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Leveraging Generative AI in Academic Libraries: A Case Study of the AI Story Idea Generator at the University of Lethbridge

Sustainable and Scalable Approaches to Enhancing Creativity and AI Literacy

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Abstract

This paper explores the design, implementation, and initial outcomes of the AI Story Idea Generator, an interdisciplinary project developed collaboratively by the Dhillon School of Business and the University of Lethbridge Library. Created to enhance digital literacy and promote creative storytelling through artificial intelligence, this open-access initiative generates dynamic, randomized story prompts by combining predefined narrative elements stored locally in structured JSON format using a rule-based (expert-system) design. The generator yields ≈76.9 trillion possible combinations. Employing a sustainable, open-source architecture free from ongoing external costs, the project exemplifies key principles of open scholarship, affordability, and ease of maintenance. This case study highlights the strategic technical decisions made to balance complexity and user accessibility, details the collaborative process involving expertise from business analytics, library science, and AI, promoting AI literacy and creative exploration. The AI Story Idea Generator serves as a replicable framework for academic libraries seeking scalable and cost-effective methods of integrating generative AI technologies into educational services. Code and setup instructions are openly available at https://sidneyshapiro.com/projects/story/.

Keywords: artificial intelligence; expert systems; digital literacy; academic libraries; generative AI; interdisciplinary collaboration; open scholarship

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Introduction

The University of Lethbridge (U of L) is a comprehensive academic and research university located in southern Alberta, Canada. Primarily serving an undergraduate population, U of L enrolls approximately 8,200 students, with around 7,500 undergraduates and 700 graduate students (University of Lethbridge, 2025a). The AI Story Idea Generator was developed as part of the University of Lethbridge Library's AI Education Month, an initiative to promote awareness and understanding of artificial intelligence (AI) within the academic library context. This project represents a novel approach to utilizing AI within the library setting, designed to foster engagement with both digital literacy and creative expression. By offering an AI-powered display that generates random story ideas, the project encourages users to engage in creative writing and storytelling activities throughout the month of June. This initiative aligns closely with the library's broader mission of promoting accessible, innovative educational experiences for a diverse audience (University of Lethbridge, 2025b). It also reflects the growing role of libraries in introducing emerging technologies in ways that are inclusive, low-cost, and sustainable.

The primary objective of the AI Story Idea Generator is to provide a tool that enhances creative writing skills through an open-access platform supported by AI technology. The generator produces unique story prompts by randomly combining elements such as characters, settings, plots, and obstacles, resulting in ≈76.9 trillion potential story combinations. This vast range of options allows users to explore countless narrative possibilities, encouraging creative exploration and development. Importantly, the project was designed with sustainability in mind, relying on a static, locally stored structure that eliminates the need for ongoing costs or external resources. This approach ensures that the generator can operate independently without the need for external data delivered via Application Programming Interfaces (APIs), which allow data transfer between platforms or additional infrastructure, making it a cost-effective and scalable solution for integrating AI into library services. The technical design, data generation, and coding were supported by expertise in business analytics and computer science, while literacy programming, user engagement, and accessibility considerations were guided by library science. Collaboration was structured around weekly planning sessions and iterative testing with librarians and students. This process ensured that technical functionality and educational priorities were balanced and consistently integrated into the final tool.

The project aligns with the principles of open scholarship by advancing open access and expanding participation in digital literacy and AI education. By offering free and open use of the AI Story Idea Generator's source code and resources, the initiative supports broader educational goals of making digital learning tools more accessible, affordable, and adaptable to diverse educational settings. This accessibility fosters greater inclusion in AI learning across disciplines, making AI technology more widely available. By offering an interactive and user-friendly platform, the project enables individuals with diverse technical backgrounds, including those with very limited experience, to engage with AI, enhancing digital literacy in a collaborative and inclusive setting (Hodonu-Wusu, 2024).

Literature Review

Integrating artificial intelligence into educational (Fuchs & Aguilos, 2023) and creative settings (Anantrasirichai & Bull, 2022) has been a growing area of interest, particularly in exploring how AI can enhance storytelling (Beguš, 2024), support interdisciplinary collaboration (Ryan et al., 2023), and engage communities (Wilson, 2022). The AI Story Idea Generator sits at the intersection of several relevant topics, including AI in creative writing, cost-effective AI applications, and AI-driven community engagement.

Generative artificial intelligence refers to model-based systems, such as large language models (LLMs), that produce new sequences of text at inference time by predicting and assembling tokens based on probabilistic patterns learned from vast training data (Chen et al., 2025; Eymann et al., 2025). These systems excel in generating coherent outputs, utilizing the intricacies of language learned from extensive datasets. In contrast, an expert system operates from a fixed, human-authored knowledge base, selecting outputs through deterministic logic or sampling rules. This deterministic nature does not allow for the same level of creativity and variability that generative AI can deliver, thus exemplifying a fundamental distinction between these technologies (Pratiwi et al., 2025). Generative AI has long played a role in building expert systems, often by helping to collate or author the knowledge bases on which they operate. In this way, the AI Story Idea Generator continues a tradition where generative AI assists in the creation of fixed, rule-based systems, but does not operate in generative mode for end-user interactions.

Recent advancements in generative AI, particularly in the development of LLMs built on transformer architectures (Raiaan et al., 2024), have significantly influenced ideation, creative writing, and storytelling by automating content generation, supporting idea formulation, and enhancing narrative complexity (Chakrabarty et al., 2024; Marco et al., 2024). These models, such as ChatGPT, process vast amounts of text data using attention mechanisms (Patil & Gudivada, 2024) to assign contextual weights to words and phrases, enabling them to generate coherent, contextually relevant responses (Zou et al., 2024). Through this pattern recognition, LLMs can act as co-creators—suggesting ideas, refining language, and helping to overcome creative blocks (McGuire et al., 2024). Their integration into education has sparked discussions about balancing human creativity with AI assistance, as well as ethical considerations such as authorship, originality, and intellectual property (Garcia, 2024). Despite these debates, their accessibility has broadened participation in creative processes and supported the development of digital literacy across disciplines (Creely, 2024; Garbuio & Lin, 2021).

To situate this project within the broader landscape of AI-assisted creative tools, similar systems have explored non-generative methods for supporting creative writing and storytelling. For example, Swanson and Gordon's *Say Anything* used textual case-based reasoning to enable open-domain interactive storytelling by selecting and recombining narrative cases from a curated repository (Swanson & Gordon, 2012). Like *Say Anything*, the AI Story Idea Generator assembles outputs from a finite set of authored elements. However, it is designed for continuous, unattended display in a library environment, uses a local (JavaScript Object Notation) based database rather than a networked retrieval system, and requires no user login or data collection.

These differences make it operationally simpler, cost-free to run, and well-suited to academic library contexts with limited technical infrastructure.

The weights in the model are adjusted during the training process, enabling the model to predict the most probable next word or phrase by evaluating the relationships between words. The weights capture linguistic nuances such as grammar, meaning, and context, allowing the model to generate coherent and contextually appropriate text. Although the training data is known, the choice of which option to pick is a "black box" because the internal decision-making process of the model—how it weighs different inputs and arrives at a specific output—is not fully transparent or easily interpretable.

The complex network of layers and weights in LLMs makes their decision-making processes difficult to trace, even when the training data and underlying algorithms are known (Johnsen, 2024). This has facilitated advancements in AI-driven applications, particularly in creative fields such as writing, where AI can generate story prompts, refine language, and suggest narrative structures (Mehrotra, 2024). These models identify patterns in large datasets, enabling them to produce text that is both contextually relevant and imaginative.

The decision to specifically focus on creative writing in the AI Story Idea Generator project was strategic, considering storytelling's universal appeal and effectiveness in engaging diverse audiences. This approach aligns directly with the Dhillon School of Business's commitment to fostering innovative thinking, creativity, and digital competencies among students. Leveraging the Dhillon School's strengths in technology management and innovation alongside the Library's established role in supporting literacy and student engagement, the partnership created a multidisciplinary framework uniquely suited to explore and promote AI literacy through creative storytelling.

The development of the AI Story Idea Generator aligns with research on cost-effective AI solutions in educational contexts (Srinivasa et al., 2022). Much of the literature on AI in education focuses on the high costs of implementing sophisticated AI systems (Alam, 2021), which can be prohibitive for many institutions. Studies have suggested that low-cost AI implementations can still be impactful, especially when tailored to specific educational needs and resource constraints (Lopez et al., 2024). For instance, some researchers advocate using static models and open-source tools to minimize costs while providing engaging and interactive experiences for learners (Kasneci et al., 2023; Ulfa, 2023). The AI Story Idea Generator reflects these principles, using a static set of AI-generated story elements stored locally to avoid ongoing costs and reliance on external APIs, thus providing a sustainable solution for educational environments.

Although an API-connected LLM could have provided dynamic, real-time text generation, several practical factors led to the decision to avoid this approach. In an open public setting, unpredictable usage patterns could quickly make per-request API fees unsustainable (Perron et al., 2024). API reliance also introduces privacy concerns, as patron interactions may be transmitted to third-party servers, and poses continuity risks if the service is altered or discontinued by the vendor. Furthermore, hosted LLM services have higher energy and compute

requirements, which may conflict with institutional sustainability goals (Kasneci et al., 2023). A self-contained, rule-based expert system running locally eliminates these costs and dependencies, ensuring the tool can operate indefinitely without budgetary or technical uncertainty.

Community engagement plays a significant role in AI applications within education. Research suggests that involving community members in AI projects enhances their understanding of technology and its applications while also promoting digital literacy (Detlor et al., 2022). AI-driven projects that offer interactive and accessible experiences are particularly effective in engaging diverse audiences and making AI more approachable for non-experts (Ahmed & Ali, 2024). The AI Story Idea Generator engaged the university community by allowing students and library visitors to independently explore the tool, demonstrating an accessible and budget-conscious implementation of AI technology. By illustrating that AI can be implemented in a budget-conscious manner, the project helps demystify AI technology and showcases its potential for broader societal benefits.

Interdisciplinary collaboration is essential for developing AI projects that span multiple fields, such as business analytics, AI, and library science. Research on interdisciplinary collaboration underscores the advantages of integrating expertise from different disciplines to solve complex problems and develop innovative solutions (Specht & Crowston, 2022). Studies indicate that such collaborations lead to more comprehensive and sustainable outcomes by leveraging the strengths of each field (Vaverková et al., 2024). The AI Story Idea Generator was developed through an interdisciplinary partnership involving Sidney Shapiro, Assistant Professor of Business Analytics at the Dhillon School of Business and Adjunct Assistant Professor of Computer Science, and Shannon McAlorum, Professional Librarian at the University of Lethbridge Library. The project was initiated in April 2024 with conceptual discussions, technical planning, and development occurring throughout April and May, culminating in a public launch during the AI Education Month hosted by the library from June 3–28, 2024. The partnership leveraged Sidney Shapiro's expertise in business analytics, computer science, and AI technology implementation, combined with Shannon McAlorum's experience in educational programming, literacy initiatives, and library community engagement.

The AI Story Idea Generator: Concept and Development

The AI Story Idea Generator was a collaborative effort between the Dhillon School of Business and the University of Lethbridge Library, aimed at displaying an example of artificial intelligence at the University library in an educational and cost-effective manner. From the beginning, sustainability was a core goal of the project. This meant designing a tool that could operate independently without incurring ongoing costs and low risk of damage in an accessible public space. Therefore, the development process was guided by balancing innovation with time and financial constraints, making strategic compromises to avoid recurring expenses while delivering a valuable educational tool.

During the project planning phase, various AI options were considered, each with distinct technical and financial considerations. One option involved developing a customized website or

app that would allow students to interact with AI-powered LLMs such as OpenAI's ChatGPT, which generate human-like text responses (Bhattacharya et al., 2024). LLMs are trained on extensive text data, enabling them to understand and produce natural language effectively (Naik et al., 2024).

Accessing LLMs through external services typically requires using an API, which facilitates communication between different software systems (Perron et al., 2024). This allows the AI model to process user requests and generate responses. However, each API call—an individual request for a response—incurs a fee. While the cost per request may be small, it can accumulate quickly as usage increases. In an academic library setting, where users may interact with the tool frequently, these costs could become significant over time, making this approach financially unviable.

To avoid these recurring costs associated with API usage, an alternative was decided on for a static, rule-based AI system that does not rely on external LLMs or continuous API calls. Instead of dynamically generating text in real-time, the AI Story Idea Generator uses AI-generated and predefined story components stored in a local database. This approach eliminates the need for server-side processing, as all story elements are readily available within the system. The generator operates independently of external services by storing these elements in a static JSON file format. JSON is a lightweight data-interchange format that organizes information in a structured, easily readable format. It allows the generator to store extensive lists of data including characters, locations, plots, and other story components that JavaScript can access and manipulate to create narratives without relying on costly API calls to an LLM.

The AI Story Idea Generator's use of open-access principles further aligns with the goals of the University of Lethbridge. The tool is entirely open-source, meaning its code and resources are freely available for others to access, modify, and redistribute. This open-access model is significant because it supports the principles of open scholarship and digital literacy. By making the tool's code publicly accessible, the project invites collaboration and adaptation from other institutions and individuals, broadening its potential impact and enabling it to be replicated or modified to suit different educational contexts.

The technical architecture of the generator consists of a combination of HTML, CSS, JavaScript, and JSON. HTML, or HyperText Markup Language, forms the structural backbone of the web page, defining the layout and the various elements with which users interact. CSS, or Cascading Style Sheets, is responsible for the visual styling of the interface, ensuring that it is both visually appealing and user-friendly. JavaScript is the scripting language that powers the dynamic functionality of the tool. It allows the generator to randomly select and assemble story elements from the JSON file into coherent narratives. JavaScript accesses the JSON file, pulls random elements from each category, and combines them to create unique story scenarios every 60 seconds. This process is handled entirely on the client side, meaning it runs directly in the user's browser, further reducing the need for server-side resources and external service dependencies.

JSON, the data format used to store the story components, is highly efficient for storing data in a structured way that is both human-readable and machine-processable, making it ideal for organizing information such as character names, plot elements, and settings. The generator includes various categories within its JSON file, such as 36 character options, 43 locations, 59 plot elements, and 63 obstacles, among other elements like quests and motivations. Randomizing selections from these categories allows the generator to create ≈76.9 trillion unique story combinations, offering a vast array of narrative possibilities.

Each story generated by the AI Story Idea Generator is assigned a unique identifier, a numerical string representing the randomly selected elements. This identifier allows for easy reference and retrieval of stories. It is generated by concatenating each chosen element's index values, ensuring each story has a distinct code. For instance, if the first character in the JSON list is chosen, its code might be "01," and similar codes are assigned for each other category. The identifier thus provides a simple yet effective means of cataloging and revisiting specific story combinations without storing the full text of each generated narrative.

Deployment and maintenance of the AI Story Idea Generator are straightforward. The tool's files, including the HTML, JavaScript, and JSON data, are uploaded to a web server accessible to library patrons. Once in place, the generator operates autonomously, requiring no ongoing intervention or additional resources. This self-sustaining setup makes it especially suitable for academic libraries lacking the technical infrastructure to support complex, server-based applications. The generator's structure allows for easy updates; new story elements can be added by modifying the JSON file, providing flexibility and the potential for future expansion without altering the underlying code.

Structure of the Story Generator

The AI Story Idea Generator builds each story using eight categories of elements: character, place, plot, quest, obstacle, companion, motivation, and resolution. The decision on which seeds to include was made by the library after discussion following the review of sample outputs. These elements are stored in a JSON file, with each category containing a large set of predefined options. The data for each category was generated using AI, providing a wide range of unique and diverse story components. The story was activated by a visitor to the library by loading the page or having it reload on a frequent basis; the page did not require any user input. This approach leverages AI's capacity for variety and creativity while ensuring a structured narrative flow.

The generator has a significant pool of elements for each category, which allows for extensive combinatorial possibilities. Specifically, there are 36 characters, 43 places, 59 plots, 63 quests, 63 obstacles, 57 companions, 61 motivations, and 61 resolutions. These AI-generated elements enable the generator to produce a wide variety of random stories by combining different aspects from each category. This design ensures that each narrative contains unique details and maintains a fresh perspective, and it is very unlikely that a story will be repeated. There is roughly a 50% chance that an identical story could be generated after about 19.6 years

of continuous operation. The probability of seeing a duplicate earlier than this is low, but it increases over time.

The story construction process begins by the computer selecting a random character and place to establish the setting. For example, a story might start with, “In a mysterious island, a fearless warrior conceals a hidden truth.” This introduction frames the story, presenting the protagonist and the environment where the action occurs. The generator then introduces the companion and motivation to add depth to the protagonist's journey. For instance, it could continue, “Accompanied by a nocturnal vampire, their motivation is to become the wealthiest person alive.” This step adds relational context and reveals the character's primary driving force, as can be seen in Figure 1.

The core action unfolds as the generator selects a quest and obstacle, describing the main challenge and conflict. An example might read, “Along the journey, they embark on a quest to secure the ancient scrolls of wisdom, facing a psychic entity that manipulates minds.” This establishes the stakes and the protagonist’s objective, detailing the adversity they must overcome. The final part of the story is the resolution, which concludes the narrative. For example, it might say, “In the end, the journey teaches their values to the next generation.” This conclusion gives closure and indicates the outcome of the character's efforts.

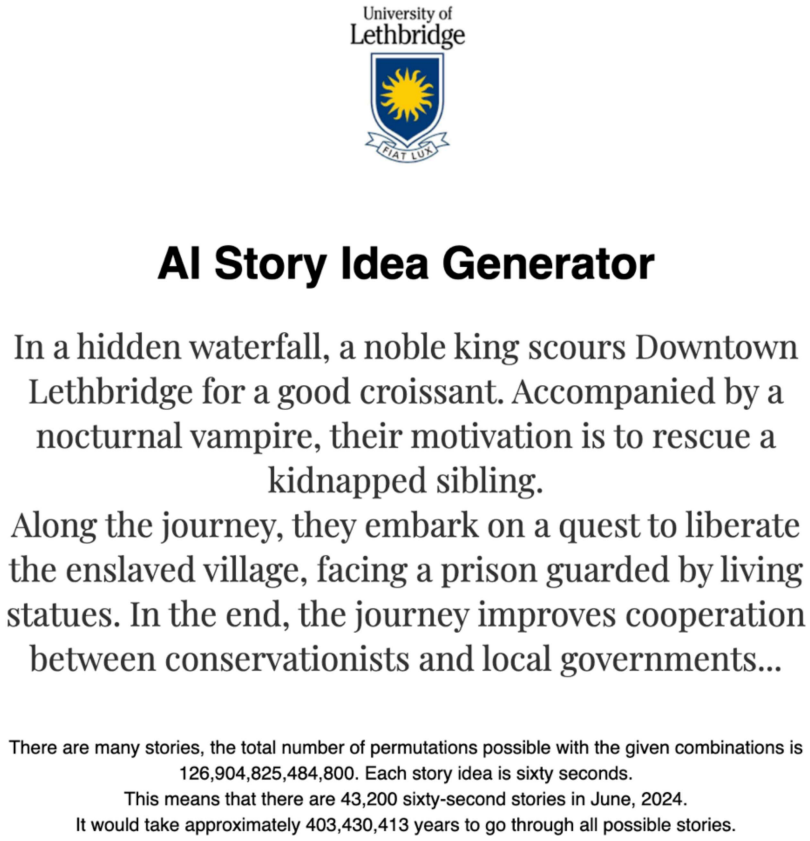

FIGURE 1 Example story generated by the AI Story Idea Generator.

Interdisciplinary Collaboration and Engagement

The collaboration was co-led by Sidney Shapiro, Assistant Professor of Business Analytics at the Dhillon School of Business and Adjunct Assistant Professor of Computer Science, and Shannon McAlorum, Professional Librarian at the University of Lethbridge Library. Shapiro provided the technical design, coding, and AI implementation, while McAlorum contributed expertise in educational programming, literacy initiatives, and community engagement. The partnership was formed deliberately to combine applied AI and software development skills with the University Library's role as a campus hub for digital literacy and student programming. Planning began in April 2024 with conceptual discussions and technical scoping, continued through May 2024 with system development, and culminated in a public launch during AI Education Month (June 3–28, 2024). Regular coordination meetings ensured that design choices—such as the decision to use a local, static expert-system architecture—aligned with the Library's educational mission and operational constraints.

The project represents a successful example of interdisciplinary collaboration, bridging different fields to create a tool that combines technical expertise with educational goals. This blend of skills and perspectives allowed the project to develop in a way that serves multiple purposes within the university and in a multidisciplinary space in the library, demonstrating the value of collaborative approaches in academia.

The project also plays an important role in community engagement, offering students and community members a hands-on opportunity to see how AI can be implemented in a practical, low-cost format. The generator was deployed as a static HTML/JavaScript application served from a regular web server and presented on a dedicated workstation near the circulation desk. To draw attention to the exhibit and encourage participation, a dedicated display table accompanied the workstation, providing visual context and drawing attention to the exhibit.

Following its installation, the project was promoted through multiple channels, including the University's AI Education Month event listings, targeted signage within the library, and notices distributed through the University's communications channels. This visibility encouraged spontaneous engagement from visitors. Library staff observed students and community members pausing to read the prompts aloud, discussing story ideas with peers, and in some cases returning to the display with friends or classmates. These interactions reinforced the tool's role as both an educational resource and a conversational catalyst within the library space.

Students and community members actively explored the display, generating story prompts. Unlike many AI projects that may involve complex models or substantial financial investment, the story generator shows that AI applications do not necessarily need to be expensive or complicated to be impactful. Using a static set of AI-generated data elements and an open-source framework, the project provides an accessible and budget-friendly platform that illustrates the novelty and versatility of AI. This aspect of the project encourages students to think about how AI can be adapted to suit various constraints while still delivering meaningful results.

AI in the Academic Library Context

The AI Story Idea Generator was a significant tool for promoting AI literacy within the academic library environment. By offering an interactive and accessible platform, the project allowed library patrons and students to engage directly with artificial intelligence in a creative context. This type of initiative helped demystify AI by presenting an example in a simplified and understandable manner. Drawing on constructivist learning theory, which emphasizes learning through active engagement and exploration (Chuang, 2021; Gal & Gan, 2020), the project encouraged participants to experiment with AI in a low-stakes environment where nothing could break and there was no cost to experimentation (Amoah-Oppong et al., 2025). The hands-on nature of the tool enabled users to develop a practical understanding of AI's functionality, thus bridging the gap between abstract AI concepts and their real-world applications. Additionally, an explanatory page provided detailed guidance, reinforcing the educational goals by supporting digital and AI literacy. In extending its educational value, because the generator operates from a fixed seed set, patrons could engage with AI in a safe, predictable environment—an important consideration for introductory AI literacy programs in academic libraries (Hodonu-Wusu, 2024; Kasneci et al., 2023). Selecting a fixed-seed, rule-based approach ensured that participants could engage with AI concepts in a controlled environment without privacy risks, unpredictable outputs, or usage costs, making it an especially effective entry point for introducing AI literacy in an academic library setting.

The AI Story Idea Generator advanced an open, experiential learning environment by making a tangible AI application freely available in a public space. Open-education theory stresses accessibility and learner-driven inquiry, and interactive approaches have been shown to heighten student engagement (Baidoo-Anu & Ansah, 2023). By inviting users to weave AI into their own creative workflows, the project embodied a shift from instructor-centred delivery to learner-centred exploration, positioning technology as a catalyst for experimentation rather than a constraint (Pont et al., 2024). This integration linked computational methods with humanistic outcomes—narrative construction and critical thinking—echoing findings that AI tools can enhance ideation and help writers navigate narrative structure (Lai, 2023). The generator, therefore, offers concrete evidence of AI's capacity to enrich learning across disciplines (Chubb et al., 2022) while illustrating a sustainable, low-maintenance model for library services that operates independently of central IT support.

Challenges and Lessons Learned

The development of the project faced several challenges that required an iterative approach to problem-solving. Throughout the process, decisions on cost, design, physical space, and technology were revisited multiple times to balance feasibility with the project's educational goals. For instance, while exploring various AI options, the team had to weigh the financial implications of different technical setups. The decision between developing a complex application server that could run AI models in real time or utilizing a simpler, static HTML-rendered webpage with generative AI content was particularly important. The latter option, which uses pre-generated story elements, was chosen due to its cost-effectiveness and ease of

integration into the library's existing technology infrastructure. This back-and-forth process emphasized the need for flexibility and adaptability in both the design and implementation phases.

Technically, one of the significant challenges was balancing the complexity of the AI story generation with user accessibility. The goal was to create an engaging tool that did not overwhelm users with technical complexity, while still providing rich, diverse content. Additionally, ensuring the generated stories resonated with the local context posed another challenge. Cultural relevance was considered to make the AI-generated stories more meaningful to the library's users.

Understanding the possibilities and limitations of AI, defining budget constraints, and addressing stakeholder concerns were all critical components of the development process. For example, collaboration between library staff and IT teams allowed for a shared understanding of how to implement the project within the university's budget and technical infrastructure. Similarly, input from academic departments helped shape the educational aspects of the tool, ensuring it met the pedagogical needs of students while remaining technologically feasible. These cross-disciplinary conversations were essential in refining the project's scope and ensuring that it aligned with the library's broader mission of promoting digital literacy and open access.

Conclusion

The AI Story Idea Generator at the University of Lethbridge Library represents a successful integration of generative AI technology into an academic library setting, fostering digital literacy, creative exploration, and interdisciplinary collaboration. The project serves as a practical example of how emerging technologies can be applied in cost-effective and sustainable ways within educational environments. By offering an accessible, open-source platform, the generator promotes broader participation in AI literacy and provides a model that other institutions can adapt to their specific contexts.

By balancing technical innovation with sustainability, the AI Story Idea Generator models how academic libraries can incorporate AI-driven tools without incurring substantial ongoing costs. The project highlights the potential of AI to engage users and promote digital literacy within financial and operational constraints, providing a replicable framework for other institutions interested in leveraging AI for educational purposes. The generator's architecture reflects a thoughtful compromise between the dynamic capabilities of LLMs and the practical considerations of budget-conscious academic settings, demonstrating how AI can be applied in a sustainable, accessible way. The project highlights the importance of iterative development, interdisciplinary collaboration, and strategic decision-making in designing and implementing AI tools. By balancing technical innovation with budgetary constraints and maintaining a focus on user accessibility, the project team was able to create a tool that engages users meaningfully without overwhelming them with technical complexity.

Building on these outcomes, looking ahead, the AI Story Idea Generator offers a replicable framework for libraries seeking to integrate AI into their services, building on the

lessons learned from this initial implementation. The full demonstration and source code are openly available at https://sidneyshapiro.com/projects/story/, enabling readers to explore the tool firsthand or adapt it for their own contexts. By lowering technical barriers and foregrounding digital literacy, the project illustrates how libraries can introduce emerging technologies to their communities. As AI continues to evolve, future iterations could incorporate more dynamic models, further expanding the generator's educational impact while preserving its core mission of keeping AI approachable and inclusive.

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