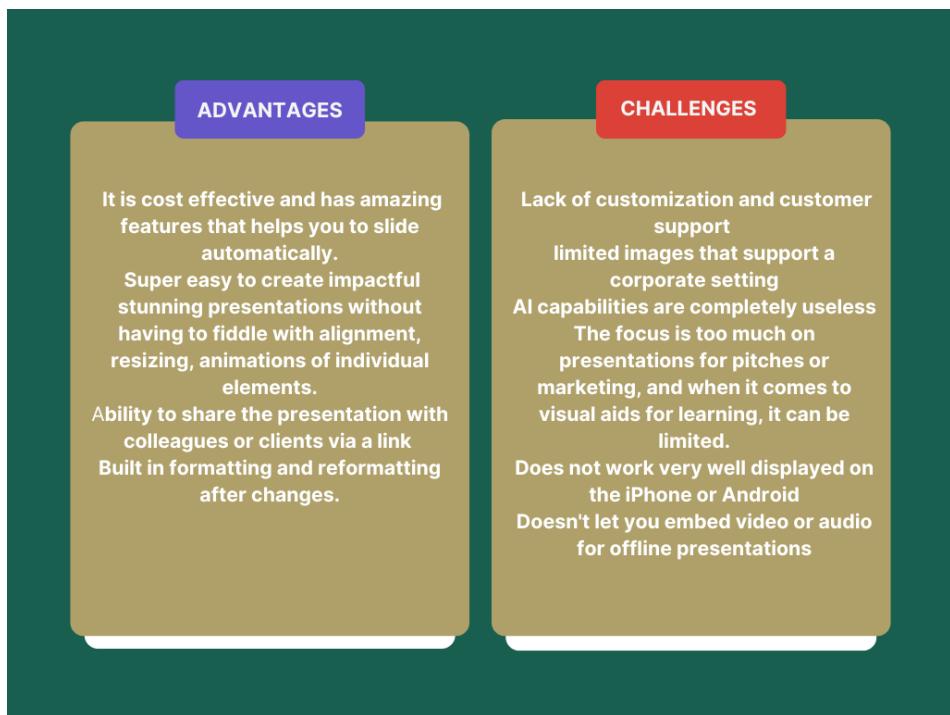
ADVANTAGES	CHALLENGES
<p>Original and Impressive Content Multilingual Support and availability in over 26 different languages. Improved Content Creation helpful assistant in generating titles, descriptions, and headlines for different type of content Enhancement of the quality of writing</p>	<p>Insufficient trial period the limited 7-day trial period is not sufficient to fully evaluate the product before making a purchase decision. High pricing in comparison to other similar products Confusing user interface</p>

SYNESTESIA This tool is one of the most advanced AI interfaces that allows users to create professional videos with human avatars and AI-generated

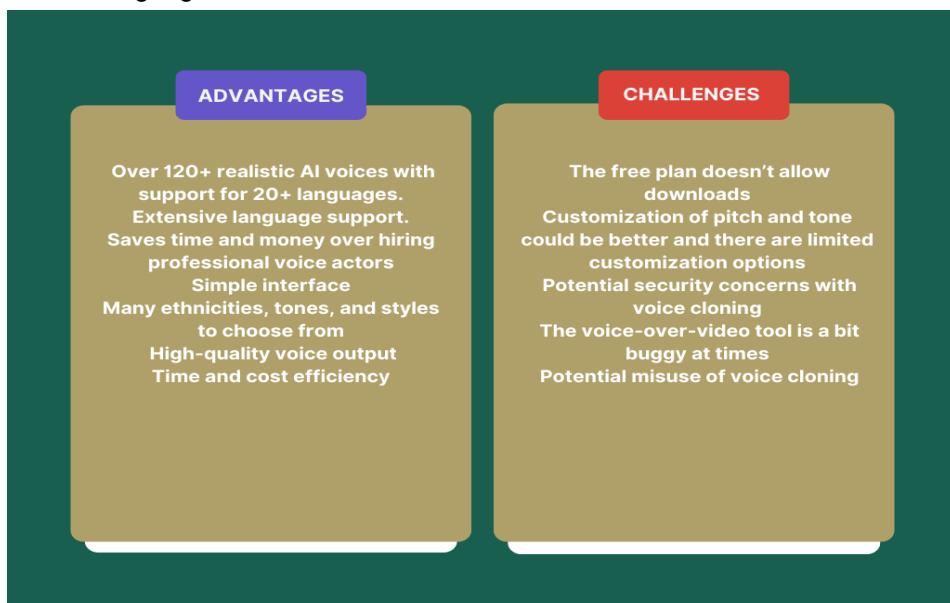
voices, without the need for prior knowledge of editing. The software offers a selection of more than 50 pre-designed templates and avatars. It works on the basis of prompt(text) video and it is available in more than 60 languages. There is an option to include subtitles, soundtracks, images and other graphic elements.



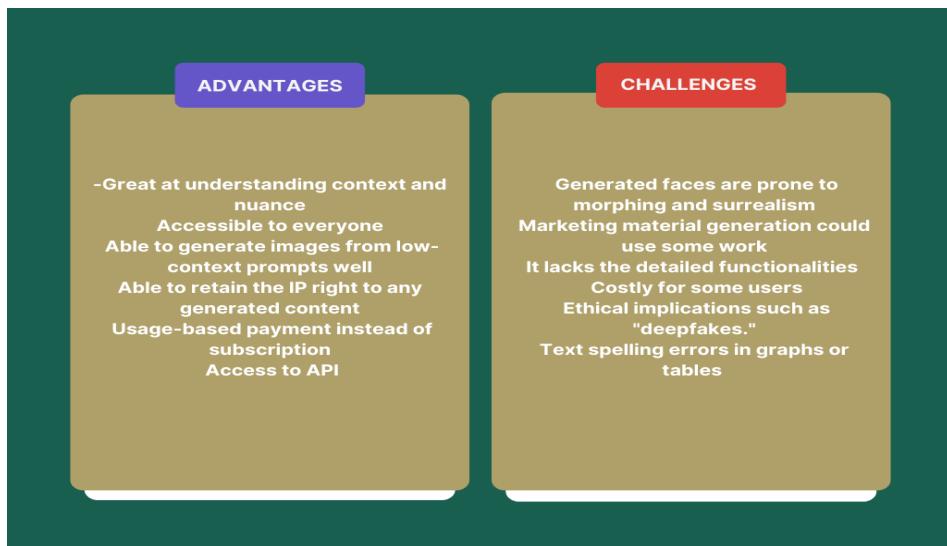
BEAUTIFUL.AI It is a software that could be used for presentations that uses Artificial Intelligence to make visual documents online and in no time. It offers more than 70 smart slide templates that automatically adapt as the user adds content and can be customised. Mainly useful for business education and marketing.



MURF.AI This software tool works on the methodology of converting text to speech where the users(educators) can develop professional audio lectures and audio learning materials for their students. The educators can select the voice and the language.



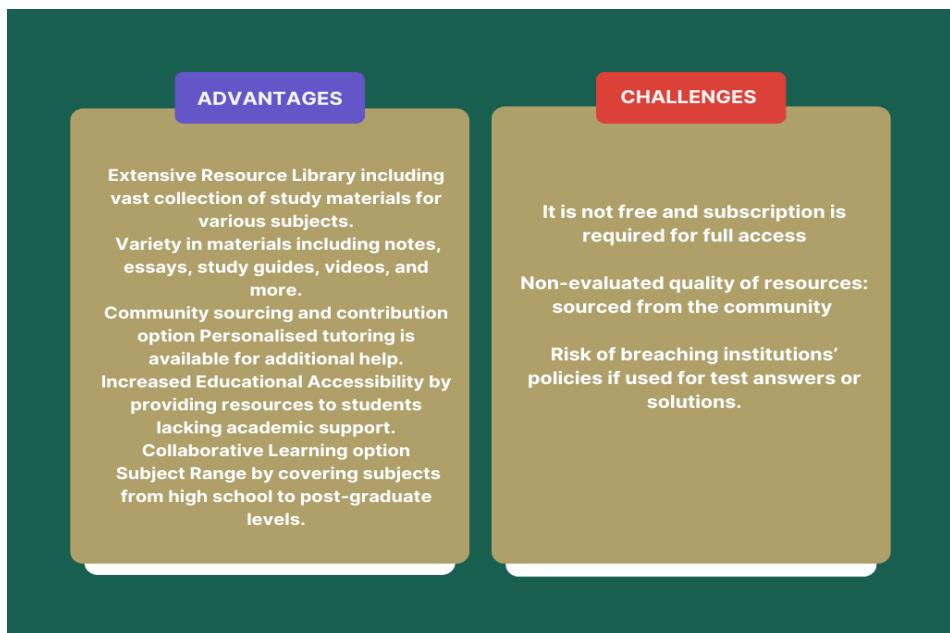
OPENAI DALL-E2 It is quite well known AI solution that works on the methodology of text (prompt) to image. This AI is powered by OpenAI the creator of ChatGPT and it works on a single subscription. It could be said that it is one of the best softwares in this category. It is widely used in many fields of education.



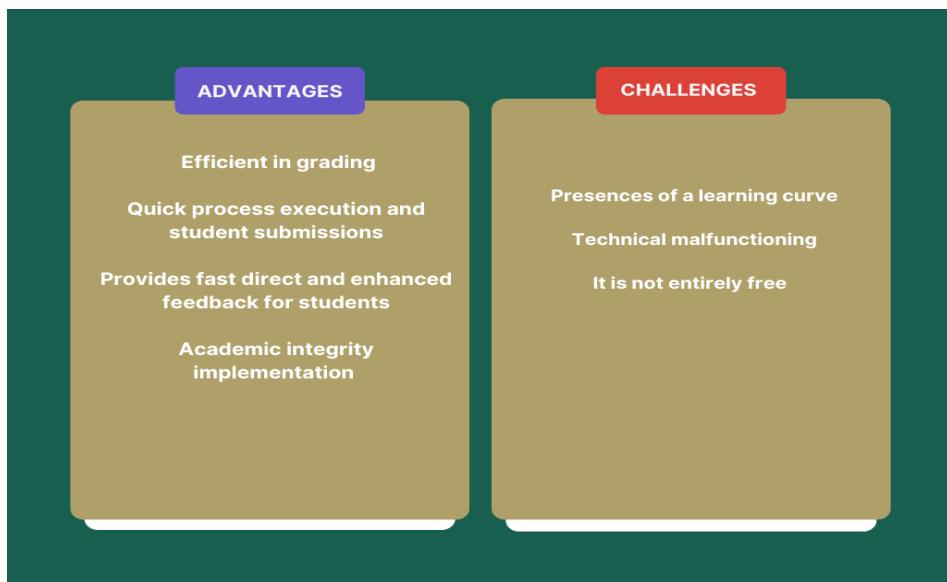
GLASP Is a very useful tool that is attached to a Google Chrome internet browser that transcribes and summarises any YouTube video in any language, completely free of charge. This allows educators to use secondary up to date sources and interviews as learning milestones. In an increasingly growing world of podcasts this tool could be a very time-saving AI application. Combined with other AI tools it can practically develop an audiobook in minutes.

ADVANTAGES	CHALLENGES
<p>Glasp is praised for efficiently organising and managing information, saving users time that would otherwise be spent on multiple applications.</p> <p>The founders actively seek user input and feedback, creating a sense of community and demonstrating a commitment to continuous improvement.</p> <p>Users highlight the founders' responsiveness, exceeding expectations by offering private 1:1 video conferences for live tutorials.</p>	<p>Lack of color options for highlighting to enhance customization.</p> <p>While Glasp is commended as the best highlighter, there are suggestions for enhancing how video highlighting works.</p> <p>Difficulties in users adaptation to the platform's features challenging, requiring time for familiarity and understanding.</p>

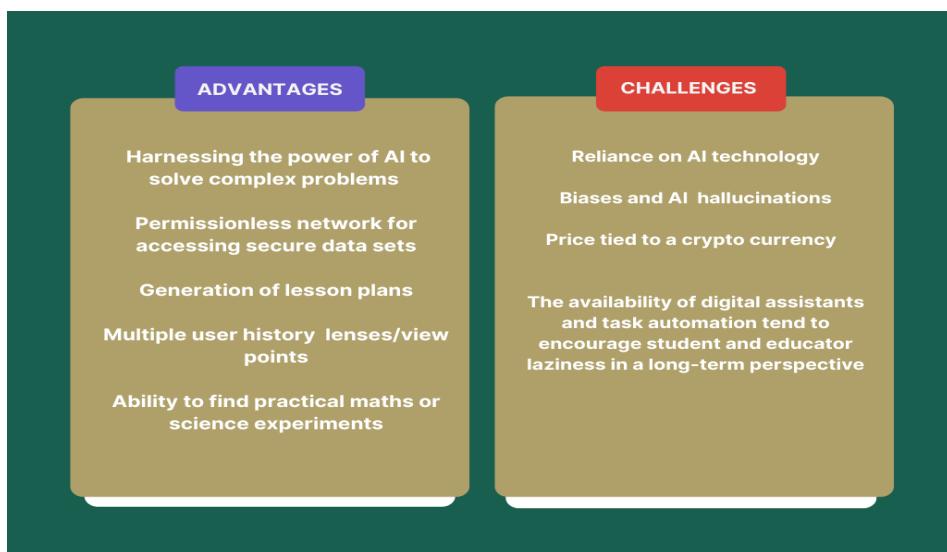
COURSE HERO This tool is quite different from the previous tools by the fact that it is focused on the after school activities. The platform provides artificial intelligence-based homework help that dramatically speeds up the process of finding instant answers and detailed explanations for a wide range of study materials. The service supports a variety of document types, including multiple-choice, fill-in-the-blank and open-ended questions. Central to Course Hero's offerings is the AI course wizard that in the very essence, provides instant AI-powered answers to homework questions. This platform could complement the educators role as tutor and could dramatically increase the uptake of learning subjects and milestones. As to adult education centers lacking the human capital for certain subjects, the platform could provide access to a relevant network of human tutors.



Gradescope AI This software is dedicated to the facilitation of the process of grading giving students options to assess each other and giving educators option of outsource this task using AI powered tools. Gradescope relies on a combination of machine learning (ML) and artificial intelligence to facilitate grading, saving time and energy and leading to AI assisted grading.



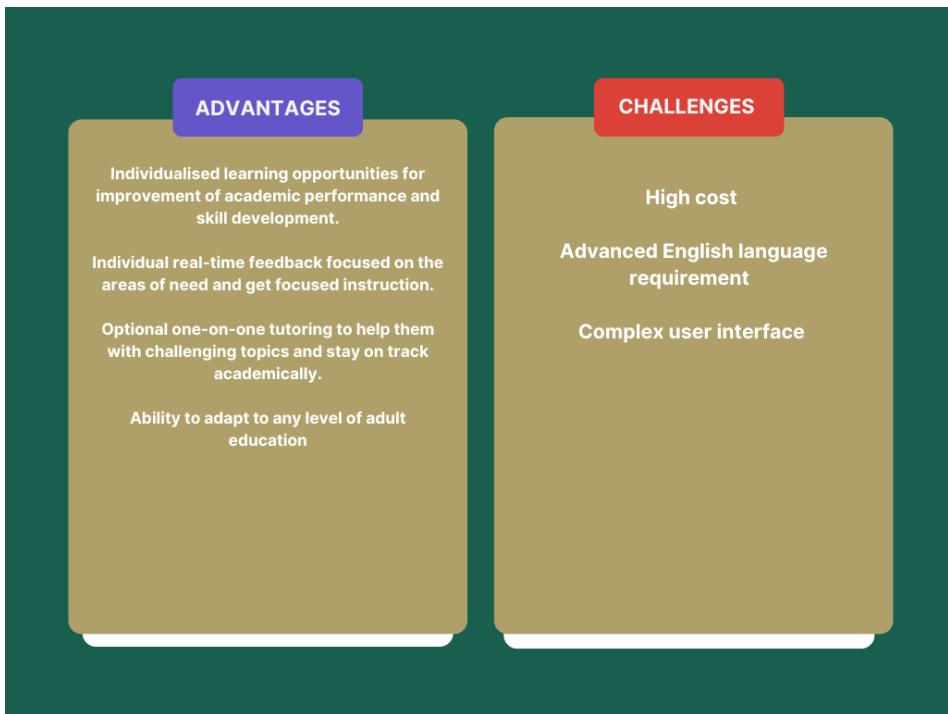
Fetchy This AI-powered generative platform designed specifically for educators. It is imagined as an all in one educators time-saving platform that gives all the educators an opportunity to create engaging lessons, newsletters, communications and more. By harnessing the power of AI, Fetchy enables educators to improve their teaching methods, optimise time management and make confident, informed decisions.



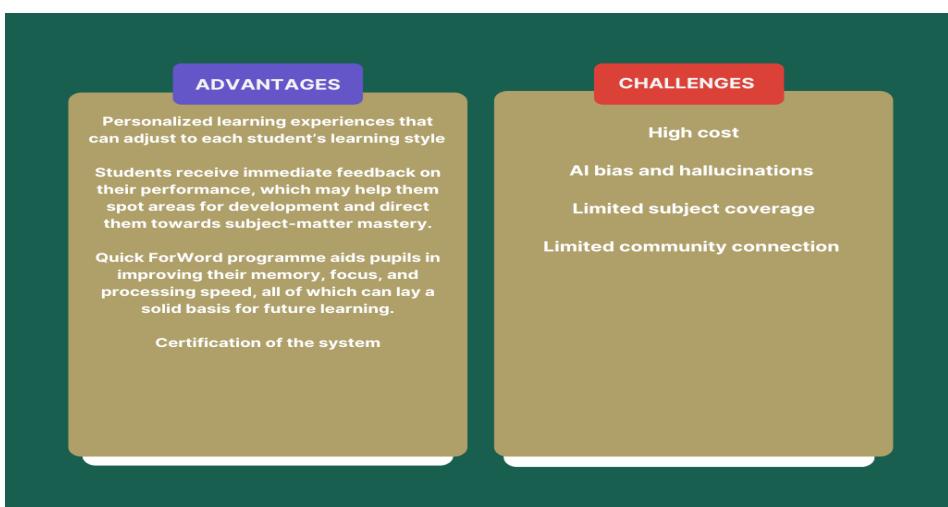
MathGPTPro As visible from the name this platform is focused in providing assistance to the uptake of math related subjects. Often educators are quite overwhelmed with dedicating the appropriate time for additional learners' assistance. This AI-powered maths software allows users to upload maths problems via photos or text to get instant solutions. Launched in 2023, it quickly went viral in over 100 countries, distinguishing itself with a 90% accuracy rate on AP maths problems, outperforming ChatGPT's 60%.

ADVANTAGES	CHALLENGES
<p>Provides accurate solutions to a wide range of mathematical problems</p> <p>Capabilities of handling various mathematical topics and problem types,</p> <p>Optimised as a learning aid offering step-by-step solutions, explanations, and visualizations to help users understand complex mathematical concepts.</p> <p>Automates the process of solving mathematical problems, saving users time and effort, especially when dealing with complex computations.</p>	<p>Performance Limitations the programme may struggle with highly specialized or esoteric topics that fall outside its training data.</p> <p>The interface may be overwhelming for some users, especially those unfamiliar with advanced mathematical notation or terminology.</p> <p>Accuracy challenged by AI hallucinations</p> <p>User Privacy concerns</p>

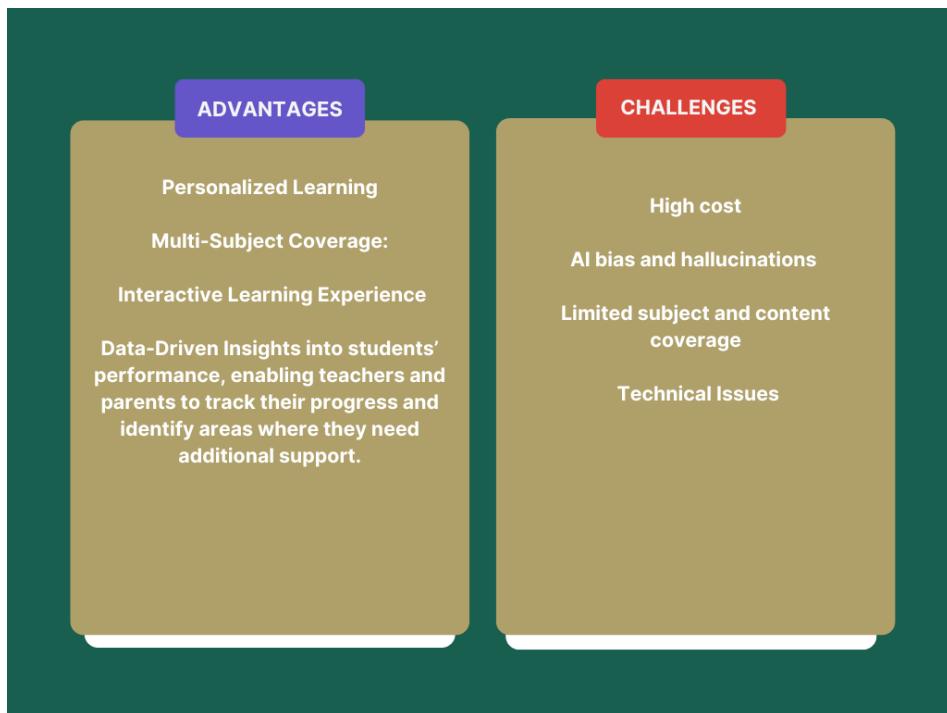
Cognii This AI powered assistant like tool is aimed at adult educators and adult learners that are involved in the final years of high school or are involved in University level education. It provides one on one tutoring experience with limited individual adaptation.



[**Carnegie Learning**](#) is an innovative AI education solution that offers AI powered tutoring in the areas of mathematics, literacy and language learning.



KNOWJI is an AI software solution application specialises in providing adult educators a resource in language teaching . This AI educational tool offers features that tracks the progress of each word and can predict when users are likely to forget them. It provides a very innovative way of learning languages particularly useful for migrants and refugees.

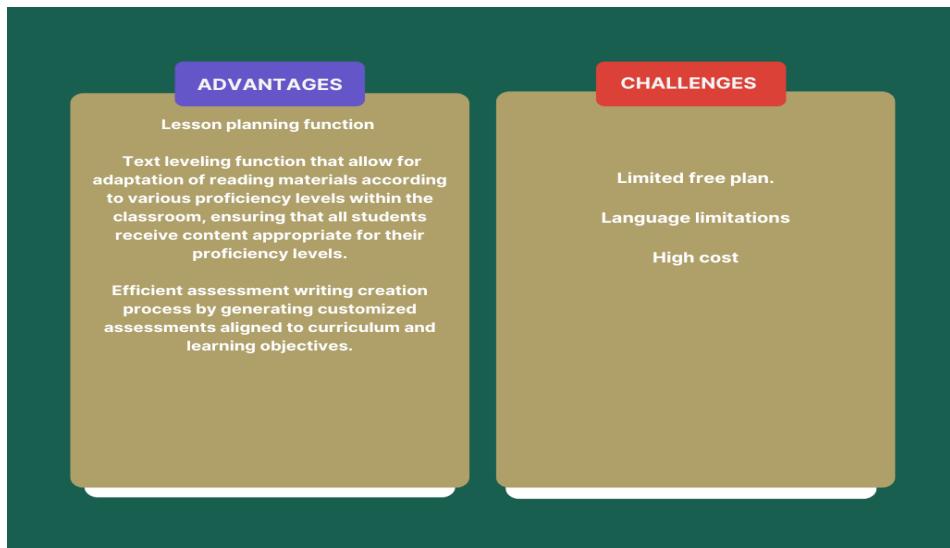


MEGAPROFE Could be considered as a more classical and user friendly educators solution that does not rely solely on the capacity of the educators to create prompts. It allows educators to create their work plan and lesions in one place.



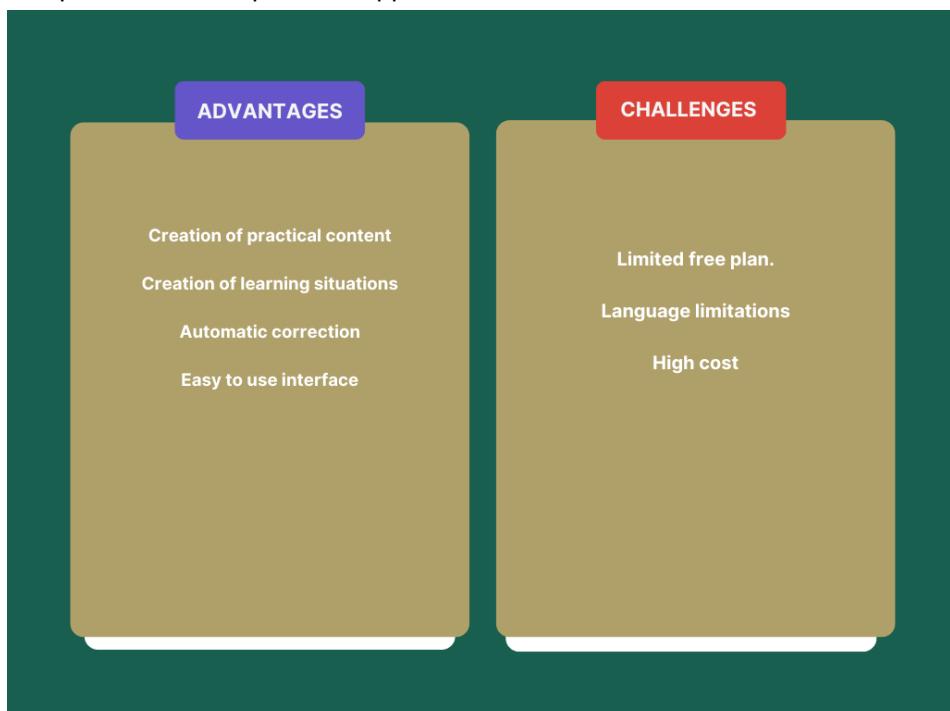
MAGICSCHOOL

An artificial intelligence platform created for the specific purpose of alleviating the workload of educators but it is also quite unique in providing assistance to school management staff. This platform can be implemented on a Local scale as it provides integration for different levels of education, accommodation suggestion and learners orientations. All powered by AI..

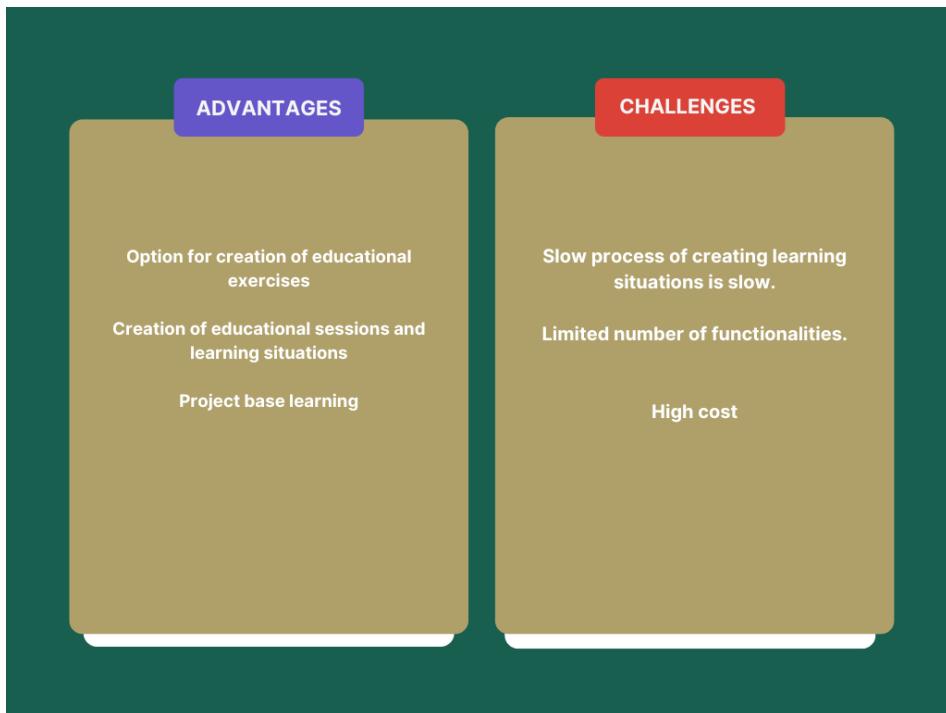


MATHEW

MATHEW is a platform that uses AI to create lesions and evaluate the performance of students according to the instructions set by the educators. It also provides limited personal approach to the needs of the learners.



THINKÖAI is spanish language platform that allows for spanish speaking educators to create educational materials and exercises for project based learning. It uses AI on the basis of generative AI technologies.



QUIZGECKO

Is an AI driven quiz style, question and answer generator. It is a basic interface that connects to the ChatGPT server to facilitate the creation of examination material based on the text provided by the educators.

ADVANTAGES

- AI driven text to quiz converter
- Conversion of YouTube videos into quiz
- Conversion of web page into quiz
- Options for questionnaires to be embedded in any LMS.

CHALLENGES

- Does not allow the creation of other content beyond quizzes.
- Only payed version available

Topic 2 The extraction of entry data from applications and social media

This guide is aimed at understanding the practical application of AI in the realm of adult education where it could be said that the integration of artificial intelligence holds transformative potential. In this part we will focus on the methods and modalities of creating value out of the data gathered from the learners. Adult educators can use different tools like applications to initiate the data gathering process and could integrate the activity on social media as relevant sources in their methodology towards individual learning curriculum and accounts. In this part we will explore that practical tool and applied process that could help adult educators in their mission to innovate.

In the very essence, one of the most significant advantages of artificial intelligence and its various applications is its ability to process big amounts of data quickly and accurately. For adult educators, in very simple practical terms means that AI can analyze information(data) from learner applications and social media to gain deep insights into individual learning preferences, strengths, and areas for improvement. AI could help create the basic profile necessary for the individual learning account and lead to personalised learners approach. Adult educators with the help of AI can maximise their time input in creating individual approach and automate some tasks like one on one interviews, after school consultation and personality tests(evaluation). The advantage of individual approach is mainly in the ability of AI powered tailored learning paths for each student. The way it works in very vague terms is that the data(information) such as educational background, work experience, learning goals, and even social media interactions are being considered in the definition of interest and engagement patterns. The adult educators role is not to programme this behavior, rather to input the data and evaluate the results of the AI powers software.

Using this kind of approach, adult educators significantly increase the probability of delivering educational content that is relevant and engaging, enhancing motivation and retention.

Another approach or a modality where data extraction could be quite significant is in the process of identification of gaps in skills and knowledge. Oftentimes adult educators could not evaluate the skills shortages and needs of every adult learner individually. If programmed in a correct way AI can identify specific skills gaps. For example, if a learner's professional experience shows proficiency in communication management but lacks advanced social media skills, the AI system can recommend courses or resources to address this challenge and augment the learning uptake. This type of AI support helps adult educators to increase the quality of their work while at the same time helps learners acquire the skills they need most, making their educational pathway more relevant and effective.

Social media is becoming an increasingly important part of our lives and consequently its role in education is becoming more relevant. There is a serious oversight in terms of integration of social media inputs into the process of education from the side of educators. In line with this chapter and our effort to highlight the significance of data in the process of education it could be said that social media is a rich source of data that reflects an individual's interests, behaviors, and interactions. It is more than personal expression or activism, it is a major part of the digital identity of learners. Adult educators should use these insights and try to integrate this data, and this is a point where AI driven software solutions can enhance the learning experience of learners. Adult educators can use AI applications to analyze social media activity and determine the types of content that resonate most with learners, including the format of the content, duration of the attention span and etc. A practical example of this type of applied AI use would be the simple video lecture format. Based on the video watching history of the learners, AI powered recommendation software could recommend similar videos. Most famous examples of this type in the world of entertainment are Youtube and

Netflix. Here the result would be increased engagement and lower course dropout rates.

Social media networks are very strong community builders, it could be said that it unites and divides people according to their interest and preferences. Extracted data from the social media networking of learners could provide good insight in the creation of project teams and peer-learning groups. A very important distinction to be made is that AI is not a static phenomena and it could be used to actively monitor users' experiences and extract(generate)data in real time. This type of AI application is giving adult educators the possibility to track the needs of learners in real time and adjust their programmes accordingly. The integration of AI and data from applications and social media in the process of adult education offers numerous benefits, but the data itself and the terms of use raise important ethical considerations. Like in the whole process of education, also while using an AI powered application ensuring ethics, data privacy and security is very important. Under the framework of GDPR(General Data Protection Regulation) educators and adult education staff representatives must obtain explicit consent from learners before using their data and be transparent about how the data will be used. The providers of AI software applications need to have in place robust security measures to guarantee the protection of sensitive information from unauthorized access and exploitation.

To capture the state of the art in extraction and exploitation of data in the process of education in the online education sector we have created the table below:

1. Coursera
AI data extraction Features: Personalized course recommendations, progress tracking, engagement analysis. Application: Tailors course suggestions based on learners' skills and career goals.
2. Knewton
AI data extraction Features: Adaptive learning experiences, real-time content adjustments. Application: Customizes learning paths by analyzing interaction data.
3. Edmodo
AI data extraction Features: Performance analytics, engagement tracking, at-risk student identification. Application: Helps educators tailor teaching strategies based on data analysis.
4. Duolingo
AI data extraction Features: Personalized language learning, proficiency level adjustments. Application: Adapts lessons to match learners' progress and preferred pace.
5. Blackboard
AI data extraction Features: Detailed performance reports, participation analytics, engagement insights. Application: Provides data-driven decisions to improve educational outcomes.
6. Canvas by Instructure
AI data extraction Features: Learning analytics, student performance tracking, personalized feedback. Application: Offers detailed insights into student engagement and learning progress.
7. Google Classroom
AI data extraction Features: Assignment tracking, participation metrics, feedback analysis. Application: Facilitates understanding of student progress and engagement levels.
8. Moodle
AI data extraction Features: Customizable analytics, learner progress tracking, activity reports. Application: Helps in identifying learning trends and areas needing improvement.

9. Brightspace by D2L

AI data extraction Features: Learning analytics, adaptive learning paths, engagement monitoring.

Application: Provides personalized learning experiences based on data insights.

10. Smart Sparrow

AI data extraction Features: Adaptive learning design, real-time feedback, performance analytics.

Application: Customizes content delivery based on learner interactions and performance.

11. Socrative

AI data extraction Features: Real-time assessment, instant feedback, performance tracking.

Application: Enables quick identification of learners' understanding and areas needing reinforcement.

12. Classcraft

AI data extraction Features: Engagement analytics, behavior tracking, gamified learning experiences.

Application: Enhances student motivation and engagement through gamification data analysis.

13. Kahoot!

AI data extraction Features: Interactive quizzes, engagement metrics, performance analysis.

Application: Provides insights into learners' knowledge retention and engagement levels.

14. Ment.io

AI data extraction Features: Collaborative learning analytics, discussion insights, participation tracking.

Application: Analyzes contributions and engagement in collaborative learning environments.

15. Pear Deck

AI data extraction Features: Interactive presentations, real-time feedback, student response analysis.

Application: Enhances understanding of student comprehension and interaction during lessons.

Adult educators can approach the application of this type of AI driven technologies via a proxy(the online course provider) or autonomously via utilisation of tools. The first method (via proxy) is preferred by most adult educators since this approach requires basic digital competences. The latter requires advanced digital competences and basic knowledge of programming.

While choosing from an already developed e-learning solution might seem the easiest way it might not be the best(most accurate way). The extraction of data is limited and it does not allow educators full autonomy on the type of data and the insights that might be more relevant for them. That is why we are going to introduce another methodology that integrates two different processes: the extraction itself, or in this case the extraction of data from the Internet also known as web scraping and data mining, or the process of gaining insights from the already extracted data.

To simplify the definition and understanding of web scraping, it could be said that it is the process of automatic extraction of data from websites. Web scrapers use the HTML code and database-stored data and convert them into structured formats like spreadsheets. Some more advanced web scrapers allow users to select which parts of a webpage to scrape, ensuring the relevance and usefulness of the collected data. The data gained through this process is stored in various formats like excel or google docs, making it quite suitable for further processing. For reference for all the adult educators we have created a list of web scrapers that could be considered in the process of data extraction.

1. Bardeen AI data scraper

Bardeen allows users to scrape individual pages with a single right click, with capabilities to extract lists and tables. Bardeen provides integrations with Google Sheets, Airtable, Notion and Coda.

2. Instant Data Scraper

This data scraper allows users to extract data directly from the webpage as it detects data that could be automatically extracted. This data scrapers extract data that could be downloaded in Excel or CSV files. It is not capable of advanced automation.

3. Phantom Buster

Phantom Buster is a data scraper that is very advanced and is capable of extracting data retrieved from session cookies from the websites. Having this advanced technology provides a limitation in terms of the number of websites that could be used for this type of operation.

4. Magical

Magical works on the concept of transferring data between tabs and scraping from webpages with specification of variables, which tells Magical where to pick the data from. It allows integration with Google sheets.

5. Grepster

This scrapper is most suitable for beginners as it gives a step-by-step instructions along the scraping process. It comes with a high price tag.

6. Listly

Perfectly integrated with Excel, as it provides data directly into spreadsheet. Compared to other web scraper extensions, it's a much simpler option and is largely focused on Excel. All in all, Listly is a good web scraper extension for Excel users and is completely free on Chrome.

7. Data Miner

This web scraper has a free version with a limit of 500 pages per month. It can export data in the following formats like XLS, CSV, XLSX, or TSV.

The role of web scraping tools is reducing the time and human intervention in the process of gathering extensive amounts of information from the world wine web. In conclusion, web scraping tools are indispensable for efficiently extracting and utilizing internet data. By automating this process and increasing the relevance of data in education, adult educators could create a pathway to creating individual learning curriculums and later individual learning accounts.

It is important to underline the point of evolution in terms of technological progress in the field of education. It could be said that the integration of data in general and data mining in particular in the process of education is seeing progress in the last two years. By extracting insights from large datasets, data mining empowers educators and educational administrators to make more informed, data-driven decisions that enhance both, the teaching and the learning processes. In this part we would like to show some practical examples of how data is being integrated in the process. This is important to demystify how AI works and from where it gets its knowledge.

First things first, we are going to focus on the origins of data answering the question where data is coming from and how to we manage that process.

The educational data is gathered from different sources, including student information from previous years, through an electronic learning management system that could contain digital assessments or digitalised offline assessments and noted classroom interactions. In this way we can project a comprehensive view of the educational environment, capturing various aspects of student learning and behaviour (Romero & Ventura, 2020). All this information on a scale is called data sets. Imagine including data in relation to the whole school year. That represents a data set. Here the type of data could be also augmented by different data available for example, behaviour data, student extra curricula activity data and family data. In another process the data from different sources is combined to create a unified dataset. This integration provides a holistic view of the educational environment, facilitating more comprehensive analyses and insights (Witten, Frank, & Hall, 2011).

To quickly sum up, we need data that now we are familiar where and how we can provide. The next step is the data processing. This process starts with clearly defined objectives of what we would like to gain with the data we have collected. It could be

include improving student performance, enhancing engagement and class activity, or identifying dropouts or extremely intelligent students. Not to forget while gathering and managing any type of that we have to be in line with the data privacy regulations such as the General Data Protection Regulation (GDPR). Compliance with these regulations is crucial for protecting student information and maintaining ethical standards (Voigt & Von dem Bussche, 2017).

We have the data, and we have the objectives, next thing on the list is the data processing or mining. In the technical terminology the first data sets are known as raw data sets, where the important information is mixed with less important information. In order to make the best of our data we need to process that data in a set of activities that includes cleaning and transformation. This step is critical for ensuring the reliability and accuracy of the analysis, as it prepares the data for model building (Han, Pei, & Kamber, 2011). To make the best model (AI) we will need the best

of the best of data. To make this happen we will need to cluster that data or impose other data mining (for meaning) techniques. The choice of technique is decided on a case-to-case scenario in order to optimise the accuracy of our AI model, it depends on the specific goals and nature of the data (Witten, Frank, & Hall, 2011). In the next phase the model is being trained on the data and it is being tested by different experts. As soon as the experts decided that the model is ready it can be integrated into different educational settings.

One very obvious example is the integration of a chat assistant that is being trained on the student specific needs and can answer the student relevant questions. Unlike ChatGPT or Gemini, this assistant only knows what we gave him to learn. This way we can avoid misleading answers and wrong conclusions.

To even better understand the possible application of an AI driven educational assistant we would point out five different use cases.

In the first use case, an AI assistant created by the data and the process we just mentioned is used to create personalized learning plans tailored to each student's strengths and weaknesses. For instance, a student struggling with math will only receive targeted exercises and resources to address specific areas of difficulty, thereby improving their overall performance (Kumari, 2020). This way educators avoid providing unnecessary readings and tasks to students, directly influencing the efficiency of the educational process.

Early school dropping out is still a challenge across the EU, in particular in the areas where adults with fewer opportunities live. If we were to use the data and create an AI assistant that can predict the level of risk in terms of early school leaving, we would easily identify students at risk of falling behind or dropping out. In this case the AI assistant could recommend early interventions, such as tutoring or counselling, to support these students, improving retention rates and academic success (Dekker, Pechenizkiy, & Vleeshouwers, 2009).

Looking on the bright side, AI assistant could also be used to increase the engagement of gifted students. For example If a student excels in a particular subject outperforming the other students, the AI assistant can present more challenging material and increase the difficulty of the exams to ensure continuous progression, fostering a more engaging and effective learning experience (Baker & Inventado, 2014).

Another AI assistant can be used to manage the engagement of all students in general.

The AI assistant can detect patterns in the student engagement, such as which types of content are most effective in maintaining interest, and this information can be used in the design of curricula to maximize engagement and learning effectiveness, leading to better educational outcomes (Yunus, 2021).

From a purely managerial point of view, adult education centres struggle with the appropriate allocation of resources. AI assistant could be used to allocate resources more efficiently.

Our project is about social media marketing and the importance of social media in the life of both educators and learners. In this context social media and social media channels represent a very important source of information. It could be said that social media channels and social media accounts contain data that are relevant to the process of education.

As we were discussing, web scraping is one of the most important processes of gathering online data. The traditional web scrapers do not in most of the cases support social media scraping or extracting of any kind of data outside of the social media platforms In the growing landscape of adult education, the ability to leverage data for personalized learning experiences is becoming increasingly essential. One innovative tool that is making waves in the domain of social media scraping is APIfy.

APIfy is a social media data extraction tool that can gather information from various social media platforms. By using APIfy, educators can collect and later use this data from platforms such as Facebook, Twitter, LinkedIn, and Instagram in the process of education. This data can derive from posts, comments, likes, shares, and more, providing a very accurate data regarding learners' interests, engagement patterns, and professional networks.

The benefits of using tools like APIfy, web scrapers and the creation of AI assistant in adult education are clear. It is very important to conduct this process under a very strong and transparent ethical procedure, ensuring data privacy. Educators must obtain explicit consent from learners before scraping or using any type of data and be transparent about how the data will be used. Additionally, robust security measures must be implemented to protect sensitive information from unauthorized access.

Topic 3 The design and implementation of individual learning curriculum

At this point we are all convinced that Artificial Intelligence is making a significant impact on our life and across different aspects of our communities. Introducing AI into the classrooms and adult education in general represents an evolution in the way that education is delivered and managed. AI driven tools, although at a very low level and with slow pace are now being introduced in different experimental phases. Educators are experimenting with the capabilities of Large Language Models and interfaces like ChatGPT and Gemini to take some load off their everyday tasks.

Taking a step forward in this part we would like to introduce the basics concepts of leveraging AI in the process of creation of individual learning curriculums across various domains in the process of adult education. As being highlighted in the previous chapter, the quality of data is of outmost importance. The design and implementation of individual learning curriculum starts with the analytical data insight that educators have. By extracting highlighting and inputting this data in digital form educators can create a space for observation of individual progress on a scale. Teachers can use performance data to adjust and refine the group curricula to better meet the needs of the individual students. By highlighting common areas of difficulty and common areas of passivity, they can modify lesson plans and introduce new teaching approaches. From the other side this process could provide unique insight on teaching performance data allowing teachers to reflect on their teaching methods and identify areas where they need improvement. By analysing trends in student performance, educators can engage in professional development that is targeted to their specific needs. Learners performance data is the

best reflection to identify instructional gaps and collaboratively develop strategies to enhance teaching effectiveness and learners performance.

As education continues to evolve and as social media is being introduced in every aspect of our life, the importance of behavioural data has become more important in the development of individual learning curriculums. This type of data provides critical insights into how learners interact with their learning environments, the group dynamics and the overall learning experience. This discussion highlights real-world examples of how educational institutions gather and use behavioural data to improve outcomes and support student success. Following the learners behaviour can also be instrumental in supporting student well-being and mental health identifying patterns that may indicate stress or disengagement. This way adult educational centres can act as facilitators of targeted programmes and interventions to help students manage their mental health and succeed academically. Again here, this type of data can also be used to improve the work of the educators. Adult educators can use this type of data to fine-tune their teaching approaches and strategies. By analyzing patterns of student engagement and participation, adult educators can determine which methods are most effective and make data-driven decisions to improve the delivery of the individual learning curriculum. Furthermore behavioural data is very important in the development of an early warning systems that report learners that might be at risk of academic failure and early programme drop out.

Case studies of data integration could be seen through different Digital **Learning Management Platforms already being implemented in different learning environments.** We could take a few examples of educational platforms like Google Classroom, Canvas, Blackboard and MOODLE that integrate software solutions to track and manage how

students are performing. They create different datasets out of the data on grades, test scores, and the submission of assignments. On a large scale platforms like the College Board for SAT and ACT exams create and manage large data sets on how students perform in standardized tests. More sophisticated tools like DreamBox Learning and Knewton use real-time data to modify the difficulty level and type of content according to a student's performance. For example, DreamBox Learning gathers information on how students interact with math lessons, including their grades and the time they take to solve problems. This data helps the system to tailor future lessons to the student's learning speed and skill level. Most of the online learning platforms gather data about the student engagement which is very important for the development of individual learning curriculum. Adult educators could get an insight on metrics such as time spent on learning modules, frequency of logins, and interaction with course materials and other relevant data. Tools like clickers and mobile apps (e.g., Kahoot!, Poll Everywhere) gather real-time data on student responses during classes. These systems provide metrics **participation during class** **gather through** responses to questions during lectures and data on **engagement in Interactive Activities through** participation in quizzes and polls. Some of the platforms use **video Analytics** (e.g., Edpuzzle, Panopto) use analytics to monitor student interactions with video content gathering data about the amount of time students spend watching each segment, critical video points where students pause, rewind, or stop watching.

It could be said that behavioral data enables educators to tailor learning experiences to meet the needs of individual students. By having a data driven insight on how the learners are engaging with educational content, adult educators can design programmes and support mechanisms that align with each student's learning style and needs.

Since we are dealing with adult education centres that are working with adult educators and learners with fewer opportunities, taking into

consideration aspects of the wider sociological context from one side and for the emotional state from the other side is very important. As we strive for more holistic education, the understanding of the learners socio-emotional state of mind is an important part of the learning process, almost as important as the academic performance because they are interconnected and one cannot go without the other. Socio-emotional data, that includes data on emotional health and social status, provides valuable insights that can help educators support their students more effectively and introduce different individual strategies as learners advance in their educational pathway. Adult education centres can gather and manage different metrics on the social state and emotional health through different digital tools, using mainly qualitative research methods to foster a nurturing learning environment and enhance the academic performance..

Data on the social context and emotional state includes a range of metrics, including learners' feeling of safety, feeling of belonging, cultural background and understanding of the overall emotional health. By considering these metrics and creating data sets of digital inputs, educators can identify learners who are facing difficulties. Later in the process they can implement programmes to support those learners and facilitate their integration and overall engagement in the process. This approach result in better academic performance and could promote a healthier, more supportive lifelong learning environment

One of the project partners, the Center for Dansk og Integration has developed some good practices being an adult education centre that deals with refugees and adults with fewer opportunities. They use fixed learning objectives for their teaching, which they continuously measure. They hold interviews with new citizens as well as guidance and follow-up interviews. They use ongoing tests to measure progression and uncover challenges, so that the teaching can be adapted to the needs of the citizen. They continuously use electronic user surveys. Finally, front their everyday practice the use of digital questionnaires is challenged by the lack of digital skills.

Topic 4 The use of AI-powered tools for feedback and evaluation

In the last part of the guide we are going to dedicate a space that will allow the adult educators to take advantage of the research and testing done in the domain of ready to use AI powered tools. There are many adult educators that are seeking opportunities to increase the level of digitalisation of their work around Europe, but there are very few specialized guides that provide easy and direct, structured access. In this part we have dedicated a space to answer that need and facilitate the access to the most updated tools and resources with brief description of their capabilities and usability. The adult educators can take advantage of a single tool for a single task or combine different tools to create a system for digitalisation of the process of feedback and evaluation that directly influences the quality of the materials and the delivery of the adult education courses.

The table below explains what tools to use in order to be able to extract the feedback and evaluation

1. [Google Forms](#) and [Google Sheets](#)

Google Forms: For quizzes and surveys that can self grade and provide feedback. Answers can be connected to Google Sheets for additional analysis.

Google Sheets : Educators can automate grading and generate detailed feedback reports with built-in functions and add-ons such as Flubaroo. Flubaroo, in fact, has built-in functions to automatically grade assignments and even email the grades to students

2. [Quizizz](#)

A FREE easily-integrated sites where teachers can make quizzes with realtime feedback. It is the kind of interactive platform that adult learners would enjoy. Immediate feedback after each question is another one Quizizz is offering and analysis result is easy

3. [Kahoot!](#)

Well-known for the gamified approach to quizzes. is a free platform that provides an opportunity to create interactive quizzes. It gives you immediate feedback and enables educators to review the results by analytics. While it is mainly for K-12 education, this can be adjusted a bit for adult learners, particularly in environments that warrant a more catchy style

4. [Microsoft Forms](#)

Like Google Forms, Microsoft Forms offers survey and quiz creation with automatic grading capabilities for educators. Works well with other Microsoft office tools that allows you to analyze Data within Excel.

5. [Edpuzzle](#)

Edpuzzle is a service which allows teachers to create interactive lessons by adding questions and comments to videos. Teachers can monitor student progress, and is especially useful for flipped or blended learning situations.

6. [Moodle](#)

A free and open-source Learning Management System (LMS) that offers extensive features for automating feedback and evaluation. Moodle allows for the creation of quizzes, assignments, and peer assessments with automated grading and feedback capabilities.

7. [Socrative](#)

A free tool for creating quizzes, exit tickets, and quick polls. It provides real-time feedback to students and gives educators a clear view of student understanding through visual reports and data analysis

8. [H5P](#)

An open-source tool for creating interactive content like quizzes, presentations, and simulations. H5P content can be embedded into websites or LMS platforms like Moodle and provides instant feedback on learner performance.

9. [Peergrade](#)

A platform that facilitates peer assessment, where students can give and receive feedback on each other's work. The tool is free for educators and allows for the automation of feedback collection and evaluation based on predefined rubrics

10. [Canvas Free for Teachers](#)

Canvas for Teachers has a Free for Teachers LMS version that offers many of the capabilities found in Paid LMS Platforms, such as simple automated quizzes and assignments, built-in digital gradebooks, and rich feedback tools. Canvas is capable of providing immediate feedback on student submissions and has rubrics.

11. [Plackers](#)

An exceedingly simple tool with no devices necessary for students. Multiple-choice questions can be written by educators and printed cards would be held up by students. The teacher uses their phone to scan the whole class and Plackers then automatically registers and analyzes the results.

12. [ZipGrade](#)

ZipGrade provides a low-cost option for scanning and grading multiple-choice tests using a mobile device, though: The service isn't

completely free. And, of course, the app helps teachers save time by delivering immediate feedback and elaborate reports.

13. [Formative](#)

An online free tool for teachers to create assignments as well as quizzes with real time feedback and analytics. With Formative, you can use a lot of different types of questions, and you can also see your students progress in real-time as they do the assignment.

14. [Poll Everywhere](#)

An integrated tool for running live polls and quizzes while presenting. A tool which provides instant feedback and takes away the guesswork about how well students are grasping material in the moment, while in class.

15. [Classkick](#)

It is a free tool that enables teachers to design assignments, while students receive instant feedback when working on them. Peer feedback is also allowed on Classkick so its another gem in the toolkit for interactive classrooms.

16. [Mentimeter](#)

Engaging presentation tool where educators can create real-time polls, quizzes, and word clouds. With Mentimeter, it is possible to obtain immediate feedback from students and at the same time, the tool is great for reading students live in the classroom.

The table below provides another set of AI powered tools that could be used in different contexts and for different adult education subjects. These tools are more advanced in terms of technology being applied and capabilities. The adult educators should take note that all of these tools are not perfect and that they will need to check the results and test the tools accordingly. For example using the otter.ai software that uses speech to text function speech, the quality of the result is heavily dependent on the quality of the sound and the diction and oral capabilities of the speaker. Some words might be confused for others and some phrases might not be understood in the correct way.

1. [Grammarly](#)

Ideal for: Feedback on written content, grammar and style suggestions

About: Grammarly is an AI writing tool that helps you to give immediate comments. It also suggests grammar, punctuation, clarity, tone and writing style. Though commonly applied to any form of writing, in education it helps in marking of essays, reports and other written tasks.

AI Features: Contextual grammar and style suggestions, plagiarism checker, tone checker and personalized recommendations based on writing objectives

Use Case: For adult learners, the ability to provide immediate feedback on writing can help improve communication skills needed in both academic and professional environments. Turnitin Feedback Studio
Suitable For: Detecting plagiarism, grading, and giving feedback on assignments.

2. [Turnitin Feedback Studio](#)

Best For: Plagiarism detection, grading, and assignment feedback.

Description: Turnitin is a widely used AI-powered tool that helps educators assess the originality of student work. Its Feedback Studio feature provides tools for grading and personalized feedback on written assignments. The AI identifies similarities, potential plagiarism, and areas that need further development.

AI Features: AI-driven plagiarism detection, grammar checking, and originality reports.

Use Case: Ideal for essay-based assessments in adult education, ensuring both originality and quality of content

3. [Otter.ai](#)

Ideal Customer Type: Records discussion and transfers notes in real-time for lectures and classes.

Description: Otter.ai converts conversations, lectures, and group discussion into text format in real time using AI Speech To Text Tool. It serves immediate feedback by creating transcripts that learners and educators can read, annotate, and analyze in terms of content and participation

AI Features: Real-time transcription, keyword analysis, and speaker identification.

Use Case: Useful in adult education settings where class discussions and oral presentations are integral to learning, enabling learners to review and improve their spoken communication.

4. [Gradescope \(by Turnitin\)](#)

Ideal for: Auto-grading assignments, quizzes, and exams

Overview: Gradescope is an AI-assisted grading tool for assignments, quizzes, and exams. It supports different question types including handwritten responses and gives instant, automated feedback to students. When students answer, the AI would cluster similar answers, which creates batches that require grading, so that educators need only consider the batch as a whole.

AI Functionality: Keep answers together, automatic grading, and rubric-based marking

Use Case: Ideal for large courses or exams that require easy-to-grade detailed assessments, such as those that involve math, science and/or engineering.

5. [Coursera Labs](#)

Ideal For: Feedback on skills & skill development paths.

Overview: In addition to using AI to create personalized learning paths for each learner, Coursera Labs designs personalised assessments to cater to learning and performance of the individual learner. This gives you immediate results on your quizzes, coding exercises, and hands-on labs.

AI Features — Customised learning recommendations, adaptive quizzes and AI-based assessment feedback.

Use Case: Well-suited for adult learners pursuing professional development or learning in fields such as data science, programming, and business.

6. Cognii

Suitable for: Essay and open-ended question feedback with conversational AI

Example: Cognii — An AI-driven tool to engage learners with dialogue-based assessments. This means immediate personalized feedback for more qualitative, open-ended answers, where learners are aided to learn effective critical thinking and writing skills. It also measures elements of content knowledge and consistency of response

AI functionalities: NLP enabled open-ended MCQ assessment, and real-time conversational-based feedback, independent learning pathways.

Use Case: Best for conversational assessments to build critical thought and written communication skills.

7. WriteLab (integrated in Turnitin Revision Assistant)

Best For: Automated writing feedback.

Description: WriteLab, now part of Turnitin's suite of tools, uses AI to provide detailed, sentence-level feedback on writing. It offers suggestions for clarity, engagement, and conciseness, making it ideal for improving writing skills through continuous feedback.

AI Features: Sentence-level feedback, real-time revision suggestions, grammar, and style recommendations.

Use Case: Useful for adult learners developing writing skills for academic purposes or professional communication.

8. Smart Sparrow

Ideal For: Personalized feedback and adaptive learning.

Smart Sparrow is an adaptive learning platform that applies AI to feedback based on how a student is performing. This feature enables teachers to develop adaptive tutorials that adjust dynamically according to the needs and progression of the learner.

Artificial Intelligence Elements: Customizing learning paths, offering immediate feedback, and providing reports on learner engagement & performance..

Use Case: Effective in courses that have a varied level of difficulty, but students also require specific practices to use if they start falling behind.

9. Century Tech

Who Is It Best For: Individualised learning and adaptive assessment

Century Tech: Merging data analytics with AI to develop personalized learning plans and offering immediate feedback to learners. Its algorithms adjust to the strengths weaknesses of every learner in order to provide an individualized and custom-tailored learning experience.

Adaptive Learning, real-time feedback (on assessments), and personalized learning recommendations.

Use case – For adult education programs emphasizing formative assessment and self-paced learning, particularly in professional development or certification programs.

10. [Quizlet](#)

Ideal for: Giving automatic feedback on quizzes and using spaced repetition to learn.

Quizlet is one of the most popular AI-enabled learning tools that offers flashcards, quizzes, and learning games, giving automated feedback. The app has an AI-backed feature called "Learn" which gives a personalized study plan to the learners and modifies the plan according to their performance over the study sessions

AI functions: Spaced repetition, personalized learning recommendations, adaptive quiz feedback

Use Case: Targeted to adult learners preparing for professional examinations, certifications or skills examinations.

11. [Knowji](#)

Ideal For: Learning a language and expanding vocabulary with insights from artificial intelligence.

Description: an AI based Vocabulary Builder App for learners through SRS — spaced repetition system. The platform offers instant feedback on learner performance and modifies the exercise difficulty based on performance.

AI Features: Vocabulary exercises based on your learning history, immediate feedback, and spaced repetition.

Finders Keepers: For adults who are studying a new language or want to enrich their vocabulary for professional or academic reasons.

12. [ScribeSense](#)

Recommended For: Handwritten assignments that need instant feedback

Scribe Sense: an AI tool to scan written assignments for grading. Scribe Sense scans handwritten assignments and gives the feedback or evaluation as well (no typing needed). Especially for math or other technical related courses.

AI Functionality: Read handwriting, Auto-mark, auto-generated feedback

Use Case: Best suited for adult education courses where students will be submitting handwritten assignments, such as math or engineering.

How to create a bot?

Going beyond the state of the art, for those being more tech savvy or those being more curious, we have dedicated a space for the process and the steps leading to the creation of an AI assistant(bot) that might be a more personalized solution for some adult educators or educational centres. Arguably the AI assistants are the future of technology in the process of education and should be considered as a very integral part of the process of advanced digitalisation. They can be built on an already existing platform like Chat GPT, Llama or Gemini or they can be built from scratch. For those who are seeking for a faster and more user friendly solution it is recommended that the mentioned platforms are used as a starting point.

Creating an AI bot for feedback and assessment in adult education is a unique endeavor that must be carefully crafted by people skilled in educational theory, artificial intelligence, and software development. Here is a well-practical guide on how to create this kind of bot stepwise.

Step 1: Set The Scope And Purpose

Determine the purpose of the bot: before creating a bot you have to make sure what the bot is supposed to accomplish. Is it meant to give immediate quiz feedback, grade papers, or monitor student engagement? Knowledge of the main goal will help to further the development process.

Who Are The Target Learners: Identify the adult learners who will be using the bot and their learning traits. Which might consist of their digital literacy, discipline, and learning preferences.

Step Two: Centralize and Analyze Learning Data

Gather The Data: Create or gather a nearly complete dataset that holds learner submissions, past educator feedback, evaluation outcomes, among some others. This data will be required for training the AI models.

Analyze Data: Do an in-depth analysis to be able to discover correlations and trends that can be observed through data. This may include gaining insight into where learners generally struggle, what feedback has proven to be most effective in the past, and when feedback is needed.

Create Feedback Mechanisms Step 3

Select Wrn Type: Kind of Wrn that bot will give in response. Is it going to be formative, providing feedback in the process, or summative, measuring end outcomes? It can make sense to include other feedback forms: comments, numerical rating, or graphics, such as graphs or charts.

Personalization Strategy — create a strategy to personalize feedback based on the learner performance, history, and preferences; This could mean making several feedback templates or natural language processing (NLP) for a tailored response that dynamically adjusts.

Step 4: Develop the AI Models

Choose AI Techniques: Choose suitable AI techniques that will perform the task. The learner submissions and feedback are commonly evaluated with simple machine learning (ML) models (e.g. supervised learning algorithms) etc. Natural Language Processing (NLP) has an important role in communication with the user as it helps in understanding the response to a written text.

Build the Models: We are training the models, applying labeled examples so that they learn to identify patterns and predict correctly. As an example the model could recognise the types of mistakes made in written submissions and provide a recommendation for improvement.

Test and Validate: Following training, validate the AI models using a distinct validation dataset. Assess how accurate, consistent, genuine the feedback the candidate gives them. Refine the models in an iterative manner to make enhancements.

Step 5: Create the Bot Interface

Designing user interface (UI) Consider designing an intuitive and user-friendly interface through which learners can easily interact with the bot. It should facilitate different feedback formats like text, audio or video. Provide accessibility features like Pick a bot that all learners, including those with disabilities, can use.

Create the backend infrastructure that will power the AI bot. For interaction data, it would involve steps like connecting the AI models with the learning management system (LMS), creating a database to store learner interactions, and cloud services if you need them for scalability.

Step 6: Integrate into Existing Systems

LMS Integration: Make sure the AI bot integrates with existing Learning Management Systems (LMS) or other educational platforms. This enables the bot to access course materials, follow the progress of learners, and provide feedback all within the learning environment itself that learners are already familiar with.

Data Safety and Privacy: Provide stronger safeguards for learner data. Include encryption, anonymization, and secure access control to ensure the BTC data pipeline adheres to the relevant legislation, such as GDPR.

Step 7: Deploy the Bot

Pilot Test: A pilot test should precede a full deployment and is conducted with a sample of learners. This ensures you get feedback, discover the problems, and correct them.

Feedback Loop: Establish a way to generate regular feedback from users. This may entail automated surveys, user forums, or direct input from in-class teachers. Build your bot with this feedbackLearn from this feedback to improve your bot functionality for the better.

Step 8: Monitor and Refine

Performance Monitoring: Regularly monitor the performance of the bot to ensure that it is achieving its goals. Monitors metrics such as user satisfaction, feedback accuracy and learning outcomes.

The process of making the best use of the indications scattered across the studies, placing the researchers in the driver seat for deploying their own clinical AI tools. This includes retraining models with new data, updating feedback loops, or improving the user experience.

Step 9: Scale and Expand

Scaling: After a successful pilot, scale the bot to a wider audience. Make sure the infrastructure is scalable and can handle usage spikes without affecting performance.

Increasing Functionality: Eventually, look at developing increased functionality for the bot. If you bring your bot to life, new possibilities can mean adding support for different types of assessments, integrating adaptive learning technologies or expanding the bot well beyond higher education and into other small areas of adult education.

Step 10: Assess Impact and Plan for Future Development

Effect Evaluation: Assess the effect of the bot on learners and the educator. This should comprise an assessment of results-based learning, teacher burden, and user feedback.

Next Steps: Point towards areas for further research such as overlaying immersive technologies such as augmented reality (AR) for extended feedback environments, or extending it to multiple languages and dialects, growing the learner community to worldwide.

Building a bot on the platforms like ChatGPT, Gemini and Llama would not require steps 3.4 and 5.

Set of recommendations for the development of high-quality digital educational materials based on the existing resources

To further contribute to the enhancement of the role of adult educators and the quality of the materials and the delivery of adult education we have developed this set of recommendations that directly, simply and precisely help in the process.

Alignment and Relevance of Content and Curriculum Alignment. Adult educators should ensure alignment to curriculum and standards. This entails citing and incorporating applicable competencies, rubrics, and proficiency sets for the associated stages of learning. Further more there is a pressing need for contemporary and applicable content. Materials need to be updated continuously and contain all knowledge, methods, and technology updates. Integrate current research and practical examples to keep content relevant and engaging for learners. Another point is the cultural relevance and inclusiveness — diverse perspectives and examples should be integrated to ensure contextual relevance of content for learners. We must try to be inclusive to where we write in a way that caters to multiple learning styles and approaches. It goes without saying that formats that are interactive and engaging should be used. Multimedia like video, audio, animations, and interactive simulations to accommodate various learning styles and keep learners engaged. Visuals and audio will add to your understanding and retention of what you have learned.

In addition it is recommended to use game elements like quizzes, badges, and challenges to create an immersive, fun experience while learning. Gamification is not just about higher engagement but also a wonderful way to strengthen the learning impact. Combining theory with practice is essential to relate theory to practical knowledge, whenever possible have hands on activities where participants can freely practice the skills in their natural environment but within a safe surrounding.

Flexibility and individualization are a must! Modular content with elements that can be customized/adjusted according to various learning

pathways and paces. With this design, educators can customize certain modules to fit learner needs or educational goals.

Adaptive learning technology are also quite important. Use AI and data analytics to monitor learner progress and offer them adaptive feedback or other resources when required. They allow for personalized learning paths which increase motivation and play to unique strengths and weaknesses.

Universal Design for Learning (UDL) is another key point when creating digital educational formats. Use UDL guidelines to make sure that materials are accessible to all learners, and that includes those with disabilities. This includes choices for text-to-speech, adjustable text sizes, and multimedia in alternative formats.

Assessment of the quality and feedback systems could be AI powered and work in synchronicities with other tools. Ongoing Assessment is highly recommended. Establish a process for assessing and revising digital content in relation to learner performance, teacher feedback and evolving educational criteria. Before a full-scale roll-out, pilot test with a small audience to troubleshoot for usability, understanding, and engagement issues. Another very important point is the consideration of the standards for accessibility and technical device compatibility. Prepare materials to work on more than one device and one platform (computer, Ipad, smartphone) and ensure it runs properly on varied working systems. As much as possible, make materials available for download or offline access for learners with inadequate internet connections.

Accessibility Compliance is another very important point— You have to comply with the WCAG (Web Content Accessibility Guidelines) and other accessibility guidelines by making content accessible to the learners with disabilities. Such as closed captions, reading from the screen and color contrast.

The professional development for adult educators is key in the process of integrating any new technology. Develop training courses to guide teachers through how to use and incorporate digital resources in the classroom. Alongside of this primarization everything can consider from technical help and teaching strategy in using digital resources. Give teachers the means or support to adapt digital content for specific needs, so that they have the option to make resources relevant to a specific class, or learner.

Use the power of social media and create an online community or forum to share best practices, resources, experiences among educators to facilitate peer learning and support.

Consider strongly privacy and ethics of data collection

Collecting learner data should adhere to GDPR and other relevant data protection standards, and data should be stored securely and used only for educational purposes. Clearly explain to learners and educators about the methods of data collection, data storage, and data usage so as to build trust and accountability.

Implement Ethical AI and Bias Monitoring in the case if AI is leveraged for personalizing content or delivering feedback, review the algorithms for biases regularly and ensure ethical practices in AI implementation.

Affordability and Sustainability should be achieved.

Use pre-existing materials where appropriate and possible, chose to adapt and repurpose high-quality resources from other community members to avoid duplicating resources and save on cost. This method can maximize resource utilization while also delivering new learning opportunities.

Open Educational Resources (OER whenever viable the use and adaptation of open educational resources that align with educational standards for ease of access and cost efficiency.

What the Future Holds for AI and Education

With an unprecedented speed in the development of artificial intelligence (AI) technology, it will look to develop the way we learn through more articulate, adaptive and intelligent learning. Fast forward to a classroom in the future and AI would help create an individualized learning experience for each student based on their strengths, weaknesses, and learning style. In this case, an AI tutor could adapt in real time to measure a student's understanding, trying different methods of representing complex ideas until the student grasps the material. Such a personal AI tutor would be able to help students academically but also provide encouragement, motivation, and engagement, thus encouraging students to build a deeper connection with learning.

AI holds the promise of relieving teachers of the administrative and repetitive “busy work” often associated with the teaching profession, which, may be life changing for educators. AI can take on routine tasks, from grading papers to scheduling and attendance, easing burdens from teachers, allowing them to focus on more meaningful aspects of education, teaching critical thinking, building relationships with students, etc. Essentially, this support is a lot like having a teaching assistant: it alleviates the burden of time-consuming tasks, thereby allowing educators to spend more time on individualized mentorship and support. It will help better student outcomes by enabling teachers to receive data about student progression due to AI’s analytical capabilities, which will allow teachers to intervene proactively.

Overall, this new generation of AI-enabled tools is transforming feedback and assessment in education and improving the experience of both students and teachers. Although we need to overcome certain challenges, including ethical concerns and the equitable access to AI, the advantages from AI we can gain for broader educational practices are enormous. When implemented right, these technologies have the potential to revolutionize learning by making it more engaging, customized and

impactful, creating an environment for both educators and learners to thrive in.

What this means is that the application of Artificial Intelligence (AI) is set to transform education and training across the globe as well as the practice of non-formal education in the European Union (EU). AI-based tools in non-formal education introduce a smart way to provide feedback and assess learners, with more individualized, scalable, and objective ways to assess learners. AI delivers tremendous value to learners of all ages and backgrounds through these advancements, consistent with the EU's vision of inclusion, lifelong learning, and the up-skilling of its citizens.

Non-formal Education in the EU: Non-formal education encompasses all structured learning that takes place outside the framework of the conventional school system and represents an essential component of the EU's lifelong learning agenda. Comprising everything from trade skills training to erudition for adults and community learning, this sphere meets the demand for the constantly renewal of skills across multiple demographics. But one of the biggest challenges is being able to assess a range of learning outcomes in an varied learner population and to provide feedback that is meaningful, actionable and personalised to the learner objectives. AI-powered tools are specifically designed to meet these requirements as they offer real-time, personalized feedback and objective assessment.

AI usage in educational settings, especially regarding non-formal education, brings up various privacy issues. Most of these tools need access to sensitive information to give industry-specific feedback, and that raises red flags regarding data protection and privacy. At the EU level, currently strong EU data protection regulation in the form of the General Data Protection Regulation (GDPR) provides a strong baseline and means that the collection, storage and use of personal data is closely regulated. But as we know that technology never sits still and neither do the regulators so continual compromise will indeed be needed to protect

the rights of learners as well as maintain public confidence in the AI technologies.

The potential of AI-powered non-formal education is not a game changer in its own right without equitable access to these technologies. This objective can be hampered greatly by the digital divide — the gap between people with effective access to digital technology and those without. If steps are not taken to narrow this gap, AI could exacerbate the marginalisation of those with the fewest resources — especially learners in rural or economically disadvantaged areas. Overcoming this digital divide will necessitate investments in digital infrastructure, affordable access to devices, and digital literacy programs so that AI tools can effectively serve all learners.

Although AI tools provide significant benefits, over-reliance on these tools could undermine the role of human educators and reduce opportunities for the development of interpersonal skills. Education is more than just passing on the keys technical knowledge, but also working with the students in the realms of social and emotional intelligence; nurturing critical thinking skills. Integrating AI while ensuring human interaction is the key to maintain the most out of learning and creating emotionally intelligent humans. AI should never be a substitute for all the things that make education worthwhile, like the role of the educator and peer interactions — it should only serve as a complementary tool.

AI applications in terms of non-formal education in the EU will produce excellent ground in the future. Technological Innovation: AI can support EU Union lifelong learning, inclusiveness, and digital literacy goals by a more effective and efficient dynamic educational system. AI can play a role in non-formal education, too: English lessons and trainings that help people learn new skills, certifications and skills verification, community schools, and so much more — all can use AI to help equip learners with the skills they need to compete successfully in an ever-evolving job market. With the right policy measures, non-formal education and the training can become a vibrant and open world where all learners come

and develop their skills and confidence to succeed through addressing existing challenges and applying AI.

These AI-powered tools are going beyond merely reinventing feedback and evaluation processes in non-formal education to usher in much more individualized, contextual, and equitable assessments. Moving forward, we must strive to harness the benefits of AI while also ensuring they are designed ethically and equitably, working towards an inclusive, efficient, and useful education system. With proper design and governance, AI can contribute to enriching non-formal education in the EU and can make it a pillar of 21st-century lifelong learning.

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