Conversing with Judita and Werther: Gamified Cognitive Agents for Croatian-Language Literature Learning

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Abstract. *This work-in-progress paper presents the design, implementation, and preliminary evaluation of two gamified cognitive agents for literature learning, letting students converse in Croatian with Maruli's Judita and Goethe's Werther. Following Design Science Research, the browser-based artifact combines speech recognition, retrieval-augmented large language model dialogue, speech synthesis, and viseme-based facial and behavioral animation. Open models remain limited for Croatian, requiring a cloud-based model. A focus group with ten vocational-school students indicated increased engagement and better understanding of character motivation, archaic language, and historical context; students stressed agents should complement, not replace, reading. We contribute design insights for embodied, game-like literary agents.*

Keywords. gamified cognitive agents, literature learning, conversational agents, large language models, text-to-speech, speech recognition, viseme animation, Croatian language, design science research

1 Introduction

Artificial intelligence has increasingly become a part of contemporary educational technologies, ranging from intelligent tutoring systems and adaptive learning environments to conversational agents and large language model based assistants. In this broader landscape, cognitive agents are especially relevant because they do not merely provide textual answers, but are designed to communicate with users through human-oriented modalities such as natural language, speech recognition, speech synthesis, animated embodiment, and contextual knowledge representation. Such agents can therefore act as social and conversational interfaces that support learning through dialogue, feedback, guidance, and affective engagement (Kuhail et al., 2023; Moreno et al., 2001; Sikström et al., 2022; Zawacki-Richter et al., 2019). Recent developments in Large Language Models (LLMs) have further expanded the possibilities for natural language interaction in education, while at the same time raising important questions regarding reliability, transparency, learner autonomy, and the appropriate pedagogical role of such systems (Kasneci et al., 2023).

The motivation for the work presented in this paper stems from the observation that literature education, particularly when canonical or historically distant works are involved, often requires students to overcome several simultaneous barriers: unfamiliar vocabulary, archaic or non-standard language, complex narrative structures, implicit historical context, and psychological distance from fictional characters. These barriers are especially visible in the reading of older Croatian literature, such as Maruli's *Judita*, but may also occur in foreign classics, such as Goethe's *The Sorrows of Young Werther*, where students must interpret emotional states, motives, social norms, and narrative perspective. Traditional educational support usually takes the form of lectures, notes, summaries, written interpretations, or classroom discussion. While these approaches remain essential, they may not always provide an immediate, personalized, and engaging way for students to ask questions, test interpretations, or explore the inner world of a literary character.

Gamification provides one possible response to this challenge. Commonly understood as the use of game design elements in non-game contexts (Deterding et al., 2011), gamification has been widely investigated as a way of supporting motivation, engagement, and participation, although its effects depend strongly on context and design quality (Hamari et al., 2014). In the context of literature learning, however, gamification need not be limited to points, badges, leader-

boards, or quizzes. A more meaningful game-inspired approach can be achieved through role-play, character embodiment, interactive fiction, and conversational exploration. From this perspective, enabling a student to speak directly with a literary character is a form of educational role-playing: the fictional world becomes partially interactive, while the student is invited to investigate the work by asking questions, comparing interpretations, and reflecting on the character's responses.

This paper continues our previous research on cognitive agents, gamification, and educational applications of artificial intelligence. In earlier work, we introduced the B.A.R.I.C.A. infrastructure as an architecture for Croatian-speaking cognitive agents, including a university student support agent capable of communicating through spoken Croatian (Schatten, Okrea uri, & Peharda, 2021). We further explored the combination of cognitive agents and gamification in a conceptual telemedicine framework, showing how agent-based interaction and gamified mechanisms can be orchestrated in service-oriented systems (Schatten, Okrea uri, & Protrka, 2021). The infrastructure was later generalized toward smart mobility applications, where B.A.R.I.C.A. was presented as an open-source cognitive-agent infrastructure for Croatian-language interaction in various domains (Schatten et al., 2022). In education, we reported a case study on the development of gamified cognitive agents for primary school pupils, where students and teachers participated in the design process and the agents were used to support learning in Croatian school settings (Schatten et al., 2023). More recently, we investigated the integration of cognitive agents into visual novels, demonstrating how agent-based dialogue can extend static branching narratives toward more dynamic and immersive interactive storytelling (Saari & Schatten, 2024). The practical use of cognitive agents in primary education was also presented to the wider educational community through CARNET's CUC 2024 conference (Schatten et al., 2024).

The present work builds on these foundations, but shifts the focus toward high-school literature learning and the gamified embodiment of literary characters. Instead of developing a general-purpose school assistant or integrating an agent into a fictional game world, we implement two cognitive agents that assume the roles of well-known literary figures: Judita from Marko Maruli's *Judita* and Werther from Johann Wolfgang von Goethe's *The Sorrows of Young Werther* (Goethe, 1774; Maruli, 1521). The agents communicate in Croatian and are intended to support students who have already encountered the literary works by allowing them to ask questions, clarify unclear parts of the plot, discuss motives and emotions, and compare the agent's perspective with their own interpretation of the text. In this sense, the goal is not to replace reading, but to create an additional interpretive and motivational layer that can be used before, during, or after reading.

From a technical perspective, the work also extends our previous architecture by combining a speech recognition–LLM–text to speech (TTS) pipeline with retrieval-augmented access to literary texts, browser-based animation, and viseme synchronization for Croatian speech. Retrieval-augmented generation is especially relevant in this setting because literary agents must not only speak fluently, but also remain grounded in the source work and its character logic (Lewis et al., 2020). At the same time, our initial objective was to keep the solution as open and browser-based as possible, making it easier for schools to deploy without dedicated infrastructure. This objective is aligned with the broader development of open and multilingual language models, including open foundation models and recent European multilingual models (Martins et al., 2024; Touvron et al., 2023). Nevertheless, our current implementation still relies on a commercial LLM API because lightweight open models did not yet provide sufficiently reliable Croatian-language literary dialogue in the intended deployment setting. This limitation is important because it highlights a practical gap between the promise of open educational artificial intelligence (AI) and the current requirements of high-quality interaction in smaller languages.

Methodologically, the work follows a design science research (DSR) approach, which is appropriate when the research objective is the construction and evaluation of an innovative artifact that addresses a relevant problem in a real context (Peffers et al., 2007). The artifact presented in this paper consists of two embodied gamified cognitive agents, their supporting backend and frontend architecture, and a preliminary evaluation with high-school students. The study therefore contributes in three main ways. First, it demonstrates how cognitive agents can be used as literary characters rather than only as assistants, tutors, or information providers. Second, it provides implementation insight into Croatian-language speech-based literary agents with animated embodiment. Third, it reports preliminary student reactions that help clarify the pedagogical value and limitations of such systems, especially the tension between increased engagement and the need to preserve reading as an interpretive and imaginative activity.

The rest of this paper is organized as follows. Section 2 provides an overview of related work on cognitive agents, gamification, conversational agents in education, and interactive storytelling. Section 3 presents the DSR methodology used in this study. Section 4 describes the system architecture and implementation of the Judita and Werther agents. Section 5 presents the preliminary focus-group evaluation with high-school students. Finally, Section 6 discusses the main findings, limitations, and directions for future research.

2 Related Work

The work presented in this paper is positioned at the intersection of cognitive agents, educational chatbots, gamification, interactive storytelling, and recent LLM-based role-playing systems. Cognitive and pedagogical agents have a long tradition in educational technology, where they have been investigated as tools for guidance, feedback, motivation, and social interaction (Baylor, 1999; Moreno et al., 2001; Sikström et al., 2022). Educational chatbots represent a closely related research direction. Recent reviews show that chatbots have been used in various educational contexts to answer questions, support practice, and provide immediate feedback, although their effectiveness depends on the quality of instructional design, interaction, and evaluation (Kuhail et al., 2023). The emergence of LLMs has further increased the potential of conversational systems in education, but has also introduced challenges related to accuracy, overreliance, transparency, and pedagogical control (Kasneci et al., 2023).

Gamification is commonly understood as the use of game design elements in non-game contexts (Deterding et al., 2011). In education, it has been studied as a means of increasing motivation and engagement, although its outcomes depend strongly on context and design quality (Dicheva et al., 2015; Hamari et al., 2014). In relation to text-based learning, Smith et al. (2021) proposed a model for automated educational game design from eBooks, showing how textual learning materials can be transformed into game-like educational activities. This is relevant to the present work because both approaches start from literary or textual material and attempt to create a more interactive learning experience. However, while that work focuses on generating educational games and activities from text, our approach focuses on embodied conversational agents that allow students to interact directly with literary characters.

The present paper is also a continuation of our previous research on the B.A.R.I.C.A. cognitive agent architecture. Earlier work introduced a Croatian-speaking cognitive agent for university student support (Schatten, Okrea uri, & Peharda, 2021), proposed the combination of cognitive agents and gamification in telemedicine (Schatten, Okrea uri, & Protrka, 2021), and generalized the infrastructure toward smart mobility applications (Schatten et al., 2022). In education, we reported a case study on gamified cognitive agents for primary schools, where students and teachers participated in the design of Croatian-speaking agents and used them in experimental school sessions (Schatten et al., 2023). Most closely related to the present paper is our recent work on integrating cognitive agents into visual novels, where agent-based dialogue was used to transform static dialogue structures into more dynamic and immersive narrative interaction (Saari & Schatten, 2024). The current work extends this direction from an original visual-novel setting to canonical literature learning.

Interactive storytelling and character-based interaction provide an additional foundation. Visual novels and interactive fiction traditionally rely on pre-authored dialogue and branching choices, whereas AI-based characters can support more flexible natural-language interaction (Cavallaro, 2009; Riedl & Bulitko, 2013; Schatten, Peharda, & Rasonja, 2021). Work on autonomous characters and multimodal conversational agents, such as cognitive modeling for games and animation (Funge, 1999) and the ODO multimodal chatbot for interactive theater (Bhushan et al., 2020), demonstrates the broader potential of believable agents in narrative media. More recently, LLM-based role-playing systems have explored how language models can imitate personas and fictional characters (Chen et al., 2024; Li et al., 2023). Such systems are promising, but they are usually entertainment-oriented and rarely evaluated in formal educational contexts, especially for smaller languages such as Croatian. Retrieval-augmented generation can help ground such agents in source texts (Lewis et al., 2020), which is particularly important when literary agents are expected to remain consistent with a novel, character, and pedagogical purpose.

Compared with previous work, the contribution of this paper is the implementation and preliminary evaluation of embodied, Croatian-speaking cognitive agents that take the roles of Judita and Werther. Rather than acting as general tutors or assistants, the agents function as gamified literary characters intended to complement reading, support interpretation, and enable students to explore motives, emotions, context, and character perspective through speech-based interaction.

3 Methodology

This study follows a DSR methodology, since the main research contribution is the design, implementation and preliminary evaluation of an educational software artifact (Peffers et al., 2007). The problem identification phase was motivated by the observed difficulty of motivating students to read and interpret literary works, especially when the works are linguistically, historically or emotionally distant from their everyday experience. In this context, literacy is understood not only as the ability to read a text, but also as the ability to understand characters, motives, context and style. The problem is particularly relevant for older or canonical texts such as Maruli's *Judita* and Goethe's *The Sorrows of Young Werther*, where students may struggle with archaic language, complex emotions, and unfamiliar cultural contexts.

The objective of the solution was to develop a gamified interaction in which students could communicate with literary characters directly, using spoken Croatian

language. The artifact was expected to support, rather than replace, reading by enabling students to ask questions, clarify unclear passages, explore character motivation and prepare for classroom discussion. Additional objectives were to provide embodied agents with speech animation, to ground the agents in the corresponding literary works, to make the system reusable for multiple agents, and to move as much of the interaction as possible toward browser-based deployment.

The design and development phase was iterative. Several prototypes were developed and tested informally by students, a vocational school teacher of Artificial Intelligence, and a school librarian. These iterations focused on four main issues: the quality of character prompts, the reliability of Croatian-language conversation, the usefulness of retrieval-augmented access to the literary texts, and the believability of the animated speech interface. Early prototypes were revised when open lightweight LLMs produced insufficient Croatian-language responses or when the interaction flow was not sufficiently natural for classroom use. Later iterations refined the viseme animation, idle expressions, RAG ingestion, agent configuration, and the speech-recognition–LLM–TTS pipeline.

The demonstration phase consisted of presenting the final artifacts during a regular elective Artificial Intelligence course in a vocational high school. In addition, the artifacts were presented at two independent professional meetings of informatics teachers, a county-level professional meeting and an inter-county event. Feedback from these professional presentations was positive and confirmed the perceived relevance of the approach for classroom experimentation, although these presentations were not treated as formal evaluation. The formal evaluation reported in this paper was based on a focus group of students, described in Section 5.

4 Implementation

The implemented system consists of a multi-agent backend, a browser-based animated frontend, a local RAG store for each agent, and speech input/output components. The overall architecture is shown in Fig. 1. Each agent is stored as a separate folder containing an `agent.json` configuration file, visual assets, audio assets, RAG documents, and a local SQLite RAG store. In the current prototype, the two literary agents are *Judita*, grounded in *Judita*, and *Werther*, grounded in the Croatian translation of *The Sorrows of Young Werther*. The same directory structure also supports additional agents, which makes the system extensible.

The backend exposes REST-like endpoints for each agent, including health, RAG status and chat interaction. At runtime, the server loads the selected agent configuration, retrieves relevant context from the local RAG store when available, sends the user question and system instructions to the LLM, and returns a cleaned response suitable for spoken output. Conversation state is preserved through response identifiers, allowing follow-up questions within a session. The RAG component indexes source documents by extracting text, chunking it, embedding the chunks, and storing them in SQLite. During interaction, the user question is embedded and compared with stored chunks, after which the most relevant passages are added to the model input. This design allows the same backend to serve multiple character agents while keeping their literary knowledge bases separate.

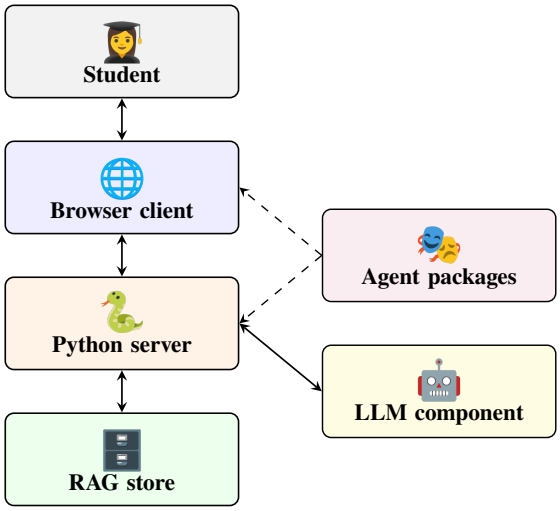


Figure 1. System architecture of the implemented multi-agent platform

Prompt engineering played an important role in shaping both agents as pedagogically useful literary characters rather than generic conversational assistants. For each agent, the system prompt defined the character identity, language, tone, stylistic constraints, relation to the source text, and expected educational function, while also limiting answers to short, speech-friendly Croatian utterances suitable for TTS output. The prompts instructed the agents to remain in character, answer from the character's perspective, avoid contradicting the literary work, and support students' understanding of motives, emotions, context, and themes. Special attention was required for Werther, since the original character is strongly associated with emotional suffering and suicide. Therefore, his prompt explicitly prohibits the romanticization of suffering, obsessive love, violence, self-harm, or suicide, and defines a safety override: if a student expresses suicidal ideation or self-harm intent, the agent must immediately leave the literary role, respond calmly and supportively, encourage the student to seek help from a trusted adult or emergency service, and avoid poetic descriptions or any practical details related to self-harm. This configuration was necessary to preserve the educational and literary value of the role-play while reducing the risk of unwanted or harmful advice during interaction with students.

The frontend is implemented in PyGame and transformed for web deployment using PygBag/WebAssembly. The web layer collects the student's spoken question through the browser speech-recognition interface, sends it to the backend, receives the generated answer, and forwards the text to the TTS component. The generated speech is then played by the PyGame frontend, which simultaneously animates the character. The characters (see Fig. 2 (a) and (b)) were initailly designed by students and later refined by artificial intelligence (namely ChatGPT 5.5). Since the application targets Croatian speech, the lip-sync module maps Croatian letters and digraphs to a reduced set of visemes (see example spritesheet in Fig. 2 (c)). The implemented viseme set includes rest position, vowels, bilabial consonants, labiodentals, sibilants, postalveolar sounds, dental/alveolar sounds, velar sounds and Croatian-specific digraphs such as *lj*, *nj* and *d*. Additional overlays implement blinking, eyebrow movements, gaze shifts and soft smiles, making the agents appear more natural during both speaking and idle states.

The current implementation therefore combines open browser technologies, reusable agent folders, local RAG stores and animated speech synthesis. The main compromise concerns the LLM component. Although the initial goal was a fully in-browser and open implementation, current lightweight open models did not provide sufficiently reliable Croatian-language literary dialogue. For this reason, the present prototype uses a commercial LLM API, while the remaining architecture is designed so that the language model component can be replaced when suitable local or browser-based models become available.

5 Evaluation

The evaluation was conducted after the classroom demonstration of both agents. The focus group consisted of ten vocational high-school students enrolled in the second and third grade, aged 15–17. The group was gender-balanced, with five male and five female students. All participants had previously been assigned both literary works. Since all students were enrolled in the elective Artificial Intelligence course, the sample is likely biased toward students who are more open to technology and AI-based learning tools than the general student population.

Students interacted with both agents for approximately 45 minutes during their regular Artificial Intelligence class. After the interaction, they were asked to write a short essay about their experience. The essays were analyzed using an LLM-assisted thematic analysis. To make this step transparent, the following prompt was used:

> Analyze the following Croatian student essays about interacting with two literary cognitive agents, Judita and Werther. Identify recurring themes, positive reactions, negative reactions, perceived educational benefits, perceived risks, preferred use cases, and comments on whether the agents should replace or complement reading. Do not invent data. Treat the sample as small and exploratory. Report findings in concise academic language and mention possible bias because the students attend an elective Artificial Intelligence course.

The analysis showed that most students perceived the interaction as novel, interesting and more dynamic than ordinary summaries or notes. Several students emphasized that asking direct questions to a character helped them understand motives, emotions and decisions, especially in the case of Werther. The agents were also perceived as useful for works with archaic language, difficult style or unfamiliar historical context. This was especially relevant for *Judita*, but students also mentioned other demanding school readings as possible candidates for similar treatment.

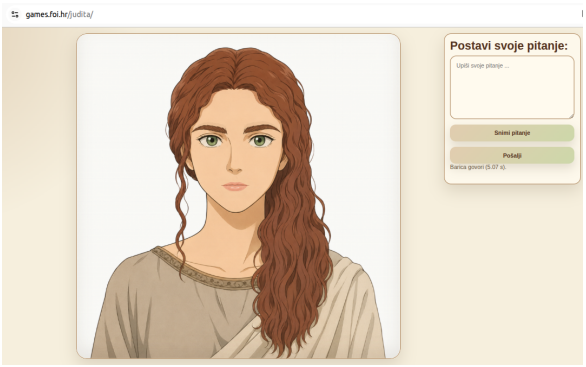
A second important finding is that students generally did not see the agents as a replacement for reading. The dominant view was that the agents are most useful as a complement before a test, after reading, during revision, or while clarifying difficult parts of the work. Several students explicitly warned that reading supports imagination, personal interpretation and attention to literary style, while the agent provides a ready-made representation of the character. This confirms that the pedagogical value of the artifact lies primarily in scaffolding interpretation and discussion, not in substituting the original text.

The essays also revealed limitations. One student considered the approach mostly unnecessary or distracting, arguing that motivated readers do not need such support and that the central novelty is only the imitation of a fictional character. Some students noted that relying on an agent could lead to incomplete knowledge if students ask only a narrow set of questions. One student found the interaction unusual and somewhat difficult to understand. These comments are important because they show that the artifact should be embedded carefully into teaching practice, with clear instructions that it is an auxiliary interpretive tool.

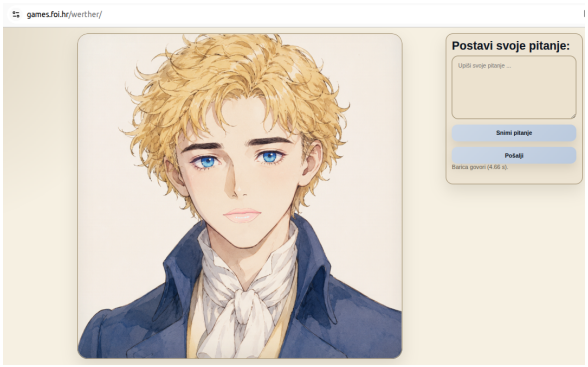
Overall, the preliminary evaluation suggests that embodied literary agents can increase engagement and help students approach literary characters from a new perspective. The results are exploratory due to the small and biased sample, but they support further investigation with larger groups, comparison classes and more structured evaluation instruments.

6 Conclusion and Future Research

This paper presented the design, implementation, and preliminary evaluation of two gamified cognitive agents for supporting Croatian-language literature learning. The agents embody Judita from Maruli's *Judita* and Werther from Goethe's *The Sorrows of Young Werther*, allowing students to interact with literary



(a) Judita



(b) Werther



(c) Judita viseme sprite sheet

Figure 2. Implemented literary agents and an example viseme sprite sheet

characters through spoken Croatian dialogue. The implemented artifact combines speech recognition, LLM-based dialogue, retrieval-augmented access to literary texts, TTS, viseme-based lip synchronization, and additional facial animations in order to provide a more natural and engaging interaction.

The work continues our previous research on cognitive agents and gamification in education, but shifts the focus from general educational support and interactive storytelling toward literature learning. The preliminary evaluation with high-school students suggests that such agents can make literary works more approachable, especially when students struggle with older language, complex emotional states, or historical context. Students particularly valued the possibility of asking direct questions and receiving answers from the perspective of a character. At the same time, the evaluation clearly indicates that the agents should not be understood as a replacement for reading. Their most appropriate role is complementary: they can support interpretation, revision, preparation for classroom discussion, and clarification of difficult parts of the text.

Several limitations need to be acknowledged. The evaluation was exploratory and included only ten students, all of whom were enrolled in an elective Artificial Intelligence course. This may have influenced their openness toward the system and limits the generalizability of the findings. In addition, the current implementation still depends on a commercial LLM API, although the original goal was to create a fully browser-based and serverless solution using open components.

Future research will therefore proceed in two main directions. First, we plan to test emerging minimalistic and lightweight LLMs with respect to their Croatian-language capabilities, literary reasoning, role consistency, and feasibility for browser-based execution. The goal is to gradually replace the backend-dependent LLM component and move toward a fully serverless implementation that schools could deploy without dedicated infrastructure or external commercial services. Second, we plan to evaluate the system with larger and more diverse groups of students, including students

who are not enrolled in AI-related courses. Future evaluations should include pre- and post-tests, comparison groups, teacher assessments, and more structured instruments for measuring comprehension, motivation, engagement, and perceived usefulness. Such studies will make it possible to better determine when and how gamified literary agents can meaningfully contribute to literature education.

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References

Baylor, A. L. (1999). Intelligent agents as cognitive tools for education. *Educational Technology*, *39*(2), 36–40.

Bhushan, R., Kulkarni, K., Pandey, V. K., Rawls, C., Mechtley, B., Jayasuriya, S., & Ziegler, C. (2020). ODO: Design of multimodal chatbot for an experiential media system. *Multimodal Technologies and Interaction*, *4*(4), 68. https://doi.org/10.3390/mti4040068

Cavallaro, D. (2009). *Anime and the visual novel: Narrative structure, design and play at the crossroads of animation and computer games*. McFarland.

Chen, N., Deng, Y., & Li, J. (2024). The oscars of ai theater: A survey on role-playing with language models. *arXiv preprint arXiv:2407.11484*. https://arxiv.org/abs/2407.11484

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining gamification. *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, 9–15. https://doi.org/10.1145/2181037.2181040

Dicheva, D., Dichev, C., Agre, G., Angelova, G., et al. (2015). Gamification in education: A systematic mapping study. *Educational Technology & Society*, *18*(3), 75–88.

Funge, J. D. (1999). *Ai for games and animation: A cognitive modeling approach*. A K Peters.

Goethe, J. W. v. (1774). *Die leiden des jungen werthers*. Weygand.

Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? a literature review of empirical studies on gamification. *Proceedings of the 47th Hawaii International Conference on System Sciences*, 3025–3034. https://doi.org/10.1109/HICSS.2014.377

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., … Kasneci, G. (2023). Chatgpt for good? on opportunities and challenges of large language models for education. *Learning and Individual Differences*, *103*, 102274. https://doi.org/10.1016/j.lindif.2023.102274

Kuhail, M. A., Alturki, N., Alramlawi, S., & Alhejori, K. (2023). Interacting with educational chatbots: A systematic review. *Education and Information Technologies*, *28*(1), 973–1018. https://doi.org/10.1007/s10639-022-11177-3

Lewis, P., Perez, E., Piktus, A., Petroni, F., Karpukhin, V., Goyal, N., Küttler, H., Lewis, M., Yih, W.-t., Rocktäschel, T., Riedel, S., & Kiela, D. (2020). Retrieval-augmented generation for knowledge-intensive nlp tasks. *Advances in Neural Information Processing Systems*, *33*, 9459–9474.

Li, C., Leng, Z., Yan, C., Shen, J., Wang, H., Mi, W., Fei, Y., Feng, X., Yan, S., Wang, H., Zhan, L., Jia, Y., Wu, P., & Sun, H. (2023). ChatHaruhi: Reviving anime character in reality via large language model. *arXiv preprint arXiv:2308.09597*. https://doi.org/10.48550/arXiv.2308.09597

Martins, P. H., Fernandes, P., Alves, J., Guerreiro, N. M., Rei, R., Alves, D. M., Pombal, J., Farajian, A., Faysse, M., Klimaszewski, M., Colombo, P., Haddow, B., de Souza, J. G. C., Birch, A., & Martins, A. F. T. (2024). EuroLLM: Multilingual language models for europe. *arXiv preprint arXiv:2409.16235*. https://arxiv.org/abs/2409.16235

Maruli, M. (1521). *Judita*.

Moreno, R., Mayer, R. E., Spires, H. A., & Lester, J. C. (2001). The case for social agency in computer-based teaching: Do students learn more deeply when they interact with animated pedagogical agents? *Cognition and Instruction*, *19*(2), 177–213. https://doi.org/10.1207/S1532690XCI1902_02

Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of Management Information Systems*, *24*(3), 45–77. https://doi.org/10.2753/MIS0742-1222240302

Riedl, M. O., & Bulitko, V. (2013). Interactive narrative: An intelligent systems approach. *AI Magazine*, *34*(1), 67–77. https://doi.org/10.1609/aimag.v34i1.2449

Saari, S., & Schatten, M. (2024). Integrating cognitive agents into visual novels. *Proceedings of the 35th Central European Conference on Information and Intelligent Systems*, 27–32.

Schatten, M., Okrea uri, B., & Peharda, T. (2021). A cognitive agent for university student support. *Proceedings of the 2021 IEEE Technology & Engineering Management Conference-Europe (TEMSCON-EUR)*, 198–203. https://doi.org/10.1109/TEMSCON-EUR52034.2021.9488627

Schatten, M., Okrea uri, B., Peharda, T., & Tomii, I. (2022). A cognitive agent's infrastructure for smart mobility. *Transportation Research Procedia*, *64*, 199–204. https://doi.org/10.1016/j.trpro.2022.09.024

Schatten, M., Okrea uri, B., & Protrka, R. (2021). Conceptual architecture of a cognitive agent for telemedicine based on gamification. *Central European Conference on Information and Intelligent Systems*, 3–10.

Schatten, M., Peharda, T., & Rasonja, J. (2021). A game engine layer for the implementation of massively multiplayer on-line interactive fiction. *Central European Conference on Information and Intelligent Systems*, 11–16.

Schatten, M., Schatten, M., & Inkret-Martinevi, L. (2023). Development of gamified cognitive agents for primary schools – a case study. *Proceedings of the 34th Central European Conference on Information and Intelligent Systems*, 3–8.

Schatten, M., Schatten, M., & Inkret-Martinevi, L. (2024). Kognitivni agenti u osnovnom kolstvu – iskustva i primjeri [CROSBI ID: 853268]. *26. CARNET-ova konferencija za korisnike CUC 2024: AI u obrazovanju – novi poetak ili poetak kraja?*

Sikström, P., Valentini, C., Sivunen, A., & Kärkkäinen, T. (2022). How pedagogical agents communicate with students: A two-phase systematic review. *Computers & Education*, *188*, 104564. https://doi.org/10.1016/j.compedu.2022.104564

Smith, G. G., Okrea uri, B., & Ricija, M. (2021). Automated educational game design from ebooks. *Proceedings of the 32nd Central European Conference on Information and Intelligent Systems*, 17–24.

Touvron, H., Lavril, T., Izacard, G., Martinet, X., Lachaux, M.-A., Lacroix, T., Rozière, B., Goyal, N., Hambro, E., Azhar, F., Rodriguez, A., Joulin, A., Grave, E., & Lample, G. (2023). LLaMA: Open and efficient foundation language models. *arXiv preprint arXiv:2302.13971*. https://arxiv.org/abs/2302.13971

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), 39. https://doi.org/10.1186/s41239-019-0171-0