Improving Learning through Automatic Generation of AI-Based Narratives

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Abstract

This chapter delves into the potential of Artificial Intelligence in education, focusing on its use to enhance students' narrative and creative skills. It analyzes how AI-assisted storytelling, especially through Large Language Models (LLMs), can be a powerful tool for learning, exploring both its limitations and opportunities in terms of training and aiding pre-service Primary Education students in developing their writing abilities. Human interaction remains crucial in the field of education, particularly in language learning, hence the importance of understanding and correctly utilizing these emerging technologies to maximize their educational benefits. Artificial Intelligence is presented as an aid in narrative creation, capable of unlocking creative processes and gen-

erating innovative ideas, provided it is used as a tool guided by the direction and interaction of human educators. LLMs still have limitations in aspects of narrative creation that cannot be fully captured by contextual relationships between words and sequential generation alone. This approach advocates for effective collaboration between humans and machines, focusing on enhancing learning and protecting rights at the intersection of Artificial Intelligence and education.

Keywords: AI, digital storytelling, education, LLM, NLG.

11.1. Introduction

We live through stories, they shape who we are (Gottschall, 2012; McAdams, 2019) and through storytelling we not only entertain and educate, but also shape our ability to understand the world, communicate effectively, and engage in complex social interactions (Pérez y Pérez & Sharples, 2023). Narratives allow us to practice problem-solving and to consider perspectives outside our own, thereby enriching our emotional and intellectual growth (Pauls & Archibald, 2021; Thorndyke, 1977). The importance of narrative in the development of human cognitive skills is paramount, as demonstrated in recent studies about the relationship between storytelling and cognition development (Breithaupt et al., 2024; Sinding et al., 2024). In this light, the role of storytelling transcends mere amusement, becoming a critical element in the development and refinement of our cognitive faculties.

Reading stories helps us learn in a more efficient way than reading essays and expository texts, mainly because the recognizable structure of narratives, often referred to as *story grammar*, captivates our interest and maintains it throughout the reading experience (Mar et al., 2021). Story grammar refers to the framework used to analyze the structure of stories, identifying common elements like setting, characters, plot, conflict, and resolution that make up a narrative (Dijk & Kintsch, 1983; Greimas, 2015). In addition, narrative texts use more high-frequency vocabulary, are structured sequentially, can be predictable and describe the characters' experiences (Medina & Pilonieta, 2006). This concept helps in understanding how stories are constructed and how they convey meaning, making it easier to understand

and create narratives rather than other text types such as expository texts (Wu et al., 2020).

11.2. Reading and Writing Comprehension Skills

Reading comprehension is a fundamental skill that enables us not only to improve our cognitive skills but also to enhance our overall understanding and learning abilities. When we interpret what we read, we make connections between ideas and concepts, which will be essential for expanding upon our existing knowledge. This process engages higher-order cognitive processes such as critical thinking, analysis, and synthesis (Marzano & Kendall, 2007).

Developing strong reading comprehension skills also fosters cultural awareness, as the reader is exposed to different perspectives and experiences, and it contributes to a more inclusive and open-minded worldview (Tabuenca-Cuevas, 2021). The whole process results in a better ability for effective communication, since a person who can understand and interpret written information will be better equipped to convey ideas of their own in a more concise and clear way. Therefore, the storytelling process is a crucial asset in teaching literacy to our students, as it engages both the reading and writing set of skills and competencies.

11.3. Digital Storytelling with Generative AI

Social interaction is crucial for language development (Lytle & Kuhl, 2017; Verga & Kotz, 2013), hence the need for human interaction in the language learning process, and the importance of understanding and correctly using the new emerging technologies to maximise their educational benefits. Digital storytelling with generative AI involves the use of Artificial Intelligence algorithms to create, enhance, or facilitate various aspects of the storytelling process.

Generative AI

Generative AI is a branch of Artificial Intelligence focused on creating new content, ranging from text and images to music and

synthetic data. It uses mainly machine learning algorithms to analyze patterns in existing datasets and generate new, original outputs that reflect learned structures and styles. This branch of AI is remarkable for its ability to produce diverse outputs across various media.

In 2021, OpenAI launched an AI to create images from text, named *DALL·E* (Ramesh et al., 2021), as a tribute to the painter Salvador Dalí and a nod to the animated film *WALL·E* (Stanton, 2008). This new software had learned from a gigantic database with millions of images described in text (Manuvinakurike et al., 2023). A year later, the organization released ChatGPT for free, which utilizes a Large Language Model to generate human-like text (Yenduri et al., 2023).

LLMs

Large Language Models (LLMs) are complex AI systems with millions or billions of parameters, trained on a wide array of text data like books, articles, and social media. They can perform various tasks such as answering questions, summarizing texts, writing essays, and more. LLMs improve over time by learning from their outputs. However, they do not possess real understanding or knowledge of the content they generate, relying instead on identifying patterns and predicting likely words. Sometimes, LLMs might present false information as if it were true, a phenomenon often referred to as "hallucinations" (Bender et al., 2021).

Digital storytelling as an educational tool

Digital storytelling can be a powerful tool for improving our students' literacy skills, from pre-service Primary Education teachers to Primary and Secondary language students. Its application in the classroom can offer a dynamic and interactive approach to develop and enhance their writing skills. The use of Natural Language Generation (NLG) systems such as ChatGPT, to cite the most popular one since its release in 2022, or any other NLG system like BERT (Devlin et al., 2018), Gemini (Gemini Team et al., 2023), etc., presents several advantages in the field of Education:

- It engages the students, as it often involves multimedia elements and allows the learners to work on their creativity on different media formats and techniques.
- It involves collaboration and work group, if we use storytelling techniques in the classroom together to create a cohesive narrative, which will also enhance teamwork and communication abilities.
- Using technology provides an opportunity for students to develop their digital competence and technological literacy, as stated by the Education Law (Ministerio de Educación, 2023).
- Digital storytelling with generative AI reinforces the importance of the narrative structure, or the story grammar, as students must work on the different steps separately before putting the story together with the NLG system. They must organize their ideas in a coherent and clear way, establish the plot and the way time will be sequenced and, finally, create a compelling story.

Here is where the AI fails to fulfil its mission. The NLG system can help the students with the organization of ideas, characters, time sequence, and basic plot structure, but for the time being, IA-based automatically generated stories can lack narrative interest and coherence in the development when the narration is longer than a few paragraphs.

11.4. Problems with AI-based Narratives

LLMs can produce narrative texts with originality, as well as with a touch of creativity. They excel at crafting entirely new stories that include characters, chronologically organized events, and dialogues (Alabdulkarim et al., 2021). Nonetheless, they fall short in several narrative aspects, mainly due to their inability to model these components solely through contextual relationships between words and sequential text generation. As teachers of pre-service Primary Education students, we can focus on these elements of narrative texts that elude the AI's grasp and use them in our favor to help our students improve their learning processes, focusing on reading and writing skills.

The elements that need enhancement are, primarily, *coherence* and *suspense*. LLMs struggle to depict cause-effect relationships,

which are essential for a story's coherence. An AI is well aware of the correlation between sunrise and the crowing of a rooster, but it is not capable of identifying whether the rooster crows because the sun rises, or the sun rises because the rooster crows (Torres, 2023).

Generating suspense implies an adequate control of the information flow so as to keep the reader's attention on point; the narrator has to know which aspects of the plot must be revealed from the beginning, and which should be kept secret until the end, strategically unveiling certain details at well-organized points throughout the story. LLMs do not take any of these aspects into consideration, hence the lack of interest in the narratives they generate (Alhussain & Azmi, 2022), which fail to be compelling and engage the reader.

Another critical area where AI struggles is in its ability to fully flesh out *characters*, often failing to imbue them with the depth and complexity that make them believable and relatable to readers. One crucial aspect of a well-written, compelling narrative is the types of relationships that the characters establish with each other, and the AI has yet to grasp that.

11.5. Using NLG Systems to Improve our Students' Narrative Skills

Addressing the limitations of LLMs regarding narrative generation requires not only complementary models to the current capabilities of LLMs, but also a different approach such as controlled generation, where narratives are shaped by human guidance. Incorporating our language and literature students into this process will not only provide the necessary human input, but also offer them a valuable opportunity to improve their literacy skills through direct interaction with AI.

In addition to ChatPGT, there are other AI text generators that can be used in the language and literature classroom, such as Rytr, Writesonic, Writer and Sudowrite, which include free plans and priced options. By assigning our students the task of human oversight, they will gradually learn how to guide and model the narrative creation process, adding and removing elements in a way that tailors the story so that the resulting narrative becomes

more believable and relatable to readers. Furthermore, this approach ensures that the story's flow of information can be managed effectively, keeping potential human readers engaged by the unfolding events.

Table 11.1. Examples of AI text generators

NAME	URL	DESCRIPTION
Rytr	https://rytr.me/	An intuitive AI-assistant that helps users create content in different formats.
Writesonic	https://writesonic.com/	Generative AI Platform for Content Creation, SEO and AI Chatbots.
Writer	https://writer.com/	An integrated platform for enterprise generative AI that helps the user to create custom apps like digital assistants.
Sudowrite	https://www.sudowrite.com/	Helps you make your writing cohesive and improve your narrative skills.

Source: developed by author.

One of the most useful applications of AI in education is the Interactive Storytelling process, in which our students, as users, can influence the plot according to their selection of choices and the input they feed into the NLG system. This is a dynamic storytelling process that engages the whole class in a more participatory manner, as the AI adapts the narrative in real time according to the students' interaction or feedback (Liang & Hwang, 2023).

The use of AI in narrative creation has evolved far beyond simple text generation. Multimodal literacy (Jewitt & Kress, 2003), which refers to the ability to generate content that includes not only text but also images, videos and audio elements, allows for more immersive and engaging narratives.

One practical example would be *AI-powered storyboarding*. For this task, students can use AI to generate visual storyboards that complement their written narratives. For instance, after writing a story outline, AI can suggest or create images and scenes that visualise the plot, helping students think critically about how different visual elements support specific aspects or areas of the textual narrative, enhancing expressivity and more powerful ways to convey meaning.

Among the educational benefits of such a task is the development of critical thinking, as this process will require students to discern which visual elements would support or enhance their written narratives, and why, which will allow for a deeper understanding of storytelling principles.

Another example of multimodal AI-based narratives could be the leveraging of text-to-speech technologies. Students will have the opportunity to transform their written tales into engaging audio formats, instructing the AI to produce sophisticated voice simulations of nuanced elements such as tone, emphasis and emotional depth.

Table 11.2. Examples of text–to–speech tools

NAME	URL	DESCRIPTION
Natural Readers	https://www.naturalreaders.com/about.html	Available for both personal and professional use, NaturalReader supports a wide range of file formats and also offers a mobile app.
Microsoft Azure	https://azure.microsoft.com/es-es/products/ai-services/text-to-speech/	Especially useful for creating more sophisticated educational or multimedia projects due to its high-quality voice synthesis.
ReadSpeaker	https://www.readspeaker.com/	Web-based tool that provides TTS services for websites, mobile apps, digital books, and online documents.

Source: developed by author.

This approach places students in a pivotal role, as they have to actively direct the AI on which segments of the narrative demand a heightened tone, additional emphasis, or deeper emotional resonance. This interaction ensures that the AI's output aligns with the intended narrative impact, fostering a collaborative process that enhances storytelling through sound.

Such a task not only emphasizes the critical role of phrasing, pacing, and intonation in storytelling, but also allows the students to reflect on the complexities involved in converting written text into spoken word (Ribes-Lafoz & Navarro-Colorado, 2023).

11.6. Conclusions

In conclusion, the integration of generative AI and Natural Language Generation systems into the educational landscape offers a revolutionary approach to enhancing literacy and technological competence among language and literature students. By actively engaging the learners in the digital narrative creation process, we will foster a rich learning environment where students can explore and master the art of storytelling across multiple modalities, and also provide valuable human input to help overcome the limitations of Large Language Models regarding narrative generation. Furthermore, through processes such as AI-powered storyboarding or the transformation of text into dynamic audio narratives, students will become familiar with the elements that make narratives coherent and compelling.

This hands-on experience with AI will bolster students' literacy and digital competencies and will also prepare them for a future where storytelling transcends traditional boundaries, embracing the complexities and richness of multimodal literacy. The education of the future is already a reality with the inclusion of AI in teacher training and in the creative process to write narratives in the classroom (Rovira-Collado et al., 2022).

As educators, our role in guiding this interaction becomes crucial, ensuring that, as we leverage these advanced technologies, we also nurture the critical thinking, creativity, and empathetic understanding that lie at the heart of effective storytelling and human connection.

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