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Digitising Education: Augmenting the Learning Experience with Digital Tools and AI

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Abstract
This paper explores how advanced technologies like Artificial Intelligence can be seamlessly integrated with contemporary pedagogical methodologies to generate multimedia-based interactive learning content. Through a blend of AI-powered applications, self-assessment tools and interactive video platforms, the research initiative is working to develop and refine an agile e-book for high schools and more specifically for the course of biology. The integration of these technologies has led to more immersive and engaging learning environments, where students can interact with content in ways that improve comprehension and memorisation of the fundamental concepts. Teachers, who reviewed the e-book, reported that it is pedagogically sound, highly practical and therefore has great potential for adoption in high schools' classrooms on a wider scale. The findings also stress the absolute necessity for teacher training to incorporate these technologies into daily teaching practice. As educators, there is a need to learn both how the tools work and where these resources fit in the curriculum delivery. According to the research, educators are upskilled almost immediately through this integration of technologies and digital tools that significantly aids student engagement with personalised adaptive learning experiences, leading to better educational outcomes and resulting in a more innovative future.

Keywords: Educational Technology, AI in Education, Interactive Videos, Text-to-Speech, Digital Storytelling, Self-Assessment Tools, QR Codes

1. Introduction

The accelerated pace of technology is revolutionising avenues used for education, not only through the provision of tools, but most significantly, through learning as well. New technologies, such as artificial intelligence (AI),

interactive multimedia and self-assessment systems are transforming the traditional teacher-centered approach to a more dynamic student-centered system. These improvements could be transformative for personalised learning (Mayer, 2021), accessibility and the adaptability of instruction, among a variety of other uses focused on increasing student engagement (Holmes et al., 2019).

A major benefit of AI in education is that it can enable personalized feedback and differentiated instruction, so students get to learn at their own pace. AI can analyse mass student levels of data, match the gaps in learning and adapt content individually to suit all learners (Zawacki-Richter et al., 2019). Videos or interactive multimedia platforms increase knowledge retention by tapping into visual, auditory and kinesthetic learning styles to facilitate more connected cognitive processing (Mayer 2021). As such, self-assessment tools may promote greater autonomy and responsibility for learning, taking root among the students as part of their thought process while playing.

Even with a clearly advantageous use of these technologies in educational practice, the appropriateness will only prove itself if teachers are ready to present them. It has been shown that teacher competence in using educational technology is a main condition for realising its full potential (Holmes et al., 2019, Zawacki-Richter et al., 2015). Unfortunately, lack of educator training is a significant barrier; often teachers are not adequately trained and supported to use advanced tools as part of their teaching effort. Studies point to the fact that technology can remain underused in classrooms due to its lack of impact on what teachers do with students, because they still lean towards traditional practices (Trust et al., 2017) and there are several pedagogical factors behind low integration level from teacher side, apart from their techno-phobia.

This paper contributes to addressing these two issues by reporting the design of a digital learning tool in the form of an interactive e-book for secondary biology education. Featuring AI-powered interactive videos, self-assessment exercises and QR codes the e-book provides a complete digital resource for students, as well as educators. Following a review by the best teachers in the field, they concluded that this content was classroom-ready and could be easily consumed by students. Nonetheless, it also pointed out that a good teacher professional development would be necessary to allow the integration of these kinds of technologies in everyday lessons. This paper seeks to evaluate the efficacy of our e-book and highlight how professional development for teachers is critical in their ability to learn new pedagogical tools.

2. Literature Review

2.1. AI in Education: Current Applications and Impacts

The face of education has been completely reshaped by unlocking personalized learning experiences through enhanced instructional delivery, and this is all thanks to one thing: Artificial Intelligence. This NextGen smart education is branched from intelligent tutoring systems (ITS) through adaptive learning platforms, which analyse the student data and provide customised ways of learning. As Zawacki-Richter et al. (2019) pointed out, AI-based systems can reflect on the development of an individual learner in real-time and allow teachers to respond with personalised instruction accordingly. Holmes et al. (2019) focus on how AI can support the creation of personalised learner experiences, with a specific emphasis on adaptive algorithms that adjust content difficulty to match student proficiency. Educators can use AI to generate custom teaching materials based on their criteria (Mavropoulou, Koutsoukos & Oikonomou, 2023). Another study, conducted by Mavropoulou (2023), shows good-quality of artificial intelligence responses to questions with less time-consuming preparation for teaching materials and exercises. Educators can customise chatbots that cater to the diverse requirements of students. Educators should accept the fact that chatbots are only an adjunct and not an alternative to the traditional method (Mavropoulou & Arvanitis, 2023).

Additionally, AI has taken over the mundane work of doing administrative duties. This frees up teachers to provide their students with quality instruction and more contact hours as a whole. AI-driven grading tools, the best and most popular instantiation of this use case, help to reduce time that teachers spend assessing vast amounts of student work with consistent fairness (Luckin et al., 2016). Still, even with all the rewards, there are still pitfalls that remain. In addition, concerns about data privacy and algorithmic bias present implications that AI has been

overly relied upon for teaching (West 2018). However, for better or worse, AI is inevitably going to change the way educators teach and learn as it becomes more ingrained in our educational practices into the foreseeable future.

2.2. Interactive Learning Tools: Engaging Students through Multimedia

The use of multimedia learning tools has become essential in enhancing student engagement and increasing educational content retention. The cognitive theory of multimedia learning (Mayer, 2021) states that when students are simultaneously presented with sounds and pictures or words (either digital, or printed on paper), they will be able to acquire the information. Interactive learning platforms, e.g., videos, games and simulation tools also offer an active student-centered approach allowing the students to develop critical thinking and problem-solving skills through meaningful engagement with these materials (Schindler et al., 2017).
This could include adopting platforms (Kahoot, Wordwall etc.) already widely used in classrooms to gamify learning and provide more interesting, interactive lessons for learners. Quizzes and games that provide instantaneous feedback are especially popular among students, as they permit active learning and self-paced delivery of content (Plump & LaRosa, 2017). In addition, the use of digital storytelling reinforces students' connections with the content by immersing them in it at a more personal level, allowing for higher levels of emotional and cognitive engagement (Robin 2016). Interactive multimedia affects learning and supports various educational objectives (Clark & Mayer, 2016).

2.3. Self-Assessment Platforms: Enhancing Student Autonomy and Feedback

Self-assessment tools enable students to realize their learning and therefore let them take control of their education. Google Forms, Quizlet, and Kahoot are just a few platforms that make it easier for teachers to develop self-assessment exercises where they can provide direct feedback allowing students to know how well or poor they performed. Self-assessment helps learners develop autonomy by reflecting on how well they have worked towards their own strengths and areas for improvement. This process is part of a greater metacognitive transformation that enhances student awareness regarding their learning processes and strategies.

In other words, using formative assessment tools to provide students with constant feedback improves learning outcomes far more effectively than merely relying on summative assessments. Feedback should be ongoing and self-assessment formative (Nicol & Macfarlane-Dick, 2006) to help students identify gaps in understanding, but also because it encourages a growth mindset: mistakes are learning opportunities. Research has shown that students who receive frequent feedback through self-assessment platforms are motivated and perform academically better. Another reason why digital assistance is expected to improve performance is because, if the system itself allows for personalized quizzes and assessments, it could be used to facilitate differentiated instruction that caters more directly towards individual learning requirements.

2.4. The Role of QR Codes in Education: Bridging Digital and Physical Learning

QR (Quick Response) codes in education have made it possible to bridge classroom materials and digital content in a frictionless manner. QR codes are one of the most efficient ways of adding links to online video resources, videos or, for example, quiz assessments and so forth, that can be integrated into traditional learning releases. Students can be directed to additional resources or interactive elements in order to round out the learning experience further, while also making use of content available just-in-time via QR codes. Research results indicated a positive attitude among students about QR Codes in that using them in courses can make the presentation more interesting, interactive, understandable, flexible, creative and meaningful (Mavropoulou & Galani, 2022).
Wu and Huang (2017) conducted research on QR codes in China, showing that they promoted quick access to learning content without the need of searching through different digital platforms. The days of being constrained by a fixed curriculum are over: teachers can create QR codes independently, taking students to individual lessons or topics, helping them dip in and out as they like. QR codes were also very popular in the m-learning literature, as it leverages the current trend of students using their smartphones and tablets for learning (Gikas & Grant, 2013).

This sort of integration between mobile technology and classroom activities works in conjunction with the idea that students can receive educational content anywhere, promoting ubiquitous learning.

3. Methodology

3.1. Research Design and Approach

The research design for this study was qualitative, using a comprehensive literature review and semi-structured interviews with secondary education teachers. This was done as it allowed for a detailed examination of digital technology integration, while capturing the rich and nuanced experiences that educators undertake. They were asked to evaluate the potential benefits and hurdles of utilising interactive videos, Artificial Intelligence content, and self-assessment platforms within the classroom.

First, a literature review grounded the project in existing research on digital tools for education and focused particularly on engagement approaches that support learning. It further identified deficiencies in teacher preparation and a necessity for instructional technology staff development.

Semi-structured interviews with secondary education teachers who reviewed and used digital learning tools. These interviews covered the qualitative data around how they view interactive video, AI content creation or self-assessment platforms in terms of usability and effectiveness for student learning.

The data collection centered on collecting rich, qualitative accounts from teachers of their perceived impact that the digital tools had in teaching practice, student engagement and learning in general. Interviews also delved into the barriers to adoption and use and provided suggestions on how integration could be made more effective.

The qualitative approach yielded in-depth contextual insight on teacher perceptions of how digital tools shape their educational practices, and highlighted professional development as a crucial support to implementation.

3.2. Selection of Educational Tools and Technologies

The selection of digital tools for this study was guided by their proven effectiveness in fostering student engagement, interactivity, and personalised learning. The primary tools used include:
- AI-driven platforms for content creation – interactive video applications, Optical Character Recognition (OCR) software. The tools were included because they can be used in the creation of multimedia learning materials and increase accessibility with minimal need for automation (Holmes et al., 2019).
- The interactivity of the assessment platforms also allowed for immediate grading and student performance measurements in real time, important aspects of both formative feedback (Reiser & Wollman, 2019) and self-evaluation.
- QR Code integration to additional digital resources for students through printed material, making a link from physical learning environment to virtual.

The tools were chosen for their ease of use, accessibility for both teacher and student, as well as how they integrate seamlessly to what is already expected within the classroom. According to previous research, the selected tools meet on how powerful they might be as a channel of learning outcomes (Schindler et al., 2017).

3.3. Data Collection: Teacher and Student Interaction with Digital Tools

All data collection was designed to capture teacher and student interactions with the digital tools studied. There were a number of ways we measured student engagement:
- Completion rates of interactive quizzes and assignments,
- Participation in interactive videos through embedded questions and activities, and
- Frequency of QR code usage to access additional learning resources.

This information was auto-recorded within the aforementioned digital platforms (Kahoot, Google Forms), therefore analyses were made real-time as students engaged with these activities. In addition to this, analytics from

such platforms provided insights into how well students were doing things like their quiz scores and time spent on a particular activity, which could be used for gauging learning outcomes. In conjunction with these numerical measures, qualitative data was collected through semi-structured interviews with teachers and student focus groups. The interviews were conducted with the purpose of discovering their experiences with the use of these digital tools, what difficulties they faced, and how they perceived the impact of such a new technology on learning. Reporters investigated teachers as to how they incorporated the technologies into their classes and perceived student involvement, while students reported on how engaging as well as useful these tools were in supporting them (Flick, 2018).

4. Practical Implementation of Digital Tools in Education

The process of digitisation in education has brought about considerable changes, introducing several tools to all teaching practices that are intended for greater involvement and entertainment through multimedia activities. Many different types of tools were used in this study, the point being to provide greater stimulation and a more diversified perspective, which relates specifically to secondary-level education. Driven by recent education and learning research, such tools have been shown to improve student engagement, comprehension & retention of knowledge.

4.1. Creation of Interactive Lessons Using AI and Multimedia Tools

It all started with the development of lesson materials using Artificial Intelligence (AI). The influence of AI as a revolutionary tool in education has been recognized — that makes the content creation automatic (Watson & Clemens, 2018) and unique learning pathways can be set up based on personalisation and positioning altogether (Zawacki-Richter et al., 2019). The driving point of this project is to use an AI application, which passed through some teaching material that already existed and generated processes with Optical Character Recognition (OCR) in static content, creating a much more dynamic interactive presentation. The role of technologies such as Optical Character Recognition (OCR) software in transforming educational resources to be more accessible has been substantiated with evidence when used along other technologies like text-to-speech.

This AI platform was responsible for curating these slides as relevant, cohesive content that not only supplied titles and text but also narrated them throughout each section. Ultimately, this allowed to easily implement digital storytelling — a method of teaching, which has shown positive results in the increase of cognitive and emotional engagement among students (Robin 2016). Digital storytelling reinforces motivation and engagement due to its playful character (Arvanitis & Krystalli, 2021).

4.2. Utilizing Interactive Platforms for Real-Time Engagement

Wordwall and Kahoot are purchased platforms that also linked to the live version mentioned in lessons. Such platforms are well-known for turning the learning process into a game, they show instant results and give students an opportunity to complete self-paced exercises. other studies have indicated that tools such as Kahoot can increase motivation and engagement, making learning more enjoyable while also becoming a significant resource for effective teaching (Plump & LaRosa, 2017).

Google Forms was his go-to tool for daily formative quick-fires and to gauge student understanding. In google forms moreover, is very easy to determine in real-time how the class had done and prepare feedback against it as fast as you can making your lesson plan more agile. Formative assessment is considered a key factor in the development of self-regulation by enabling students to monitor their learning and adapt strategies.

4.3. Enhancing Accessibility and Learning Continuity with QR Codes

In order to make the connection between in-class learning and solo study, QR codes were integrated into different types of educational materials. Due to this reason, QR codes are widely used for education purposes such as accessing additional study materials, Quiz and or sometimes video content. In the study, QR codes were affixed to selected chapters of an e-book that allowed students push a button and gain access to interactive videos. The

students would then scan these codes, which in turn allowed them to interact with material at anytime and anyplace away from the classroom (Gikas & Grant, 2013).

Made using AI and video-editing software, these videos were interactive in a way that the lessons had highlights with questions integrated within them as engagement works better than passive learning. Quizzes embedded in videos are a way to support learning as it requires them to think about and interact with the content "on-the-spot" (Mayer, 2021). In addition, the videos were accessible to students with different learning needs such as vision and reading difficulties, this was done by utilizing text-to-speech technology and AI-generated narrations.

4.4. Self-Assessment and Feedback through AI and Digital Tools

A particular emphasis of this pragmatic approach was on the development and deployment self-assessment tools that have been shown to be central in student autonomy (Nicol & Macfarlane-Dick, 2006) or learning outcomes. AI was utilized to create practice exercises, including multiple-choice questions that could be answered by the students for instant feedback. Google Forms and Kahoots as self-assessment opportunities that make it easy for students to receive feedback on where they are in the learning process. QR codes were also used to provide students with around-the-clock access to self-assessment quizzes out of classroom times.

4.5. Interactive video Theory

This research is impactful in that, the theory presentation was developed using cutting-edge technologies incorporating artificial intelligence (AI) and this work aims to lay foundation for numerous future works. So, firstly the learning material in second class was put through Optical Character Recognition (OCR) technology which is a reading machine that can read printed or digital text using Hardware Enhancements. With that data, the AI then auto analyzed and structured the material so it could be turned in to slides — providing slide titles and content for each given type of class. The output material was scrutinized, approved and the next stage in process is to produce slides for each of these features.

The images were then organized in order of presentation, and the slide titles — to scaffold coherence and comprehension for learning purposes – were later added by a video editor. Intro narration is added with a Text-to-speech voice over of the article, to make it more watchable. But to make it as more human-like and personal telling the story was simulated with a talking image technology that could represent virtual appearance of the teacher, just for an introduction to concept. This was important especially for their first exposure to the content and teacher. After aligning all the components including pictorial, textual and narrative Direct-to-Timeline of a video and final edits, export was done for uploading it on popular YouTube. Multiple-choice and fill-in-the-blank exercises were also developed using an interactive video creation tool to reinforce some of the key content points at those junctures during the videos when new ideas or information was introduced. These exercises were seamlessly integrated into the interactive segments of the video where students could verify their comprehension as they watched.

QR code technology was used to allow students to scan the QR and go directly. These QR codes were embedded in an e-book that came with the course, essentially fusing two disparate realms of education into one learning experience.
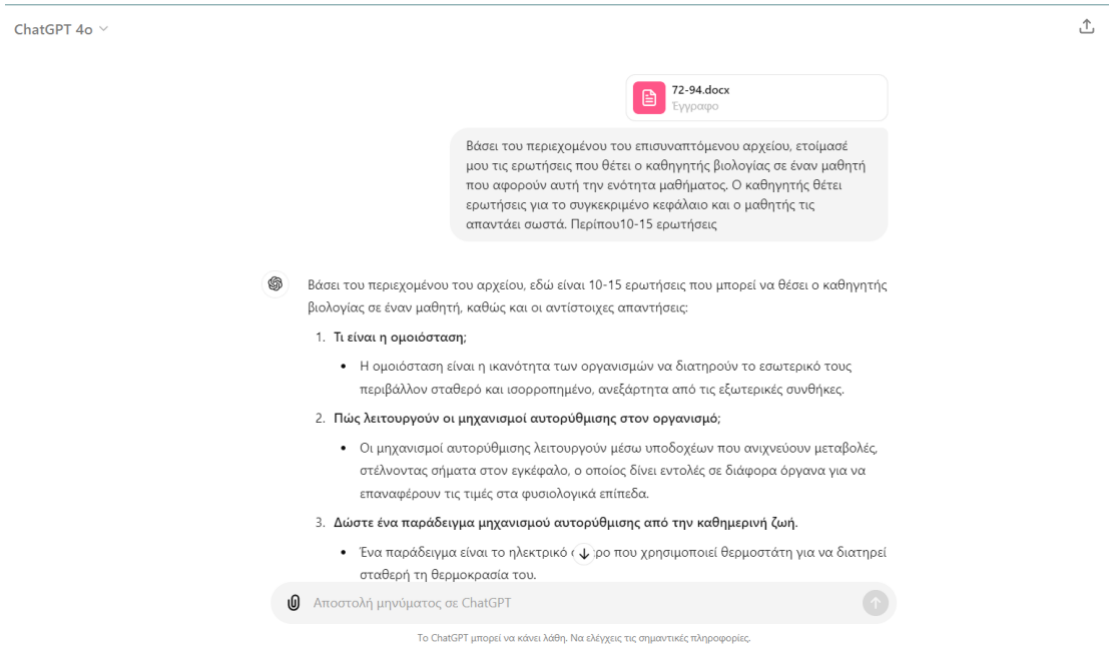
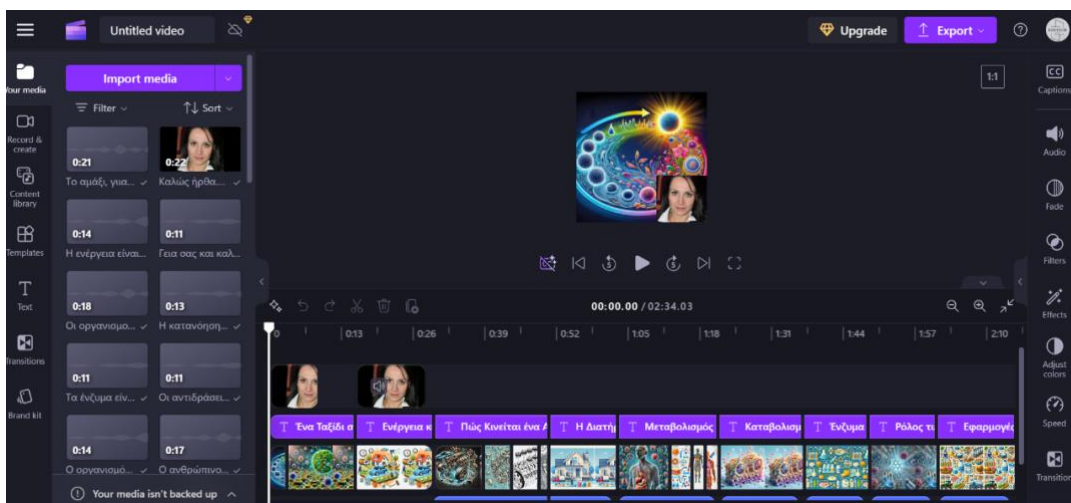Image 1: use of artificial intelligence

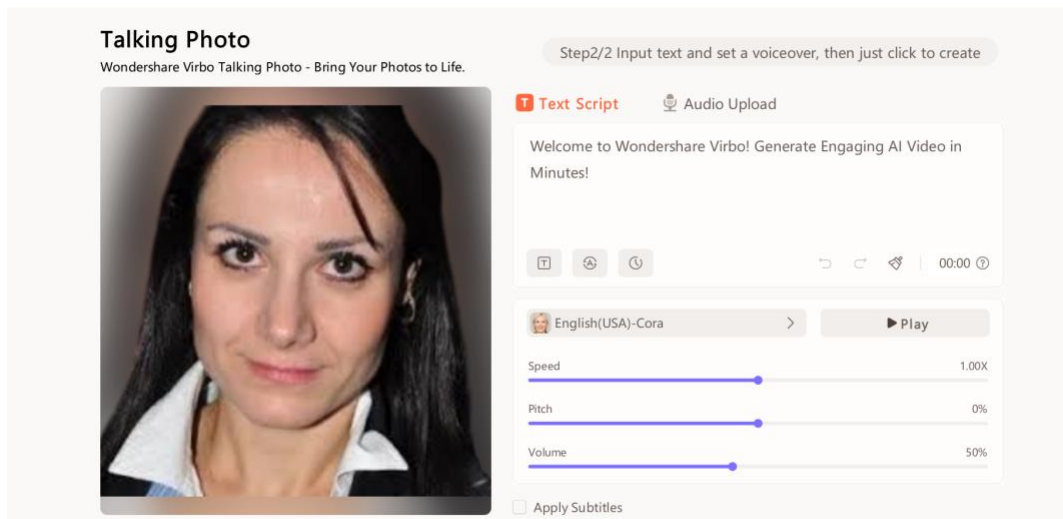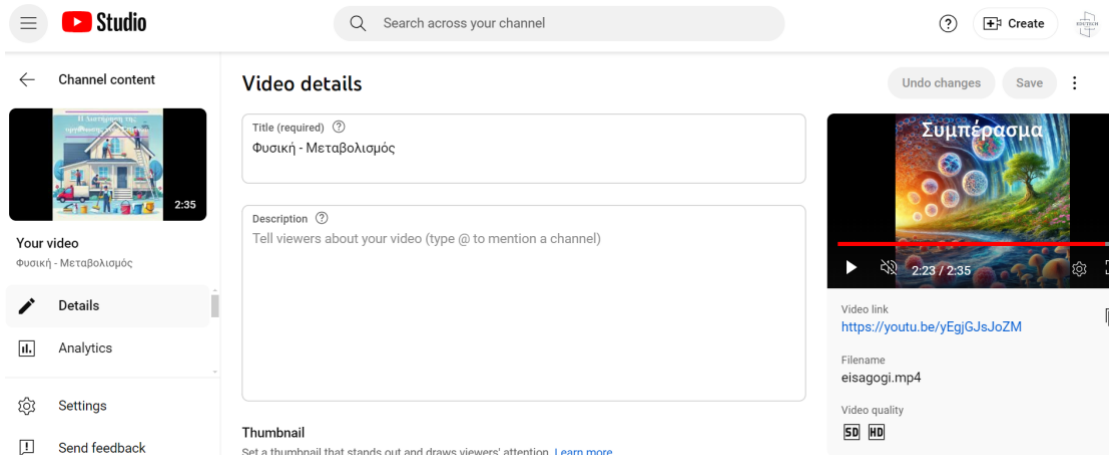Image 2: video editing – digital narration

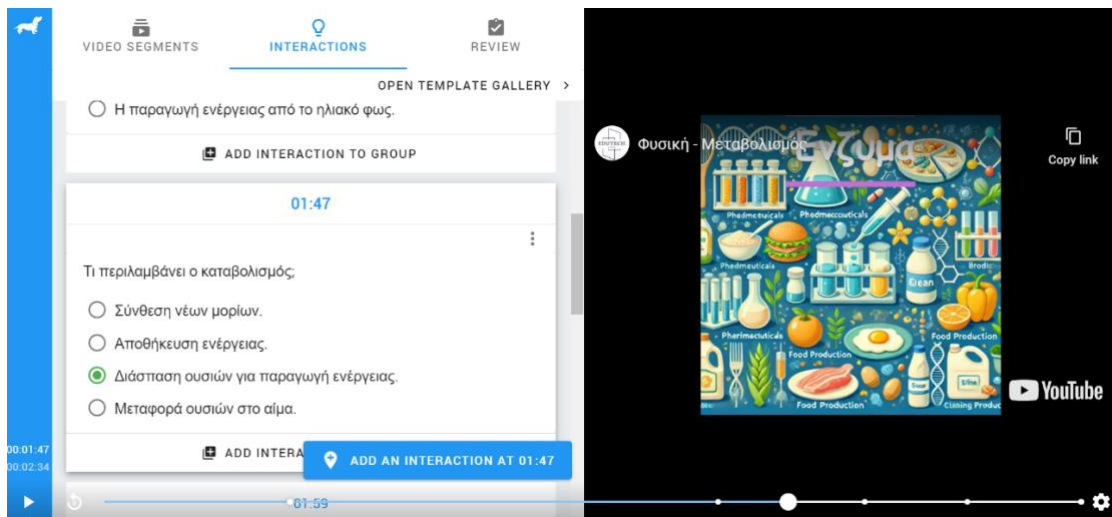Image 3: talking image

Image 4: Use of the platform YouTube
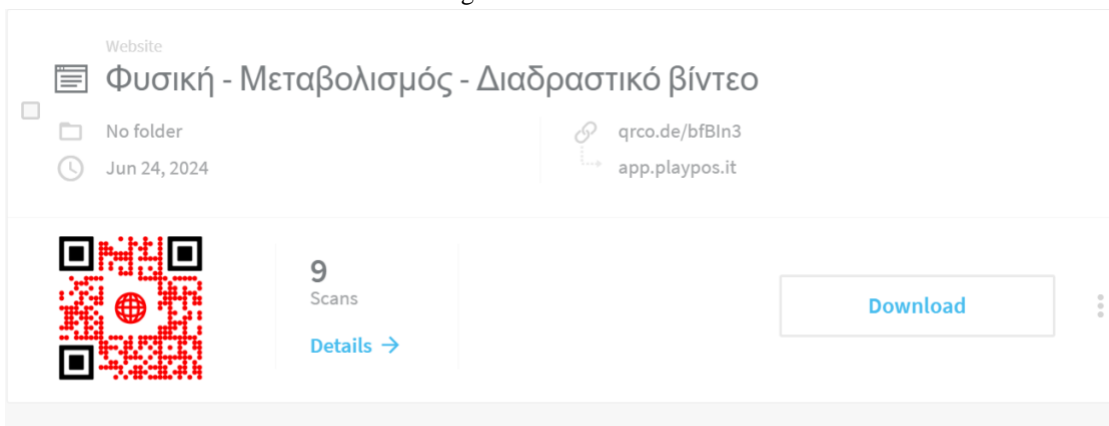

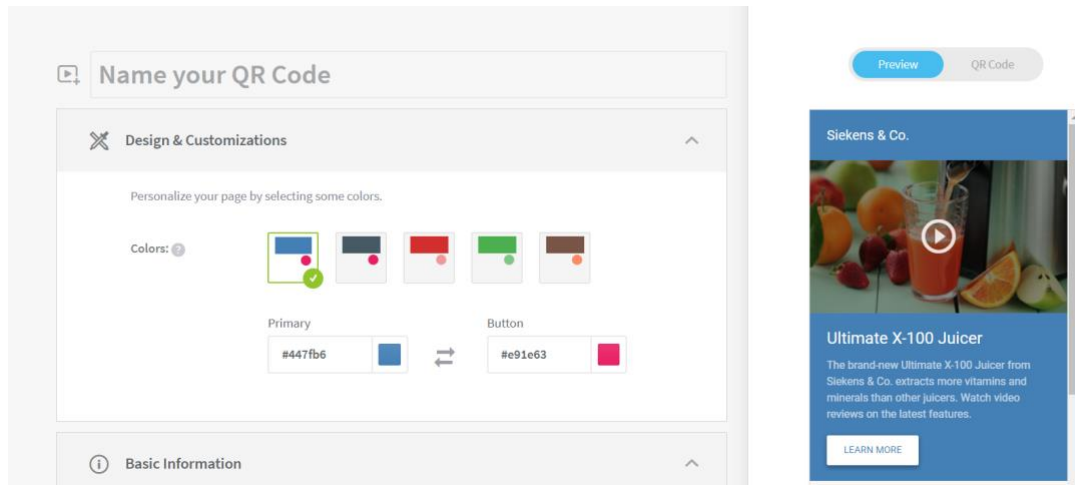
Image 5: Interactive video

Image 6: QR Code generator 1
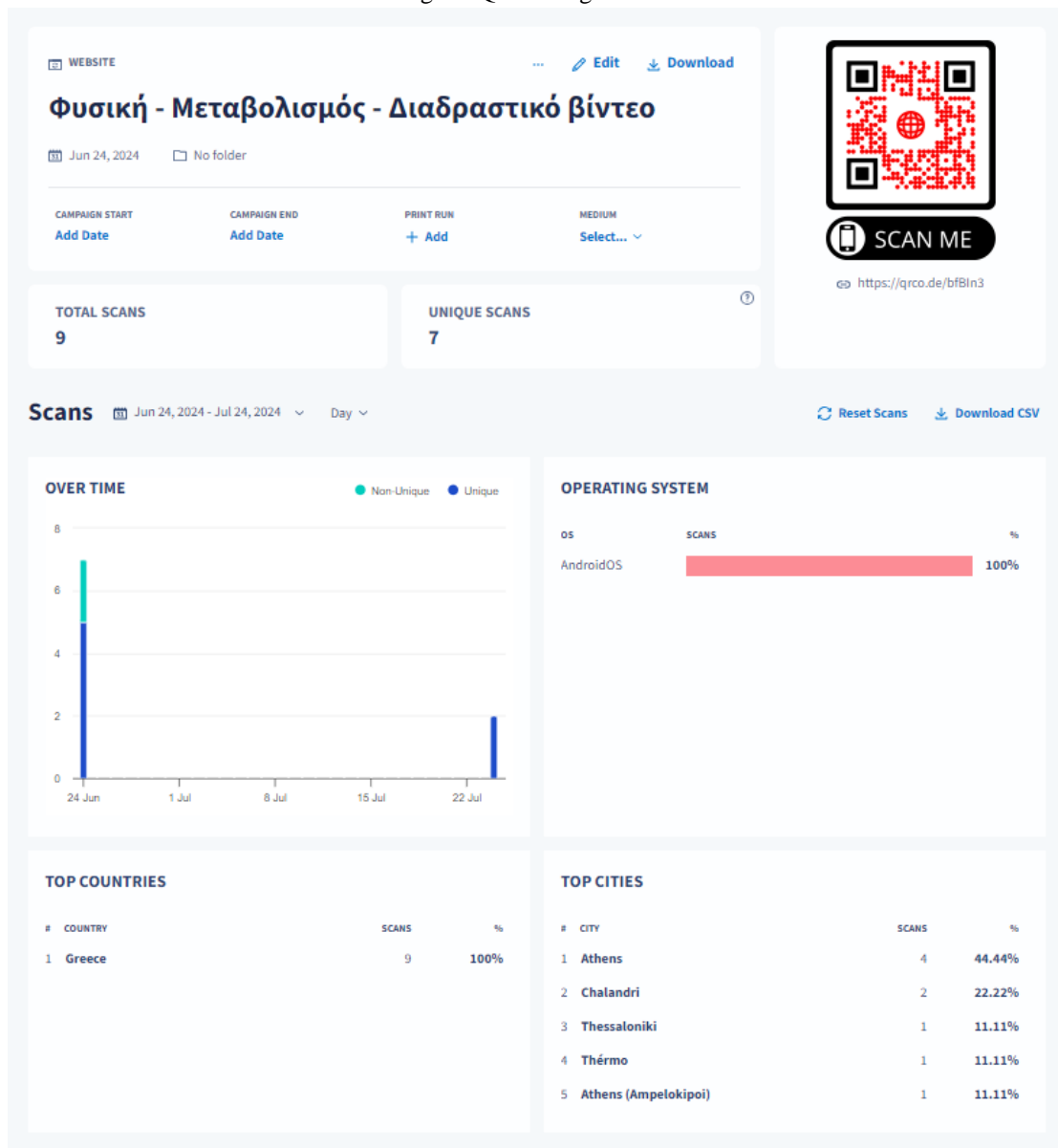
Image 7: QR Code generator 2

Image 8: QR Code generator 3

4.6. Questions and Answers

Then an artificial intelligence (AI) dialogue was prepared between Teacher-Student to enforce the module concepts. The function of the AI was to provide a conversation script with questions about the learning material, and its right answers. The dialogue was constructed to invoke critical thinking and involve the learner with more direct contact between them concerning what they were learning. This way, students delve deep into the concepts and this helps them in a better understanding of the topics.

This scenario was then re-cast to a digital learning environment using digital storytelling software. Digital storytelling is a great way to incorporate text, audio and images for better engagement in learning. As Screen Dialogue detects different audio formats at the level of dialogue lines as we go frame by frame and takes note conformity to its best guesses, this became a two-step process: converting dialogue scenes into video massaging using specialized video editing software; then text-to-speech-based narrator treatment. The technology provided the form of natural sound to produce dialogue, keep it accessible and make viewing an enjoyable experience for students.

The video is stored on an accessible, cloud platform to grant students instant access at any time without the hassle of downloading and it makes learning easy. This QR code was also generated through a specialist platform, which seamlessly uploaded into the learning materials.

Image 9: Digital storytelling

4.7. Practice - assessment exercises

Artificial Intelligence (AI) technologies were asked to generate multiple-choice exercises on the content that had been developed for a course. The AI then provided questions that whoever had to train but also gave the answers (by this creating, censuring and assuring exercises). For this exercise, various online self-assessment platforms such as Google Forms and Kahoot were used to keep track of them and incorporate it with course structure (e.g., immediate feedback which was available in google form responses also instant analysis about student performance).

These platforms are useful in that they also serve as repositories for information on student performance. Thus, they can offer more personalized feedback on a timely basis, providing differentiated instruction. The exercises were then made into QR codes so students could easily and immediately access them. All the students had to do was scan this code using their mobile phone or any other device, which would direct them straight to exercises.
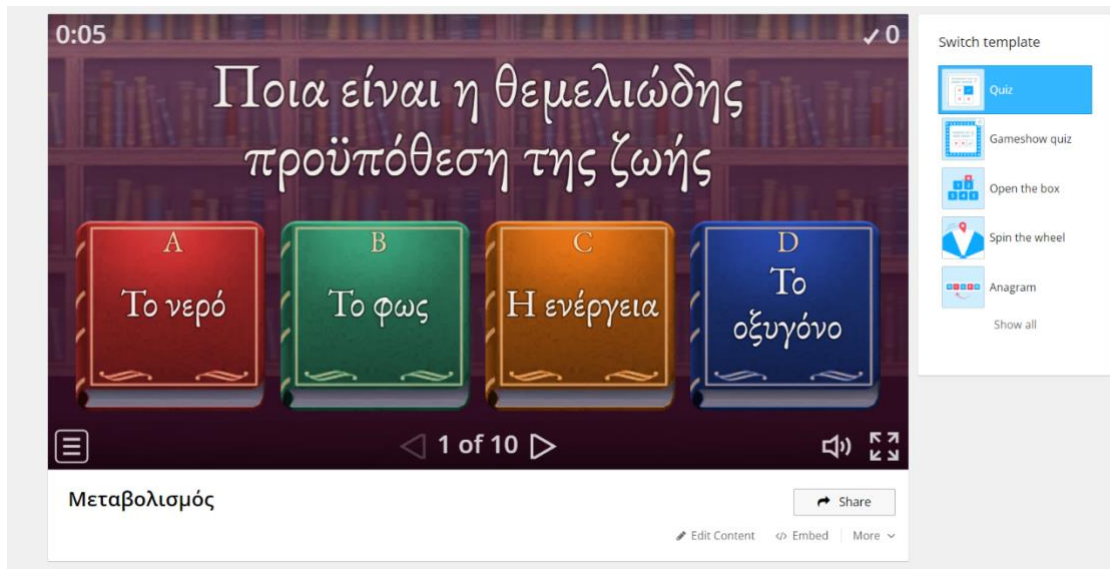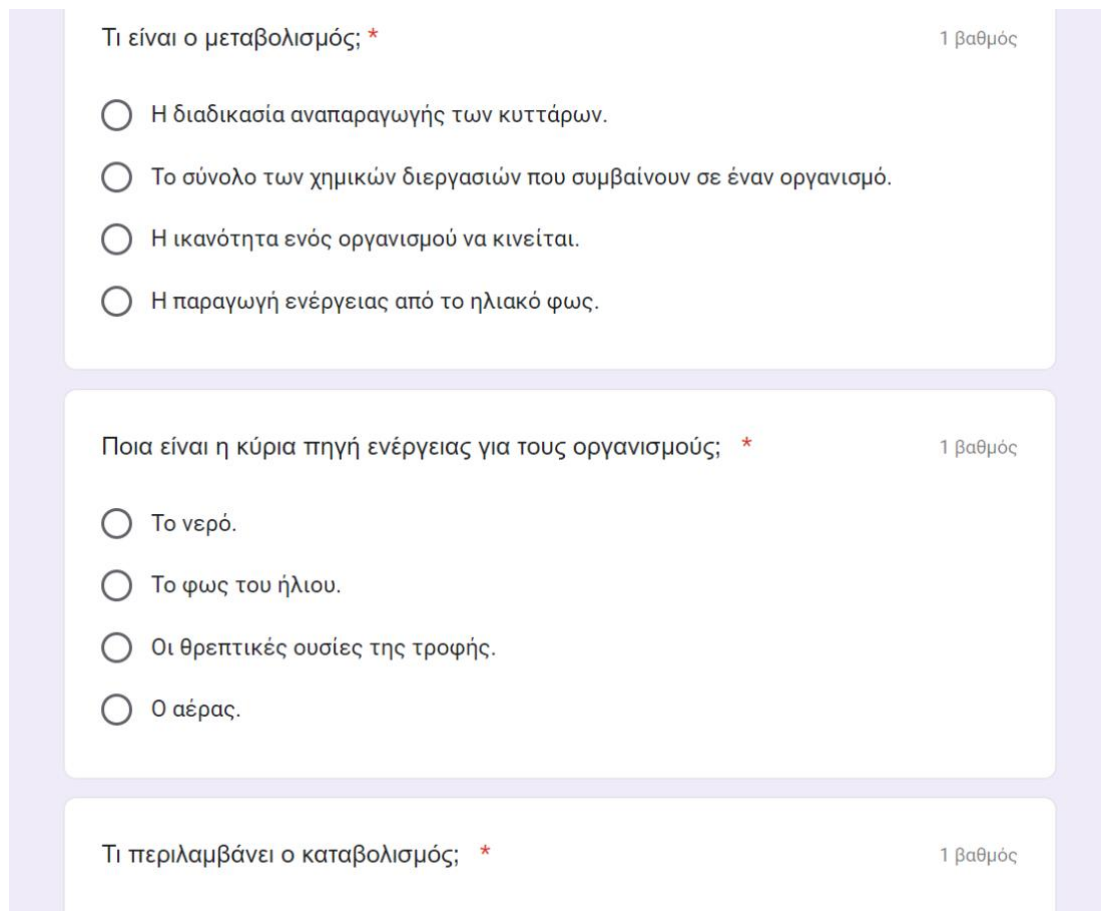
Image 10: questions multiple choice 1

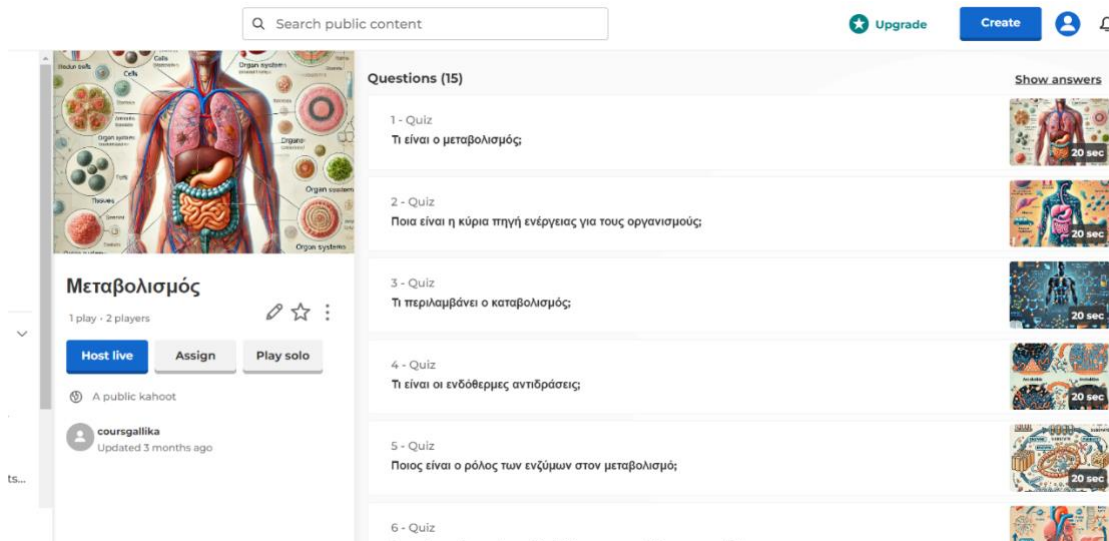Image 11: Questions multiple choice 2

Image 11: Questions multiple choice 3

4.8. E-book creation

All the created learning materials adapted to new technology tools embedded in an e-book creating platform. The cover of the e-book was developed using artificial intelligence. Next, we added its corresponding QR code for every learning object.
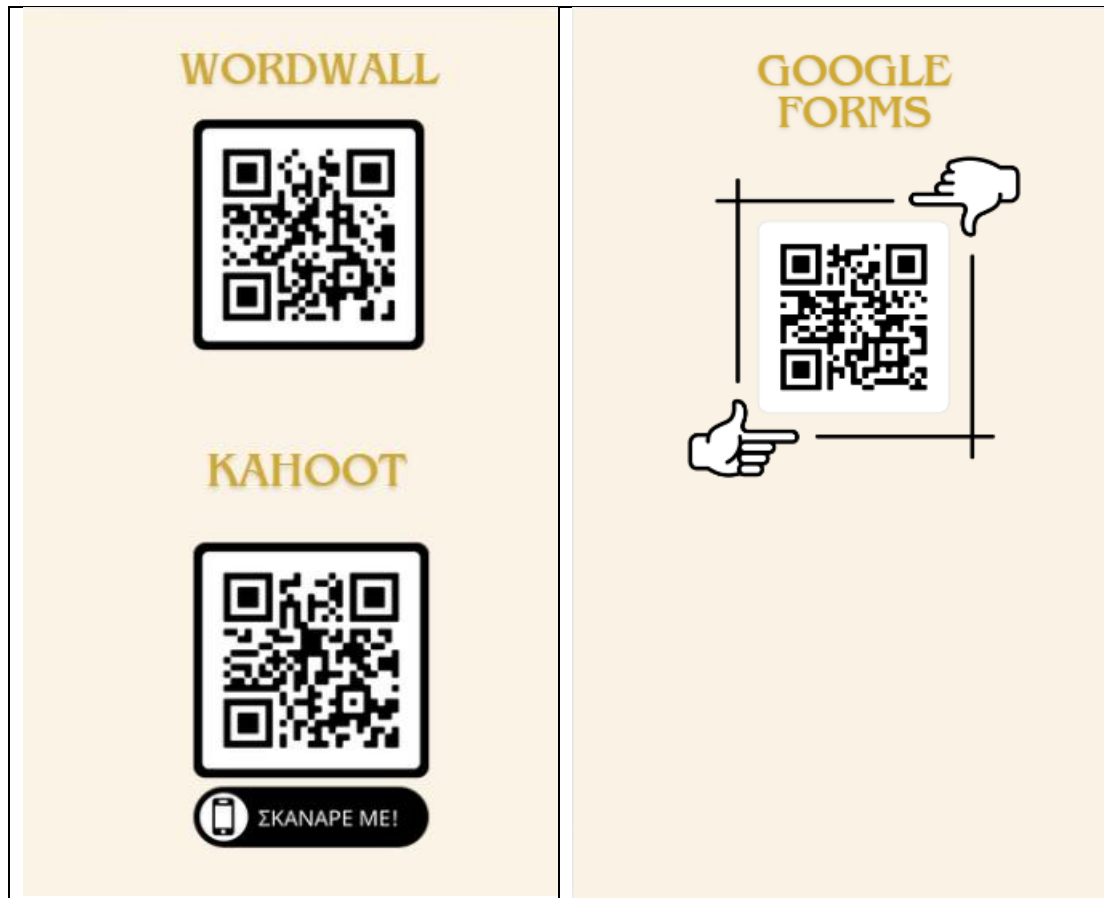

Image 12: e-book

Image 13: e-book 2

5. Discussion

Two key insights emerged from the comments of teachers who reviewed this e-book. The learning content was suitable and effective for secondary school students, highlighting the e-books potential to engage and provide understanding about complex scientific concepts. The AI-generated content, Interactive Video and Self-assessment tools reflect what recent research supports: transformation in educational practices towards technology-enhanced learning is recommended ways to promote deeper cognitive processing, build digital literacy & cater varying learning style (Mayer 2021). The personalized nature of these tools enables students to interact with content in a way that works for them (Holmes, et al., 2019).

For example, interactive videos can provide the opportunity to enhance student engagement and motivation via in-lesson feedback or real-time elements (Schindler et al., 2017). Self-assessment platforms also facilitate self-regulating learning by promoting students to monitor their own performance and differentiate the areas where they may need additional work. These results are supported by the very strong e-book embrace from teachers and they see that it is an addition to classroom dynamics in ways such as making better us of multimedia, interactivity.

Although present iterations of these technologies have been favorably received, comprehensive teacher preparation is still required to support teachers as they further integrate emerging learning tools into their day-to-day instructional practice. For a long time, research has emphasized that the success of (particularly) educational technologies depends on whether or not teachers are able to use them appropriately (Zawacki-Richter et al., 2019; Trust et al., 2017). Digital tools are designed to be in service of learning (Passey et al., 2018) but the efficacy only emerges if teachers have adequate confidence and competency with their use (Davis & Niederhauser 2007). Without quality training, facilitating these types of learning tools is a challenge for educators and this can only slow down the impact.

Teachers who participated in the study indicated that they were unfamiliar with many of these digital tools, such as interactive video platforms and QR code integration, resulting in a need for targeted professional development to successfully infuse them within their existing instruction. Teachers with lower professional development may not be aware of the potential for use, or misuse, and underutilization /misapplication could stifle their usefulness (Zawacki-Richter et al., 2019).

This results in one of the main recommendations made by this study: structured professional development workshops. Curricula for these programs must need to address the use of each digital tool and provide good practices for incorporating them into lesson plans, autolyzing instruction, assessment techniques as well as real-time data analysis (Nicol & Macfarlane-Dick, 2006). With help of these fundamental skills, we need to impart the same to teachers so that institutions can ensure new introductions will lead to real benefits in terms of teaching and learning. Moreover, teachers need continuous and up-to-date professional education to stay informed about the changing technologies and proven methods (Trust et al., 2017).

6. Conclusion

The presented study contributes to the possible integration of novel technologies in didactic work via an AI-based interactive e-book. What the teachers thought about teaching material was that it's good to go and both educators and students will appreciate this outcome. However, these digital tools are only as effective as the proficiency of those delivering instruction who will use them.

However, the teachers all stated that professional development is needed to be able to apply an e-book and comparable devices correctly based on instructional material. Teacher professional development programs that emphasize on strategies for utilizing AI, interactive videos teaching tools and self-assessment platforms together with various others like QR codes, etc. will be essential in promoting a cultural shift towards the integration of these technologies into routine instructional practices in schools.

As a wrap-up, these digital tools brought in the study have shown tremendous promise for increasing student engagement and learning outcomes; however, their success is invariably contingent upon the readiness or competency of those educators tasked with delivery. This implies for future research to investigate enduring impacts of teacher training programs in sustainable implementation processes with educational technology and their effects on student achievement.

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References

Arvanitis, P., & Krystalli, P. (2021). Digital storytelling and augmented reality-based scenarios for foreign language teaching. In Digital Pedagogies and the Transformation of Language Education (pp. 1-22). IGI Global.

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative research in sport, exercise and health*, *11*(4), 589-597.

Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., ... & Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, *15*(1), 1-126.

Bryman, A. (2016). *Social research methods*. Oxford university press.

Clark, R. C., & Mayer, R. E. (2023). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. john Wiley & sons.

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*. Sage publications.

Field, A. (2018). Discovering Statistic Using IBM SPSS Statistic, 5th Edn. ed J. *Seaman (Los Angeles, CA*.

Flick, U. (2017). The Sage handbook of qualitative data collection.

Gikas, J., & Grant, M. M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media. *The Internet and higher education*, *19*, 18-26.

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education promises and implications for teaching and learning*. Center for Curriculum Redesign.

Ma, W., Adesope, O. O., Nesbit, J. C., & Liu, Q. (2014). Intelligent tutoring systems and learning outcomes: A meta-analysis. *Journal of educational psychology*, *106*(4), 901.

Mavropoulou, E. (2023). Exploitation de l'intelligence artificielle dans l'enseignement du français langue étrangère sur objectifs spécifiques: une étude de cas. Ziglôbitha, Revue des Arts, Linguistique, Littérature & Civilisations, pp.63-70.

Mavropoulou, E., & Arvanitis, P. (2023). CONTRIBUTION/IMPLICATIONS OF CHATBOT INTEGRATION ON TEACHING AND LEARNING A FOREIGN LANGUAGE. In *ICERI2023 Proceedings* (pp. 7596-7605). IATED.

Mavropoulou, E., & Galani, M. (2022). Students' perceptions for the use of QR codes in literature-theater course. In *14th Conference on Informatics in Education*.

Mavropoulou, E., Koutsoukos, M., & Oikonomou, A. (2023). Integration of Artificial Intelligence on Teaching the Course of Didactic Methodology: A Case Study. *European Journal of Social Science Education and Research*, *10*(3), 36-51.

Mayer, R. E. (1997). Multimedia learning: Are we asking the right questions? *Educational psychologist*, *32*(1), 1-19.

Luckin, R., & Holmes, W. (2016). Intelligence unleashed: An argument for AI in education.

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in higher education*, *31*(2), 199-218.

Plump, C. M., & LaRosa, J. (2017). Using Kahoot! in the classroom to create engagement and active learning: A game-based technology solution for eLearning novices. *Management Teaching Review*, *2*(2), 151-158.

Robin, B. R. (2016). The power of digital storytelling to support teaching and learning. *Digital education review*, (30), 17-29.

Schindler, L. A., Burkholder, G. J., Morad, O. A., & Marsh, C. (2017). Computer-based technology and student engagement: a critical review of the literature. *International journal of educational technology in higher education*, *14*, 1-28.

Trust, T., Krutka, D. G., & Carpenter, J. P. (2016). "Together we are better": Professional learning networks for teachers. *Computers & education*, *102*, 15-34.

West, D. M. (2018). *The future of work: Robots, AI, and automation*. Brookings Institution Press.

Wu, T. T., & Huang, Y. M. (2017). A mobile game-based English vocabulary practice system based on portfolio analysis. *Journal of Educational Technology & Society*, *20*(2), 265-277.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators? *International Journal of Educational Technology in Higher Education*, *16*(1), 1-27.