

IELA AWARD WINNER

E-Learning with an AI Learning Assistant for Legal Education in Public Administration

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ABSTRACT

This case study explores an innovative e-learning ecosystem for legal training in local government that integrates structured video lectures, interactive quizzes, and personalized microlearning powered by Micromate, an AI conversational learning assistant. Micromate complements complex legal topics—such as procurement law and housing benefit law—with accessible five-question chat-based microlearning sessions. The system uses generative AI to auto-create quiz sessions, analyzes individual forgetting curves, and adapts to each learner's behavior. Five-question sessions fit seamlessly into daily routines, while gamification elements such as badges sustain motivation. Content is dynamically unlocked based on course progress, encouraging continuous engagement. Deployed across three pilot courses, Micromate achieved 70% voluntary participation among eligible staff, over 12,000 quiz questions answered during the six-month pilot phase across three e-learning-courses, and a 300% increase in weekly questions (800→2,400 from week 1 to 28). This comprehensive approach redefines professional development in public administration by creating efficient, engaging, and personalized learning experiences that enhance knowledge acquisition and retention

KEYWORDS

AI learning assistant, microlearning, conversational agent, public administration, legal education, spaced repetition, gamification

1 INTRODUCTION

Professional development in local government faces persistent challenges including traditional classroom-based legal training, difficulty retaining complex regulatory information, and limited time for extended learning sessions during busy work schedules. The legal domain presents particular challenges as statutory requirements are often perceived as dry and disconnected from daily work contexts, yet mastery is essential for regulatory compliance and effective public service delivery.

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The vhw e-learning ecosystem with Micromate addresses these challenges by combining generative artificial intelligence, conversational user interfaces, and evidence-based microlearning principles. Learning behavior has changed, and today we all tend to learn in shorter chunks and feel motivated when we are personally addressed and praised. Chat-based microlearning, combined with video-based and interactive knowledge transfer, is a new learning format that fits the times and meets the needs of learners. Over a six-month period, the integration of the AI learning assistant was evaluated across three e-learning courses. The AI assistant was integrated directly into the Moodle-based learning management system and connected to Moodle activities. Whenever a learner completes a topic-oriented input session, Micromate offers new questions related to the topic.

2 MATERIALS AND METHODS

2.1 System architecture and technical implementation

Micromate operates as a cloud-based Software-as-a-Service platform built on a sophisticated multi-tenant architecture. The core system integrates several key technical components designed for enterprise-grade deployment in public sector environments.

The conversational interface delivers learning through an integrated interface into the Moodle-based learning platform, eliminating the need for additional software installations or separate authentication systems. Users interact with Micromate as a chat contact while learning in the virtual classroom, creating a natural learning experience that feels like consulting with a knowledgeable colleague. The system supports seamless integration with existing Learning Management Systems through flexible APIs and can be embedded as web widgets in intranets, applications such as MS Teams, or deployed as standalone web applications [1].

Micromate's adaptive learning algorithm continuously analyzes individual learning behavior including answer correctness, response time, learning frequency, and forgetting patterns to optimize question selection and timing. This spaced repetition methodology ensures knowledge consolidation through scientifically timed review cycles, adapting to each learner's unique retention characteristics.

The system maintains full GDPR compliance with Swiss data residency, addressing critical public sector security and privacy requirements [2].

2.2 Implementation timeline and methodology

The project progressed through five distinct phases from July 2023 to July 2025:

- **System Familiarization & Plug-In Development (July 2023 – January 2024)**
We began by exploring Micromate's core functionality and integrating it into our Moodle-based LMS. Together with our cooperation partner, Micromate, we adapted the AI learning assistant to our environment and developed a custom Moodle plugin to enable seamless communication between Micromate and our course activities.
- **Internal Testing (February 2024 – March 2024)**
Ten internal colleagues helped us evaluate two content-packaging strategies: a single comprehensive learning package with tagged chapters versus multiple

modular packages aligned with individual course units. Based on their feedback, we chose the comprehensive package for its streamlined user experience.

- **Pilot User Testing (June 2024)**
Nine actual users from one e-learning course participated in written surveys and structured telephone interviews to assess Micromate's usability, content relevance, and motivational impact. Their insights guided refinements to question difficulty and conversational prompts.
- **Official Implementation (November 2024–December 2024; Live January 1–June 30, 2025)**
We configured and deployed Micromate across three pilot courses:
 - 6-hour e-learning course Basic knowledge of Procurement law
 - 60-hour e-learning course Fundamental knowledge of Procurement law
 - 60-hour blended-learning course Facility Management
 Micromate went live on January 1, 2025, and remained active for the project phase through June 30, 2025.
- **Scale-Up Integration (July 2025)**
We analyzed user activities and evaluated the feedback results collected via written surveys. Building on successful pilot outcomes, we extended Micromate integration to four additional e-learning courses, further embedding AI-driven microlearning into our organization's professional development offerings. Going forward, we will integrate Micromate into all new e-learning courses and designated blended-learning courses. Structure and Design of Your Manuscript

3 RESULTS

The 6-hour e-learning course Basic knowledge of Procurement Law emerged as the clear frontrunner, achieving an engagement rate of 11.5%. This course dominated user interactions, accounting for 44% of all answered questions across the three-course pilot, making it the most successful implementation of the AI learning assistant. The Blended Learning course Facility Management completed the three-course evaluation, though specific engagement metrics were not detailed in the available data. The three courses combined covered 85% of all user interactions, demonstrating concentrated engagement within the pilot program [3].

Participation and Engagement Metrics:

- 70% of eligible staff voluntarily participated in at least one microlearning session, demonstrating strong learner buy-in without mandatory requirements
- Over 12,000 quiz questions were answered during the six-month pilot phase across all three courses
- 300% increase in weekly questions from 800 to 2,400 between week 1 and week 28

The evaluation noted missing precise session durations due to absent timestamps and unavailable completion rates, limiting comprehensive performance analysis. These metrics would be valuable for future optimization and benchmarking efforts.

The results indicate that procurement law content significantly outperformed facility management topics, suggesting either higher relevance to user needs or superior content design in legal domains. The sustained growth pattern demonstrates successful integration of AI-powered microlearning into daily work routines across all three courses.

4 DISCUSSION AND FUTURE IMPACT

The results suggest broad applicability beyond public administration, with potential for scaling across various professional domains requiring complex regulatory knowledge. Future research should focus on comparative effectiveness studies with traditional training methods, long-term knowledge retention validation, and optimization strategies for maximizing engagement across diverse content areas.

The integration of generative AI for automated content creation, combined with sophisticated spaced repetition algorithms and conversational interfaces, establishes a new paradigm for professional education that balances efficiency, effectiveness, and user experience in ways previously unattainable through conventional approaches.

5 CONCLUSION

The Micromate AI-powered microlearning system represents a transformative approach to professional development in public administration. By combining conversational AI, adaptive learning algorithms, and evidence-based microlearning principles, the system achieved remarkable engagement rates and sustained participation growth. The 70% voluntary participation rate and 300% increase in weekly engagement demonstrate the system's effectiveness in addressing traditional challenges of legal education in government settings.

This comprehensive approach enhances professional development by creating efficient, engaging, and personalized learning experiences that enhance knowledge acquisition and retention, establishing a new standard for AI-driven education in the public sector.

6 REFERENCES

- [1] Micromate documentation. Available: <https://paixon.atlassian.net/wiki/spaces/Micromate/overview> [Accessed: July 28, 2025].
- [2] Micromate Privacy Policy. Available: <https://micromate.ai/en/privacy-policy> [Accessed: July 25, 2025].
- [3] Evaluierungsbericht Micromate (01.01.–14.07.2025), Internal Evaluation Report, 2025.

7 ANNEX

7.1 Sample interaction

On the following pages, you will see some interactions with Micromate. When Micromate asks questions, it always provides the correct answers along with an explanation. If a question is answered incorrectly, the explanation appears immediately for review. If a question is answered correctly, only a button is displayed, which then shows the explanation when clicked.

Micromate is able to indicate the source in which document the answer can be found. For example, as shown in the previous screenshots, after each question,

Micromate provides a citation such as “Source: Course Materials Unit 3” (or similar), referencing the specific course unit or material from which the correct answer derives.

This feature ensures traceability and transparency for users, as they can see exactly where each answer comes from and, if needed, refer back to the original material for further study or verification.

In addition to asking quiz questions, Micromate can also answer open-ended questions if relevant information is available in the uploaded documents. In these cases as well, it indicates the source from which the answer is derived.

Screenshot 1

Hi Katrin, schön dass du wieder zurück bist 🤖

Dein aktives Lernpaket ist **EL018 Gesamtpaket Vergaberecht**.

Wie möchtest du fortfahren?

Lass uns mit einer Lernsession zum Thema **EL018 Gesamtpaket Vergaberecht** beginnen.

Dein Lernziel ist es, das Level **Fortgeschrittener 55%** zu erreichen. Dein aktueller Lernfortschritt ist **4%**. Du hast noch einen langen Weg vor dir, aber mit etwas Disziplin kommst du schnell voran.

[Lernfortschritt anzeigen](#)

Lernpaket: EL018 Gesamtpaket Vergaberecht 1/5

Welche Bundesrechtsverordnung regelt alle Vergaben für Liefer- und Dienstleistungen und auch den Bereich der Bauleistungen?

A) Vergabeverordnung (VgV)

B) Konzessionsvergabeverordnung (KonzVgV)

C) Sektorenverordnung (SektVO)

Screenshot 1:

Hi Katrin, nice to have you back! Your active learning package is EL018 Complete Package Public Procurement Law. How would you like to continue?

Let's start a learning session on the topic EL018 Complete Package Public Procurement Law. Your learning goal is to reach Advanced Level 55%. Your current progress is 4%. You still have a long way to go, but with some discipline you will make progress quickly.

[Show learning progress]

Learning package: EL018 Complete Package Public Procurement Law

Which federal regulation governs all procurements of supplies and services, as well as the area of construction services?

- A) Public Procurement Regulation (VgV)
- B) Concession Procurement Regulation (KonzVgV)
- C) Sector Regulation (SektVO)

Screenshot 2

Lernpaket: EL018 Gesamtpaket Vergaberecht 1/5

Welche Bundesrechtsverordnung regelt alle Vergaben für Liefer- und Dienstleistungen und auch den Bereich der Bauleistungen?

- A) Vergabeverordnung (VgV)
- B) Konzessionsvergabeverordnung (KonzVgV)
- C) Sektorenverordnung (SektVO)

Quelle: Kursunterlagen Einheit 1

Richtige Antwort!

Erläuterung

Screenshot 2:

Learning package: EL018 Complete Package Public Procurement Law

Which federal regulation governs all procurements of supplies and services, as well as the area of construction services?

- A) **Public Procurement Regulation (VgV)**
- B) Concession Procurement Regulation (KonzVgV)
- C) Sector Regulation (SektVO)

Source: Course Materials Unit 1

Correct answer!
[Explanation]

Screenshot 3

Lernpaket: EL018 Gesamtpaket Vergaberecht 2/5

Welche Fristen gelten oberhalb der Schwellenwerte für die Beantwortung von Bieterfragen?

- A) **Spätestens 6 Tage, in Fällen der Dringlichkeit spätestens 4 Tage vor Ablauf der Angebotsfrist.**
- B) Es gibt es keine Vorgabe bis wann rechtzeitig gestellte Bieterfragen zu beantworten sind.
- C) Spätestens 15 Tage, in Fällen der Dringlichkeit spätestens 10 Tage vor Ablauf der Angebotsfrist.

Quelle: Kursunterlagen Einheit 3

Deine Antwort stimmt!

Erläuterung

Toll gemacht! Ich darf dich mit einem neuen Badge belohnen!

Badge anzeigen

Screenshot 3:

Learning package: EL018 Complete Package Public Procurement Law

What deadlines apply above the threshold values for responding to bidder inquiries?

A) **No later than 6 days, in cases of urgency no later than 4 days before the bid deadline.**

B) There is no requirement as to when bidder inquiries must be answered in time.

C) No later than 15 days, in cases of urgency no later than 10 days before the bid deadline.

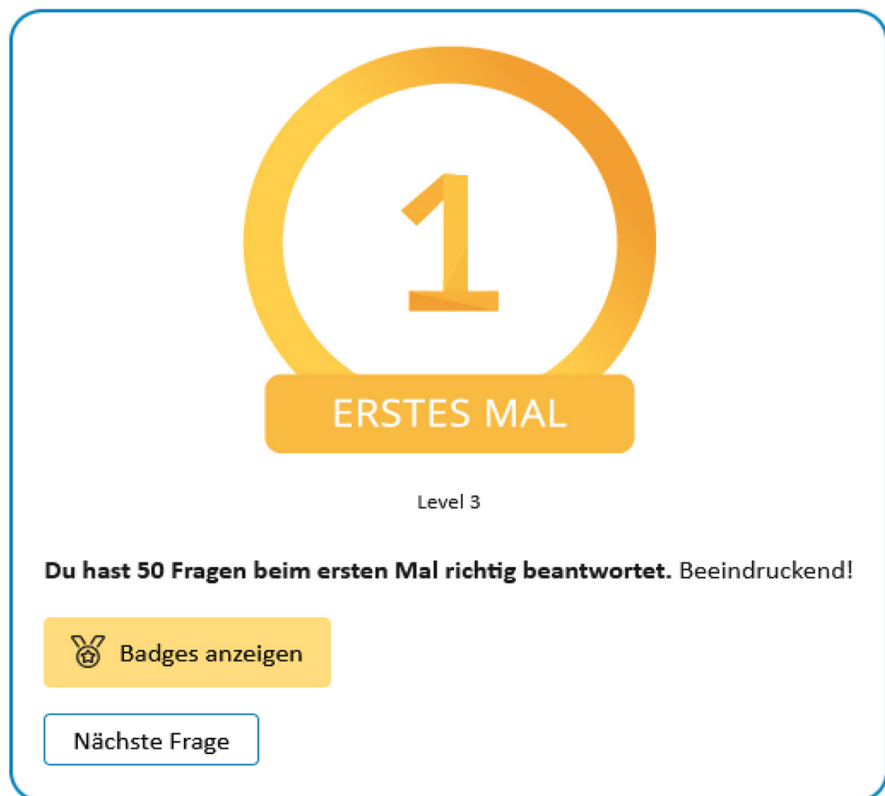
Source: Course Materials Unit 3

Your answer is correct!

[Explanation]

Well done! I may reward you with a new badge!

Screenshot 4



Screenshot 4:

FIRST TIME

Level 3

You have answered 50 questions correctly the first time. Impressive!

[Show badges]

[Next question]

Screenshot 5

Lernpaket: EL018 Gesamtpaket Vergaberecht 1/5

Welches der folgenden Kriterien ist **kein** Zuschlagskriterium?

- A) Ästhetik.
- B) Umsatz des Unternehmens jeweils bezogen auf die letzten drei abgeschlossenen Geschäftsjahre.
- C) Verfügbarkeit von Kundendienst.
- D) Schutz der Gesundheit der am Produktionsprozess beteiligten Arbeitskräfte.

Quelle: Kursunterlagen Einheit 2

Das stimmt leider nicht.

Die richtige Antwort ist **B**. Der Umsatz des Bieters ist ein Eignungskriterium.

[Nächste Frage](#)

Screenshot 5:

Learning package: EL018 Complete Package Public Procurement Law

Which of the following criteria is **not** an award criterion?

- A) Aesthetics.
- B) Turnover of the company, in each case based on the last three completed fiscal years.
- C) Availability of customer service.
- D) Protection of the health of workers involved in the production process.

Source: Course Materials Unit 2

Unfortunately, that's incorrect.
The correct answer is **B**. The turnover of the bidder is a suitability criterion.

Screenshot 6

Lernpaket: EL018 Gesamtpaket Vergaberecht 3/5

Bei Verfahren ohne Teilnahmewettbewerb entfällt die Möglichkeit, dass sich jedes interessierte Unternehmen bewerben kann.

Falsch

Richtig

Quelle: Kursunterlagen Einheit 3

Deine Antwort ist richtig!

[Erläuterung](#)

Lernpaket: EL018 Gesamtpaket Vergaberecht 4/5

Welche Angebotsfrist gilt für das Offene Verfahren?

Screenshot 6:

Learning package: EL018 Complete Package Public Procurement Law

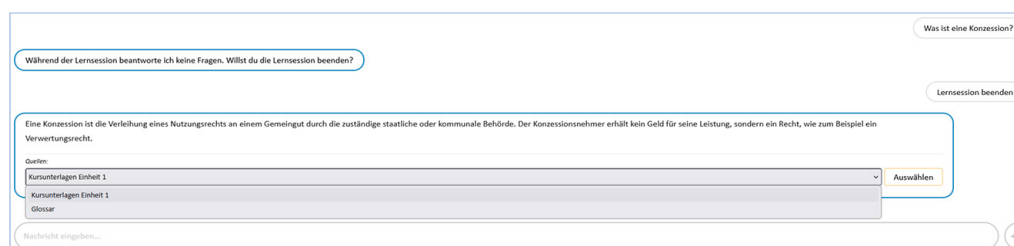
In procedures without a call for competition, the possibility for any interested company to apply no longer exists.

False | **True**

Source: Course Materials Unit 3

Your answer is correct!

Screenshot 7



Screenshot 7:

What is a concession? (my question I typed in)

During the learning session, I do not answer any questions. Would you like to end the learning session?

Finish learning session

A concession is the granting of a right to use a public good to a third party by the competent governmental or municipal authority. The concessionaire does not receive money for their service, but rather a right, such as the right to exploit, for example, a waste management service.

Source: Course Materials Unit 1, Glossary

8 AUTHOR

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