Online-Journals.org

iJET International Journal of Emerging Technologies in Learning

iJET | eISSN: 1863-0383 | Vol. 19 No. 4 (2024) | OPEN ACCESS

https://doi.org/10.3991/ijet.v19i04.47977

SHORT PAPER

Star Words Re-Generated: Gamification and GenAI for Effective Training

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ABSTRACT

Star Words was a gamification project developed in 2015 with the goal of facilitating the acquisition of skills related to the Microsoft Office suite on Moodle. The utilization of game mechanics and rules was enhanced by situating the entire course within the Star Wars™ universe, a widely popular saga at the time due to the release of its seventh cinematic episode. The results obtained from the experiment demonstrated the effectiveness of this approach. However, the significant amount of time invested in adapting the storyline and materials led to the decision not to replicate the experience with different themes. The article illustrates how the use of generative artificial intelligence (genAI) can help overcome this issue by assisting educators in creating high-quality educational and narrative content in a shorter timeframe. This enables educators to select the most up-to-date and captivating theme for their students every year.

KEYWORDS

gamification, generative artificial intelligence (genAI), massive open online courses massive (MOOC), moodle

1 THE STAR WORDS PROJECT

"Star Words" was a project developed in 2015 with the goal of facilitating the acquisition of skills related to the *Microsoft Office* suite on *Moodle* [1], [2]. This initiative originated from a video course titled *"Gli Irrinunciabili di Microsoft Office" ("Essentials of Microsoft Office")*, which has been provided to *University of Genoa* staff since 2012. The course aims to educate participants on the software applications *Word*, *Excel*, and *PowerPoint* [3]. The practical knowledge imparted resulted in the course being integrated into the university's computer-related programs. This integration helps students develop proficiency and expertise in using personal productivity tools.

Despite the quality of the content, students often showed limited interest and engagement in completing the activities because of an excessively traditional educational approach. This method was not yet commonplace among students at the

Zolezzi, D., Iacono, S., Vercelli, G. (2024). Star Words Re-Generated: Gamification and GenAI for Effective Training. *International Journal of Emerging Technologies in Learning (iJET)*, 19(4), pp. 97–104. https://doi.org/10.3991/ijet.v19i04.47977

Article submitted 2024-01-15. Revision uploaded 2024-02-24. Final acceptance 2024-02-24.

time in the online environment, primarily due to the limited adoption of *massive open online courses (MOOCs)*, which are online courses that leverage the potential of learning within a vast, openly distributed community of peers, in Europe [4].

The concept of using gamification was introduced to make the learning of these materials more enjoyable. Gamification involves applying game mechanics and rules to non-gaming contexts to generate a positive impact on a user's awareness of a subject or habit, making it engaging and fun [5]. Engaging the user as an active participant in the educational process reinforces the message and makes it more digestible, resulting in the retention of approximately 9% more information in the long term [6]. Gamifying activities is a common practice today. Integrating gaming elements into the learning process has proven effective in enhancing education and sustaining the attention and interest of the new generations raised in the digital age [7].

However, at the time, students were not accustomed to this approach, which led to the decision to further enhance the experience by setting the entire course in the *Star Wars™* universe. This decision was made due to the immense popularity of the saga created by George Lucas, which was further boosted by the release of the seventh episode in cinemas at the end of that year.

The teaching of *Microsoft Office* was adapted in such a way that each of the three courses was seamlessly integrated into the events of the original film trilogy. Students could explore the story from three different perspectives by assuming the roles of the three main protagonists of the films: Luke Skywalker, Leia Organa, and Han Solo. The initial character choice did not preclude experiencing the story from other points of view; in fact, the curiosity to explore all the storylines, specially adapted for the experience, served as an incentive to revisit the educational content multiple times, solidifying comprehension. The narrative structure for the courses to be completed followed the pattern provided in Table 1.

Table 1. Pairings of narrated films and taught software

Movie	Star Wars: Episode IV – A New Hope	Star Wars: Episode V – The Empire Strikes Back	Star Wars: Episode VI – Return of the Jedi
Course	Microsoft Word	Microsoft PowerPoint	Microsoft Excel

Activities within the course included watching video content, viewing PDF files, reading narrative sections, and completing quizzes necessary for progressing in the course. Each completed activity earned participants points, which contributed to their ranking on a leaderboard. These leaderboards were categorized based on the character chosen for the adventure. Additionally, there was an overall leaderboard that included all active students in the experiment, consolidating scores from all available narrative arcs.

Students had the opportunity to earn various thematic badges upon completing specific course sections or achieving specific objectives within the required activities. These badges could be displayed on each student's profile, allowing them to compare their progress with that of their fellow classmates. Negative badges were also available, designed to alert participants that their progress was not as expected and they were deviating further from becoming true *"Office Jedi."*

The course introduced the *"Dark Side"* point mechanic. Participants could utilize these points to receive assistance if they were unable to pass a specific quiz or task. Utilizing *"Dark Side"* points facilitated learning by offering answers in a *"quicker, easier, more seductive"* manner, echoing the words of Darth Vader. This mechanism enhanced the learning process and reinforced comprehension by generating

positive emotions, such as overcoming educational obstacles or improving one's position on the leaderboard. However, delving into the *"Dark Side of the Force"* had consequences. The accumulation of *"Dark Side"* points had a negative impact on the time allocated for students to complete the final exam; as more points were accumulated, students had less time available for the final test.

2 RESULTS AND IDENTIFIED PROBLEMS

During the academic year 2015/16, the students of the course *"Sistemi Operativi e Reti di Calcolatori" ("Operating Systems and Computer Networks")* in the undergraduate program *"Communication Sciences"* were divided into two equally sized groups. The first group had access to a traditional *Moodle* platform that offered the original version of the video course *"Gli Irrinunciabili di Microsoft Office."* In contrast, the second group had access to the gamified version of the course with the rules and mechanics described in the previous section. The experiment yielded positive results. Those who engaged in the activity with the support of gamification scored, on average, one point higher on the final grade compared to students who completed the classic version of the course. Furthermore, the level of student engagement in the gamified experience remained consistently high, with very few students expressing dissatisfaction with the chosen method or falling significantly behind in the rankings.

Despite the positive outcomes, the experience was not pursued further. The primary reason for discontinuing the experimentation was the nature of the topics covered. While the *Microsoft Office* suite remains essential for personal content production, other subjects require more in-depth exploration to prepare students for the future world of work. The decision to focus the course on teaching the creation of responsive websites led to the shelving of previously studied topics such as *"Gli Irrinunciabili di Microsoft Office."* Additionally, the project's underlying idea was that the central theme for developing the narrative should be a strong and current topic. Therefore, it would have been necessary to revisit the course each year by selecting a new theme to immerse students in and encouraging their active participation in something relevant to their generation and time. However, the preparation of elements for the entire *"Star Words"* project alone took six months. During this time, the storyline had to be adapted to the chosen context, and all thematic visual elements were created through photomontage. The significant amount of time needed to achieve the desired result within *Moodle* led us to the decision to discontinue the experimentation in subsequent years.

Today, however, numerous technologies are available to assist teachers in creating gamified projects. Thanks to recent advancements in *generative artificial intelligence (GenAI)*, it is now possible to design and create educational and narrative content in a much shorter time than previously, enabling the selection of the most current and relevant themes for students each year.

3 UTILIZING GENERATIVE AI FOR EDUCATIONAL CONTENT ENHANCEMENT

Recent developments in machine learning have led to the proliferation of tools utilizing *GenAI* to create new digital content based on textual instructions (prompts) [8]. The idea was to utilize such applications to attempt to create a course of the same type, but with the assistance of *GenAI*. The objective is to demonstrate how these

tools can serve as valuable aids for teachers who want to incorporate gamification experiences into their courses but are discouraged by the challenges related to the time required to produce materials for students. To demonstrate the significant reduction in course production time, we opted to recreate the *"Star Words"* experience by utilizing *GenAI* to generate the narrative plot on the platform and the images used in exercises and menus.

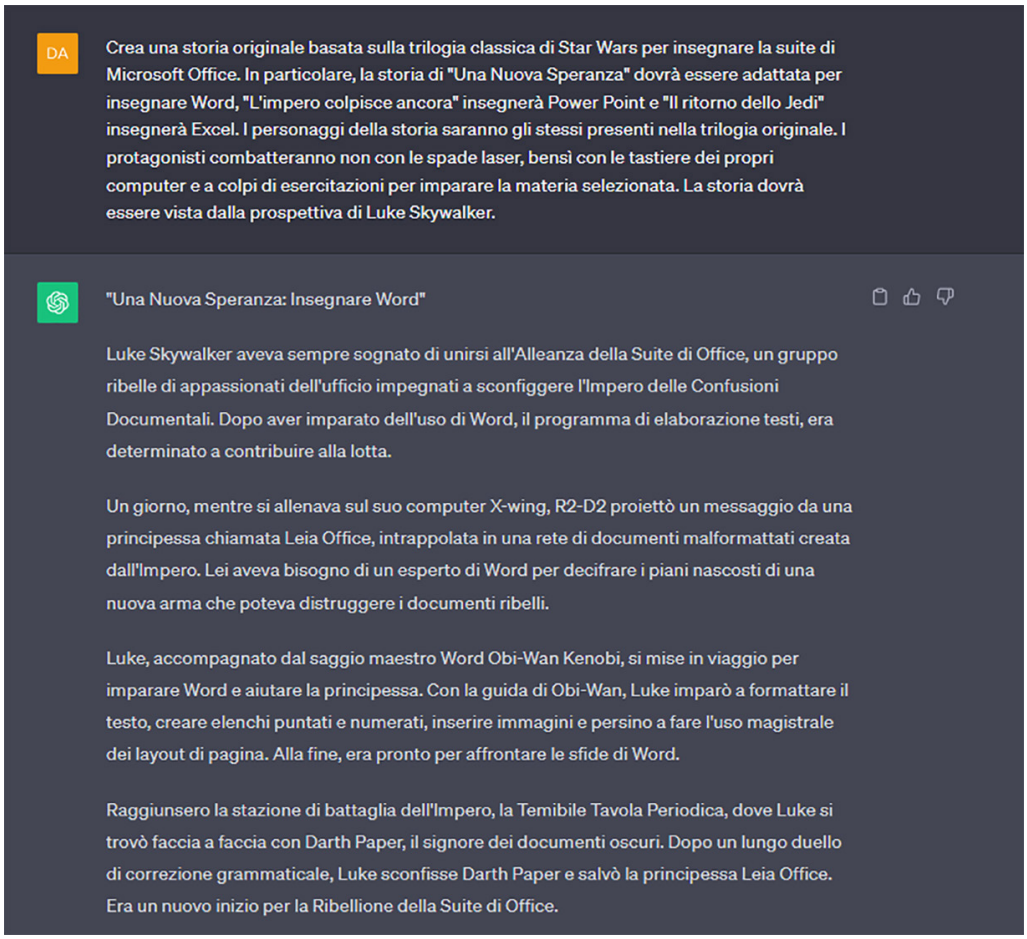

Fig. 1. Prompt provided to ChatGPT-3.5 and result obtained (in Italian)

The narrative of the experience was recreated using the most well-known and readily available *GenAI* tool at the time, namely *OpenAI*'s *ChatGPT-3.5* [9]. When directly asked how it would describe itself, *ChatGPT* responds, *"ChatGPT is a language model designed to generate natural language text in response to questions and commands from users."* The pretext and narrative context we aimed to create with *ChatGPT* were the same as the original experience. For instance, the prompt provided to create a story from Luke Skywalker's perspective, the protagonist of the classic trilogy, needed to include a detailed explanation of the essence of the replicating experience, which elements of the original saga should be retained, which ones modified, and the alignment of the film with the course. *Figure 1* illustrates the instructions given to the *AI* and the system's response for the *Word* section.

The result obtained in just a few seconds is impressive. The model produced a coherent narrative for both the story told in the original films and the reimagining we envisioned, modifying names and events to fit the chosen contextual course. *ChatGPT* can retain answers provided earlier, allowing the narrative framework

obtained from the first response to be divided into the necessary parts for one's course while maintaining narrative consistency throughout. Naturally, the story can be subsequently edited if one is not satisfied with the result. Having an effective plot as a starting point can greatly assist teachers in creating an immersive and enjoyable project.

Furthermore, it is possible to generate new quizzes for students by directly requesting the model create them based on the chosen topic. When asking *ChatGPT* to generate an exercise from scratch, the model will provide the question-and-answer options based on the type of exercise requested. However, for a more educationally effective outcome, based on our tests, it is advisable to still provide the question text and its corresponding answer. This allows the model to concentrate solely on generating additional answer choices.

Fig. 2. Image of a Padawan studying Microsoft Word generated by DALL-E 3

The image generation was entrusted to *DALL-E 3*, an *OpenAI* tool integrated within *Bing's chat*, which is also present in *Microsoft Copilot* for *Windows 11*. *DALL-E* is an algorithm capable of generating images based on textual descriptions. The system comprehends human language effectively and responds to user requests with a high degree of fidelity to the request [10]. *Figure 2* displays the result obtained by entering the prompt *"Create an image of a young Padawan studying Microsoft Word with*

his Jedi Master in the Star Wars™ universe." The generated image extensively incorporates all the elements requested by the tool, drawing from its internal libraries' concepts typical of the *Star Wars™* universe, such as *"Padawan"* or *"Jedi Master."* It analyzes them and presents them within a credible environment. Padawans are young candidates who, under the guidance of a Jedi Master, prepare for an apprenticeship to become Jedi Knights [11]. The algorithm retrieves information related to these terms and generates an image of a young boy in a typical Padawan robe inside a bedroom with specific contextual details (a Wookie doll, an R2-D2-shaped ball, etc.), next to a Jedi Knight with a lightsaber, also wearing the typical robe.

Moreover, *DALL-E 3* can also be used to create thematic badges to be awarded to students upon reaching specific goals. *Figure 3* provides an example of a badge where the villainous character Darth Paper, who acts as an antagonist to the protagonists in the narratives created by *ChatGPT-3.5*, expresses his dissatisfaction with our heroes for successfully finishing a mission.

Fig. 3. Badge displaying the displeasure of the villainous Darth Paper

4 FUTURE WORKS

Generative AI tools present a significant opportunity for educators who want to explore the integration of gamification systems in their educational activities. The ability to acquire high-quality materials quickly, without the need for advanced skills in creating photomontages or complex storylines, can significantly help in creating enjoyable and engaging teaching experiences that maintain students' consistent focus on the content. The implementation described in this article has laid the foundation for creating textual and photographic content only, using the tools we actively employed for the course. However, there are many other algorithms capable of achieving similar results, and new *AI* applications that can generate various types of content are emerging daily. These include speech synthesizers that replicate people's voices naturally (e.g., *Murf AI*), generating music from textual prompts (e.g., *MusicGen*), or transforming text into video (e.g., *Synthesia*). The assistance provided by these tools will

help us develop a new gamified course set within a fresh context to engage the current generation of students and address the new knowledge required for web page creation. The upcoming phase involves moving beyond the essentially random generation of images produced by *DALL-E 3* and instead imbuing the characters within the experience with consistent physical features. This allows users to empathize with the characters and easily identify them within the illustrations. To achieve this, we will utilize *stable diffusion*, an open-source model skilled at generating images from a textual prompt by iteratively denoising initial noise across a series of diffusion steps [12]. The synergistic application of models designed for photorealistic image creation, such as *epicRealism* [13] or *Copax TimeLessXL* [14], within *stable diffusion*, coupled with the *ReActor* [15] extension facilitating the superimposition of a face selected by the creator onto any person generated within the image, expeditiously produces enduring characters that are recognizable and consistent over time, avoiding alterations in features with each new image. Furthermore, the creation of persistent avatars for the characters within the learning experience allows them to serve as first-person teaching tutors, proficient in explaining the lesson. Leveraging the *HeyGen* [16] software, we can import the avatar generated through *stable diffusion* into the platform, select a voice from the available options, or create a customized one. Subsequently, the avatar can articulate and elucidate the lesson by delivering the provided text. The lesson content can be generated directly by integrating *ChatGPT-4* into the platform, which prompts the system to create a lesson on a specific topic. Alternatively, it can be edited to correct any errors or improve its effectiveness. Alternatively, the instructor can freely compose it to align with their pedagogical objectives. The system exhibits multilingual capabilities by interpreting the lesson in various languages and, if necessary, translating it from one language to another. This caters to the specific requirements of foreign students in the class. The evaluation will determine whether using characters from the gamified experience as direct instructors for the concepts leads to improved retention of the taught information or not. Finally, we will experiment with *ChatGPT-4* for narrative production to analyze whether *OpenAI*'s new algorithm proves to be more effective than its predecessor.

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