



## ISILA Impact on ULe

**“Improving the quality and sustainability of learning using early intervention methods based on learning analytics”**

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| <b>Abstract</b>                 | The present document summarizes the impact of the ISILA project on the University of León, as well as the plans for sustainability and future use of the project results. |
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# 1 Institutional Context

The University of León (ULE) is a public higher education institution in Spain with a strong commitment to improving teaching quality, advancing digital transformation in education, and strengthening student support services. Within the ISILA project, ULE has contributed across all Work Packages, providing expertise in Learning Analytics and Multimodal Learning Analytics, and supporting the project’s goal of enabling timely, data-informed interventions to improve student success and reduce dropout risk.

ULE has played a particularly relevant role in the piloting and evaluation activities, contributing a large-scale implementation context with nearly 170 students participating in the pilot courses. This participation has allowed ULE to gather meaningful evidence on how learning analytics can support early identification of learning difficulties and disengagement. For ULE, it is especially important to explore not only academic performance indicators, but also how students feel during the learning process, as emotional state and engagement are closely linked to persistence and learning outcomes. This perspective aligns with the institution’s interest in more holistic approaches to student monitoring and support, combining learning progress with multimodal signals that can provide richer insight into learners’ experiences.

In terms of Work Package leadership and workload, ULE’s most substantial contributions have been concentrated in WP4 (Data collection) and WP5 (Impact analysis). In WP4, ULE supported the compilation and consolidation of pilot results (including the activities related to deliverable 4.3), ensuring that evidence from implementation was properly documented and comparable across contexts. In WP5, ULE contributed strongly to the final stages of impact analysis, completing key tasks linked to the refinement of intervention strategies, the integration of improved multimodal reporting into teacher-facing dashboards, and the development of updated materials and recommendations to support broader adoption.

Overall, ISILA aligns well with ULE’s strategic priorities in educational innovation and digitalization by strengthening the use of data to support teaching decisions, improving mechanisms for early student support, and promoting evidence-based interventions that can enhance learning quality and sustainability across diverse university learning environments.

## 2 Impact on Teaching and Learning Practices

Participation in ISILA has opened new opportunities for the ULE and its teaching staff by introducing practical tools and approaches that strengthen data-informed teaching and student support. Through the pilots, instructors gained first-hand experience with the potential of using a Learning Record Store (LRS) to collect and consolidate learner traces, making it possible to analyze student interactions across learning activities and platforms in a more systematic and scalable way. This has increased awareness among teachers of how learning evidence can be leveraged beyond end-of-course results, enabling earlier insight into learning processes and engagement.

A particularly valuable contribution has been the use of analyses grounded in Self-Regulated Learning (SRL). By exploring how SRL-related indicators can be combined with course grades and interaction data, ULE staff have improved their understanding of how learning analytics can support a transition toward more personalized learning pathways. This includes identifying different learner profiles, recognizing patterns of study behavior, and detecting moments where students may benefit from timely guidance, scaffolding, or motivational support.

The pilots also influenced course monitoring and feedback processes. Teachers reported that the availability of dashboards and structured data views made it easier to interpret learning dynamics during the semester and to consider targeted actions rather than general, uniform support. In this sense, ISILA has helped strengthen a more reflective teaching practice, where decisions are increasingly supported by learning evidence and not solely by intuition or summative assessment outcomes.

Regarding the effectiveness of interventions, the experience at ULE suggests a nuanced picture: interventions were successful in terms of academic impact, contributing to improved performance and supporting students’ progress, while the students’ direct responsiveness to some intervention actions was more limited than expected. This insight has been useful for refining how interventions are communicated, timed, and embedded into course routines to increase uptake and engagement.

Importantly, ISILA has generated sustained interest among participating teachers. Several instructors involved in the pilots have expressed willingness to continue using the dashboards in future iterations of their courses and to explore new metrics and visual representations that better capture learning progress, engagement, and learner experience. Overall, ISILA has acted as a catalyst for

expanding ULe’s capacity to adopt learning analytics infrastructures and to evolve toward more adaptive and personalized teaching and learning practices.

### **3 Impact on Research and Development**

ISILA has significantly strengthened research and development activities at the ULe by providing a solid methodological and technological basis to advance work in adaptive and personalized learning, as well as in the evolution of learning analytics methodologies for eLearning and blended learning contexts. The project has reinforced ULe’s capacity to move from isolated course-level observations toward a more systematic, data-driven research approach, where learning evidence can be collected, integrated, and analyzed to better understand student learning processes and support timely interventions.

A major contribution of ISILA is the availability of learning analytics datasets derived from real teaching contexts, which serve as a foundation for ongoing and future research. These data enable ULe researchers to investigate how different interaction patterns, engagement trajectories, and self-regulation indicators relate to learning outcomes. In particular, the project has supported the exploration of SRL constructs and their relationship with academic performance, allowing researchers to study how combining SRL-related variables with grades and interaction traces can inform learner profiling, prediction of learning difficulties, and more targeted personalization strategies.

In addition, within the ILEDA context, ULe has expanded the scope of data sources beyond traditional learning platforms by exploring student interaction data from communication tools such as Discord. While Discord had already been used to support and evaluate teamwork dynamics, ISILA has encouraged a more integrated view by considering how these social and collaborative interaction traces can be combined with other learning data sources and compared against them. This line of work opens new research opportunities in understanding collaborative learning processes, participation roles, and team regulation strategies through multimodal and multi-source analytics.

Building on these experiences, ULe plans to extend research in two complementary directions. First, to continue integrating additional data sources linked to authentic learning activities—such as GitHub Classroom (to analyze development workflows, contributions, and learning progress in programming-related tasks) and educational escape rooms (to capture problem-solving strategies, collaboration behaviors, and engagement under challenge-based learning scenarios). Second, to explore analytics-driven approaches for identifying students at risk and indicators

related to burnout, moving beyond teamwork-specific contexts to broader student wellbeing and persistence challenges. These future research initiatives will help refine early-warning models and intervention strategies that combine performance, engagement, and learner-experience variables.

Overall, ISILA has acted as a catalyst for new R&D pathways at ULe, supporting the generation of publishable evidence, the refinement of multimodal learning analytics methods, and the preparation of future research outputs and project proposals focused on scalable infrastructures and richer, multi-source data approaches for personalized learning and student support.

## 4 Dissemination and Visibility

The ULe has actively contributed to increasing the visibility of ISILA by disseminating project progress and results through academic venues, institutional channels, and public outreach events. At an international level, ULe has presented ISILA-related outcomes in large-scale scientific conferences such as HCII, as well as in mid-size international events such as TEEM, using these forums to share the project’s approach to learning analytics, multimodal evidence, and early-intervention strategies with both research and practitioner communities.

At the local and regional level, ULe has also promoted ISILA through science communication initiatives aimed at broader audiences, including public engagement events such as Expociencia, where project ideas and results can reach students, families, and the general public. In addition, project milestones and activities have been amplified through local media coverage and the university’s own communication channels. For example, ULe has published institutional news about ISILA and its objectives—highlighting the project’s focus on learning data, real-time monitoring, and early intervention to improve student success (<https://www.unileon.es/noticias-de-investigacion/la-ule-participa-en-un-proyecto-europeo-que-busca-revolucionar-la>)

To reinforce accessibility and long-term visibility, ULe provides institutional web presence for the project and ensures that ISILA can be reached through university structures that support international initiatives. In particular, information about internationally managed projects is made available via ULe’s Office for International Projects (OPI), which serves as an entry point from the institution to externally funded projects and related initiatives. (<https://www.unileon.es/internacional/vicerrectorado/opi/proyectos-gestionados>)

Beyond dissemination of results, ULE also supports the promotion of innovative teaching methods and digital tools developed in ISILA through participation in workshops, webinars, and teacher-focused sessions, contributing to the broader goal of encouraging adoption and replication of learning analytics-based intervention practices at local, national, and European levels.

## **5 Sustainability and Future Use of Results**

ULE is committed to sustaining and extending the use of ISILA results beyond the project’s duration, particularly by continuing to apply and refine the learning analytics dashboards and the early-intervention methodology developed throughout the project. Building on the experience gained during the pilots, ULE aims to consolidate these approaches as part of its ongoing efforts to strengthen evidence-informed teaching, improve student monitoring, and support more personalized learning pathways.

A key sustainability action is the intention to continue collecting learning data across multiple courses and academic contexts, moving from pilot-based implementation to more regular use in selected subjects. This continuity will allow ULE to validate and improve indicators over time, compare learning patterns across cohorts, and better understand how engagement and learning behaviors evolve throughout the semester. As a result, the dashboards can become a stable support tool for instructors, enabling them to identify emerging difficulties earlier and to implement targeted pedagogical actions with greater precision.

ULE also plans to maintain and enhance the technical ecosystem, ensuring that the system remains operational and adaptable as teaching practices and digital environments evolve. A central part of this long-term strategy is the progressive incorporation of new and complementary data sources, extending beyond standard learning management system traces. By integrating additional sources linked to authentic learning activities (e.g., collaborative tools, programming and project-based environments, or other learning interaction platforms), ULE will enrich the available evidence base and improve the explanatory power of analytics for both learning progress and learner experience.

Continuous refinement of the ISILA methodology is expected to contribute to long-term improvements in teaching effectiveness and student support in several ways: (1) by strengthening the alignment between learning activities, assessment, and monitoring points; (2) by improving the interpretability and usefulness of dashboard representations for instructors; and (3) by enabling more effective early interventions tailored to different learner profiles and learning contexts. Over time,

this iterative cycle of data collection, analysis, and instructional adaptation will support a sustainable institutional capacity for ongoing pedagogical improvement, helping ULE progress toward a more adaptive, personalized, and student-centered educational model.

## **6 Stakeholder Engagement and Collaboration**

ULE promotes active exchange and collaboration among key stakeholders involved in the ISILA approach (teachers, researchers, and institutional staff with responsibilities in teaching innovation and digital support) to ensure that project results are understood, discussed, and progressively adopted within the institution. ULE’s engagement strategy is based on creating regular opportunities for dialogue and shared reflection, helping stakeholders align pedagogical needs with the possibilities offered by learning analytics and early-intervention methodologies.

A central mechanism for this collaboration is the organization and participation in workshops and collaborative sessions, where teachers can share experiences from implementation, discuss challenges in interpreting learning data, and identify practical intervention strategies that fit their course contexts. These workshops also help translate project outcomes into actionable institutional practices by encouraging common criteria for student monitoring, feedback timing, and intervention triggers. Through these exchanges, teaching teams gain confidence in using learning analytics evidence and can collaboratively refine how dashboards and indicators are applied in real courses.

To support broader uptake, ULE facilitates access to ISILA outputs by making available the project’s guidelines and methodological resources for teaching staff and relevant administrative units. Providing structured guidance helps reduce barriers to adoption and ensures that interventions and data practices are implemented consistently, with attention to ethical and pedagogical considerations. In parallel, ULE offers technical support to assist teachers in using the developed tools, including onboarding to the dashboards, clarification of metrics, and assistance with integrating data from course activities. This support is essential for sustaining use over time and for enabling teachers with different levels of technical expertise to benefit from the system.

Overall, these stakeholder interactions (grounded in workshops, shared access to project guidance and results, and ongoing technical support) contribute to building a coordinated institutional approach to student monitoring. They also create the conditions for scaling ISILA results beyond pilot settings, encouraging wider adoption of learning analytics-supported teaching practices and

strengthening collaboration between pedagogical, technical, and research perspectives within ULe.