Report WP5-A1

Learner Usage Database of the TET Platform

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency

Co-funded by the European Union

Result

This deliverable is part of the Erasmus+ project TET – The Evolving Textbook (2022-1-SI01-KA220-HED-000088975), which reimagines the textbook as a digital, adaptive, and interactive tool to enhance student engagement and support innovative teaching in higher education. Within Work Package 5 on dissemination and impact, this report (WP5-A1) presents the learner usage database of the TET platform, outlining the framework for data collection and its role in evaluating and improving the platform.

Related to

WP5-A1: A database of learners' usage of the TET platform during the deployment and evaluation phase

Statement of originality

This deliverable contains original unpublished work, except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation, or both.

Sustainability and Open Access

In line with the project's dissemination strategy, all outcomes will be made openly available on the project website and through institutional repositories of partner universities. Resources are published under Creative Commons licenses whenever possible, ensuring reusability, adaptation, and further development beyond the project's lifetime.

Disclaimer

This report contains material which is the copyright of TET Consortium Parties. All TET Consortium Parties have agreed that the content of the report is licensed under a Creative Commons Attribution Non-Commercial Share Alike 4.0 International License. TET Consortium Parties does not warrant that the information contained in the Deliverable is capable of use, or that use of the information is free from risk and accept no liability for loss or damage suffered by any person or any entity using the information.

Copyright notice

Note

For anyone interested in having more information about the project, please see the website at: https://tet-erasmus.eu/

Revision Table

• Version	Date	Author	Description
1.0	15/01/2025	Antonio Maffei Fabio Marco Monetti	Issued
2.0	12/03/2025	Antonio Maffei Fabio Marco Monetti	Added Review Table Implemented suggestion from Reviewer D. Stadnicka Populated suggested reading section

Table of contents

Introduction

This section introduces the *TET – The Evolving Textbook* project and situates the current deliverable within its broader objectives. It outlines the project background, its main goals, and the specific purpose of Deliverable WP5-A1.

1.1 Project background (*TET – The Evolving Textbook*)

The Erasmus+ project *TET – The Evolving Textbook* (2022-1-SI01-KA220-HED-000088975) addresses the need for innovative digital learning resources in higher education. It redefines the concept of the textbook by integrating digital, adaptive, and interactive elements, creating a flexible platform that enhances student engagement and supports educators in adopting modern pedagogical approaches.

1.2 Objectives of the project

The project aims to:

- strengthen the quality and relevance of higher education by promoting digital innovation,
- improve student engagement through interactive and adaptive learning tools,
- foster innovative teaching methodologies aligned with European digital and educational strategies, and
- support higher education institutions in the transition toward more inclusive and flexible digital learning environments.

1.3 Scope and purpose of the deliverable (WP5-A1)

This report corresponds to Deliverable WP5-A1 within Work Package 5 on dissemination, exploitation, and impact. Its main purpose is to present the learner usage database of the TET platform, explain its design and data structure, and show how it contributes to monitoring, evaluation, and continuous improvement of the project's outcomes.

Methodology

This section describes the methodological approach followed to design and implement the learner usage database of the TET platform. It explains the sources of data, the structure of the database, and the procedures used to ensure consistency, reliability, and compliance with ethical standards.

2.1 Data sources (platform logs, partner reports, surveys, etc.)

The database integrates multiple sources of information, including:

- automatic logs generated by the TET platform (e.g. logins, time spent, activity types),
- structured reports provided by partner institutions, and

- survey data and feedback collected from learners and educators.

2.2 Data structure and indicators in the learner usage database

The dataset is organized around key indicators of learner engagement, such as frequency of platform use, type of resources accessed, duration of activities, and interaction patterns. These indicators align with the project's objectives of assessing how the evolving textbook supports learning.

2.3 Data collection process and responsibilities

Each partner institution contributed to the collection of learner data according to a shared template. A common protocol was defined to ensure comparability across contexts, with one partner coordinating data consolidation and quality assurance.

2.4 Ethical considerations (GDPR, anonymisation, informed consent)

Data collection was conducted in compliance with GDPR and institutional ethical guidelines. All learner data was anonymised before inclusion in the central database, and participants were informed about the scope and purpose of data usage.

2.5 Limitations of the methodology

The database is constrained by variations in institutional contexts and levels of platform adoption. Differences in class sizes, course integration, and technical infrastructure may influence the representativeness and comparability of data.

Learner Usage Database

This section presents the learner usage database created within WP5-A1. It describes its design, the indicators and metrics included, and the way it is integrated with the TET platform. The database provides a structured foundation for monitoring learner engagement and supporting both evaluation and future improvement of the platform.

3.1 Database design and architecture

The database has been designed as a centralized, partner-accessible repository. Its structure is modular, allowing for data to be aggregated across institutions while maintaining compatibility with local data collection systems. The design supports both quantitative analysis (usage metrics) and qualitative inputs (student feedback)

3.2 Indicators and metrics tracked (engagement, frequency, types of activity)

Key indicators include:

- number and frequency of logins,

- time spent on the platform and on specific resources,
- types of activities accessed (reading, quizzes, collaborative features),
- interaction with adaptive functionalities,
- submission and completion rates for assigned tasks.
  These metrics provide insights into how students engage with the evolving textbook and how learning activities translate into platform use.

3.3 Integration with the TET platform

The learner usage database has been designed to be seamlessly integrated with the TET platform's internal tracking and reporting mechanisms. Data is captured directly from user interactions with the platform, such as logins, navigation between modules, time spent on specific activities, and completion of interactive exercises. These records are automatically transferred into the database using standardised export formats and protocols, reducing the administrative burden for partner institutions and ensuring data consistency.

The integration also supports adaptability. As the platform evolves, new features (for example, adaptive quizzes or collaborative learning tools) can be added to the database schema without disrupting existing records. Feedback loops between the database and platform developers ensure that improvements to the interface or to data capture mechanisms are informed by both technical feasibility and pedagogical needs. In this way, the integration of the database with the TET platform creates a living system capable of evolving alongside the project.

3.4 Access and sustainability of the database

Access to the learner usage database is carefully managed to balance usability with security and ethical considerations. Authorised project partners have controlled access for uploading, reviewing, and analysing data, while all personal identifiers are removed or anonymised before integration into the central repository. To facilitate collaboration, a shared access system allows partners to view consolidated data across institutions, while maintaining the confidentiality of local contributions.

Sustainability is a central concern for this deliverable. The database is built using open and widely adopted standards, ensuring long-term compatibility with institutional repositories and external research tools. Following the end of the project, anonymised datasets will be made openly available under a Creative Commons licence, enabling reuse by educators, policymakers, and researchers. The database will thus continue to generate value beyond the project's lifetime, serving both as a resource for future research in digital pedagogy and as a benchmark for institutions considering the adoption of adaptive learning platforms.

Results and Analysis

4.1 Overview of learner participation

4.2 Usage patterns (e.g. number of logins, duration, features used)

4.3 Differences across partner institutions and learner groups

4.4 Insights for teaching and learning practices

Expected Outcomes and Impact

This section outlines how the learner usage database contributes to the broader aims of the project and how its outcomes are expected to create impact at different levels.

5.1 How the data supports evaluation of TET platform effectiveness

The learner usage database will serve as a key instrument in evaluating the effectiveness of the TET platform. By systematically collecting data on student engagement, it enables both quantitative and qualitative analysis of how the evolving textbook supports learning. Metrics such as login frequency, time spent on different activities, and the use of adaptive features will provide detailed insights into patterns of use. These insights will help identify which platform components are most valuable to students, which learning scenarios foster higher engagement, and where improvements are needed.

In addition, the database offers a longitudinal perspective, allowing project partners to trace changes in learner behaviour over the course of the pilot phase. This makes it possible to see not only immediate reactions but also longer-term trends in adoption and effectiveness. Ultimately, this evidence base strengthens the project's ability to demonstrate impact to stakeholders, including educators, institutions, and funding bodies.

5.2 Contribution to dissemination and exploitation (WP5 objectives)

Beyond its internal evaluation role, the learner usage database is an essential tool for dissemination and exploitation within WP5. By providing measurable evidence of platform use, it enables the project to communicate results in a way that is both concrete and persuasive. Findings from the database will be integrated into dissemination activities such as conference presentations, journal articles, workshops, and policy briefs, ensuring that the project's achievements reach both academic and non-academic audiences.

For exploitation, the database underpins the project's capacity to demonstrate value and sustainability. Concrete usage data provides credibility when presenting the TET platform to

potential adopters, whether universities, schools, or EdTech developers. It also creates opportunities for comparative studies across different partner contexts, offering insights into how the platform adapts to diverse educational settings. This makes the outcomes more transferable and increases the likelihood that the TET platform will be adopted beyond the consortium.

5.3 Added value for educators, institutions, and EdTech developers

The learner usage database is designed not only as an internal monitoring tool but also as a resource that generates broader educational value:

- **For educators**, the database provides concrete evidence of how students interact with different types of digital resources, from adaptive quizzes to interactive materials. This information can support teachers in tailoring their instructional strategies, identifying which materials are most engaging, and refining their use of digital pedagogy. Over time, it can also help create a feedback loop where teaching practices are continuously improved on the basis of actual learner behaviour.
- **For higher education institutions**, the aggregated data offers strategic insights into how digital platforms contribute to learning outcomes and student satisfaction. It allows decision-makers to evaluate whether investments in digital learning environments are aligned with institutional goals such as inclusivity, innovation, and the digital transition. Moreover, the availability of structured data makes it easier for institutions to benchmark their practices against other universities and to position themselves in European and international discussions on digital education.
- **For developers and technology partners**, the data collected represents an invaluable resource to guide the iterative improvement of the TET platform. Usage trends highlight which functionalities are successful and which require redesign or simplification. This ensures that the platform evolves in direct response to user needs, strengthening its potential for long-term sustainability and wider adoption.

Overall, the added value of the learner usage database lies in its ability to act as a bridge between pedagogical practice, institutional strategy, and technological development, ensuring that the evolving textbook is not only innovative in design but also effective and sustainable in real educational contexts.

Conclusions and Next Steps

This section summarises the main achievements of Deliverable WP5-A1 and outlines the actions required to ensure its continued value within the project. It reflects on the role of the learner usage database as both a monitoring tool and a driver of pedagogical and technological innovation, and it highlights the recommendations, sustainability measures, and follow-up activities that will guide the next stages of work.

6.1 Key findings

The work carried out in WP5-A1 has established the foundation for a systematic and structured learner usage database linked to the TET platform. While detailed results will only emerge as more data is collected during piloting, the current deliverable already demonstrates the feasibility and value of integrating usage tracking into the platform. The database provides a consistent framework for gathering comparable information across partner institutions, ensuring that learner engagement can be monitored in a transparent and reliable way.

In addition, the design of the database highlights the project's commitment to combining pedagogical innovation with technological robustness. It shows that monitoring learner activity is not simply a technical task, but one that is deeply connected to the project's broader educational objectives. The database thus positions itself as a crucial tool for measuring both the pedagogical and technological effectiveness of the evolving textbook.

6.2 Recommendations for WP5 and future cooperations

Based on the development of the learner usage database, several recommendations can be drawn for ongoing and future work:

- **Ensure consistent data collection**: all partners should follow the common protocols so that data remains comparable and reliable.
- **Promote active use of the data**: findings should be fed back into teaching practice and platform development, creating an iterative improvement cycle.
- **Integrate dissemination and exploitation**: usage data should be systematically included in communication materials, helping to demonstrate the impact of the TET platform to wider audiences.
- **Support capacity building**: training for educators and administrators on how to interpret and use the data will increase the added value of the database and promote sustainability.

6.3 Sustainability and follow-up (e.g. open access, long-term use)

Looking ahead, the sustainability of the learner usage database is key to ensuring that the TET platform continues to generate impact beyond the project's lifetime. This will be achieved by:

- storing the database in open and interoperable formats,
- linking it to institutional repositories to secure long-term preservation,
- ensuring compliance with GDPR and ethical standards, so that the data remains usable for research and teaching purposes,
- making anonymised datasets openly available for future studies in digital pedagogy and EdTech.

The next steps will involve populating the database with data from pilot implementations, analysing patterns of use, and translating these findings into concrete recommendations for platform

improvement. In this way, the learner usage database will not only serve as a monitoring tool but also as a driver of innovation and knowledge creation in the field of digital education.

Suggested Readings

1. Mabkhot, M., Al-Ahmari, A., Salah, B., Alkhalefah, H., Abidi, M. H., & Mohammed, M. (2021). Mapping Industry 4.0 enabling technologies into United Nations Sustainability Development Goals. *Sustainability, 13*(5), 2560. https://doi.org/10.3390/su13052560
2. Lupi, F., Antonelli, D., Lanzetta, M., Gualtieri, L., & Rauch, E. (2022). Toward a sustainable educational engineer archetype through Industry 4.0. *Computers in Industry, 134,* 103543. https://doi.org/10.1016/j.compind.2021.103543
3. Antonelli, D., Maffei, A., Lanzetta, M., & Lupi, F. (2019). Tiphys: An open networked platform for higher education on Industry 4.0. *Procedia CIRP, 79,* 706–711. https://doi.org/10.1016/j.procir.2019.02.128
4. Maffei, A., Onori, M., Papetti, A., & Germani, M. (2016). CONALI ontology: A framework for design and evaluation of constructively aligned courses in higher education—Putting in focus the educational goal verbs. *Procedia CIRP, 50,* 765–772. https://doi.org/10.1016/j.procir.2016.06.004
5. Maffei, A., Onori, M., Papetti, A., & Germani, M. (2022). On the design of constructively aligned educational unit. *Education Sciences, 12*(7), 438. https://doi.org/10.3390/educsci12070438
6. Sala, R., Lombardi, D., Traetta, L., Maffei, A., & Antonelli, D. (2024). Blended learning in the engineering field: A systematic literature review. *Computer Applications in Engineering Education, 32*(3), e22712. https://doi.org/10.1002/cae.22712
7. Maffei, A., & Enoksson, F. (2023). What is the optimal blended learning strategy throughout engineering curricula? Lessons learned during the Covid-19 pandemic. In *Proceedings of the 2023 IEEE Global Engineering Education Conference (EDUCON)* (pp. 1–8). IEEE. https://doi.org/10.1109/EDUCON54358.2023.10125225
8. Sala, R., Lombardi, D., Traetta, L., & Maffei, A. (2023). Examining the implementation of blended learning in the engineering field. In *Proceedings of the 5th International Conference on Higher Education Learning Methodologies and Technologies Online (HELMeTO).* [Conference paper]. LINK
9. Lombardi, D., Traetta, L., Maffei, A., & Podržaj, P. (2024). Enhancing instructional design: The impact of CONALI ontology and ChatGPT in primary education training. *Computer Applications in Engineering Education, 32*(3). https://doi.org/10.1002/cae.22712
10. Bonello, A., Grima, J., Antonelli, D., & Sala, R. (2023). Development of an Agile Blended Learning Framework for engineering higher educational institutions post Covid-19. In *Proceedings of the 33rd International Electrotechnical and Computer Science Conference* (pp. 644–647). e-ISSN 2591-0442. LINK
11. Antonelli, D., Lupi, F., Maffei, A., & Sala, R. (2024). Exploring the limitations and potential of digital twins for mobile manipulators in industry. *Procedia Computer Science, 232,* 1121–1130. https://doi.org/10.1016/j.procs.2024.01.110
12. Lupi, F., Antonelli, D., Maffei, A., & Lanzetta, M. (2023). Automatic definition of engineer archetypes: A text mining approach. *Computers in Industry, 152,* 103996. https://doi.org/10.1016/j.compind.2023.103996
13. Lupi, F., Antonelli, D., Maffei, A., & Sala, R. (2023). Ontology for constructively aligned, collaborative, and evolving engineer knowledge-management platforms. In G. Casalino et al. (Eds.), *Higher Education Learning Methodologies and Technologies Online (HELMeTO 2023)* (pp. 125–136). Springer, CCIS, 2076. https://doi.org/10.1007/978-3-031-67351-1_10
14. Bonello, A., Sala, R., Antonelli, D., & Grima, J. (2023). Beyond the pandemic: How has Covid-19 shaped the capability to adopt an Agile Blended Learning in HEI? In *Book of Abstracts, 5th International Conference on Higher Education Learning Methodologies and Technologies Online (HELMeTO)* (p. 29–30). Foggia, Italy. ISBN 978-88-99978-64-8. LINK
15. Antonelli, D., Lupi, F., Maffei, A., & Sala, R. (2022). Introducing sustainability themes in STEM education: Evidence from some European countries. In *Book of Abstracts, 4th International Conference on Higher Education Learning Methodologies and Technologies Online (HELMeTO 2022)* (pp. 312–314). Palermo, Italy. LINK

16. Maffei, A., Antonelli, D., & Stylios, C. (2021). Overcoming the obstacles hindering the application of virtual reality to e-learning. In *Proceedings of HELMeTO 2021: Third International Workshop on Higher Education Learning Methodologies and Technologies Online*. ISBN 978-88-99978-36-5. LINK

Annexes

Annex 1: Data collection template

Annex 2: Example of anonymised learner usage records

Annex 3: Glossary of terms

Lead Partner

Partners