Structuring from scratch a legal interoperability laboratory

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Abstract

This article defines what is required in order to create an innovative legal interoperability laboratory from scratch at the National School of Public Administration and Local Government in Athens. Its scope and objectives are critically analysed and its modules outlined. The problem-based learning method has been applied to a synchronous and asynchronous distance learning educational environment. In particular, in the context of the laboratory, the use of LEOS (Legislation Editing Open Software), a legal informatics tool that has been developed as a European Union ISA2 solution, is highlighted. Moreover, the relation of the laboratory to existing open interoperability courses and the wider European Interoperability Framework are presented along with the tool being assessed for potential use as an authoring tool by the Hellenic public administration. Both the laboratory and the course have been thoroughly evaluated and the results of this evaluation are presented and discussed, in view of plans for the design of additional related interoperability courses and laboratories.

Key words: legal interoperability, digital transformation, legal informatics, LEOS, e-Governance, public administration.

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Estructurando un laboratorio de interoperabilidad legal desde cero

Resumen

Este artículo determina qué se necesita para crear un innovador laboratorio de interoperabilidad legal desde cero en el ámbito de la Escuela Nacional de Administración Pública y Gobierno Local de Atenas. Su alcance y objetivos son analizados críticamente; y sus módulos, debidamente ponderados. El método de aprendizaje basado en problemas se ha aplicado a un entorno educativo de aprendizaje a distancia sincrónico y asincrónico. En particular, en el contexto del laboratorio, se destaca el uso de LEOS (Legislation Editing Open Software), una herramienta de informática jurídica que se ha desarrollado como solución ISA2 en la Unión Europea. Además, se presenta la relación del laboratorio con los cursos abiertos de interoperabilidad existentes y, un poco más amplio, con el marco europeo de interoperabilidad. Asimismo, se evalúa la herramienta para uso potencial como herramienta de creación por parte de la administración pública helénica. Tanto el laboratorio como el curso han sido evaluados exhaustivamente; y sus resultados, presentados y discutidos con el fin de elaborar nuevos planes para el diseño de cursos y laboratorios de interoperabilidad adicionales.

Palabras clave: interoperabilidad legal, transformación digital, informática legal, LEOS, e-gobierno, administración pública.

1. Introduction

Digital transformation of public administration is proceeding at an astonishing pace and passes through the development of legal informatics tools and standards (Loutsaris & Charalabidis, 2020; Pagallo et al., 2018). In recent years, it has also significantly progressed with the introduction of disruptive technologies, most notably artificial intelligence (Wirtz et al., 2019). Indeed, legal informatics technology can be a solid base for utilizing more advanced AI applications.[3] As regards the law-making process, it has been shown that legal technology is a promising candidate for entering the parliamentary workspace (Koryzis et al., 2021). Yet, the adoption of new technology by public sector entities can be substantially eased if it is 'an inside job', meaning that internal stakeholders, such as public administrators and officials, would constitute a significant catalyst for this process.

These actors need to be supported and potentially re-educated in order to support the digital transformation process (Matt et al., 2015), for instance by contributing to the creation and publication of big open legal data (BOLD) and the related business process re-engineering (Grover et al., 1995). Special know-how on the user's side is first necessary in the development phase of legal informatics systems to ensure a significant and appropriate level of customization to local needs. Typical skills and knowledge for this purpose include generic ontology mapping, metadata schemes development and legal document templates. Later on in the law/rule-making process training needs to ensure, among others, uniform drafting techniques and homogenous handling of legal texts.

Additionally, interoperability especially within the European Interoperability Framework turns out to be a critical feature for efficient systemic integration (Kouroubali & Katehakis, 2019). This is particularly true of its legal dimension, which is key for establishing an ecosystem of interconnected legal documents that relies on legal documentation and semantic web standards. The ministers in charge of e-Government policy across the European Union recognised the need for digital-ready legislation by calling upon the European Commission in the recent Tallinn Declaration to: 'fully integrate digital considerations into existing and future policy and regulatory initiatives' (European Commission, 2017a).

Such legislation needs to be interoperable. Legal interoperability as defined in the European Interoperability Framework (EIF) is about ensuring that organisations and, by extension, whole countries operating under different legal frameworks, policies and strategies are able to work together. A specific recommendation for legal interoperability included in the new EIF proposes that public administrations: '[e]nsure that legislation is screened by means of 'interoperability checks' to identify any barriers to interoperability' (European Commission, 2017b).

Interoperability resources contribute to the expansion of resources available in the collection that are dedicated to Digital Skills in the Public Sector on the Joinup digital platform and can be reused/exploited via different types of education and training activities.

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3   See, for instance, Sovrano et al. (2020).

The implementation of an educational framework to promote the necessary capacity building on interoperability has been conducted by the Interoperability Academy of the ISA2 programme and can be expanded and/or promoted by national schools of government in a structured and homogeneous manner.

This article reviews an interoperability case study in Greece and the establishment of a legal interoperability laboratory, or simply 'interoperability lab', by the National School of Public Administration and Local Government, known as ESDDA, in Athens. Besides links to the international educational reference framework, the pre-existing national actions and preparatory courses that facilitated the lab's creation will be outlined. ESDDA's approach is innovative as it has opted to directly transform scientific knowledge and practical field expertise into a pilot course for public administrators.

The next section highlights the relevant national and international educational framework and attempts to connect to former courses that have paved the ground for the interoperability lab and the accompanying courses. It is followed by an analytical description of the methodology used for course design (section 3). The actual lab, as well as all the relevant courses, is presented in section 4. A series of surveys was used for course evaluation and these results are discussed in section 5, before concluding with some thoughts on the evolution of the current approach (section 6).

2. Digital education strategy to promote the appropriate skills in public administrations

In the digital era, people need digital skills for all sorts of personal or societal activities: to study, work, communicate, access online public services and find trustworthy information and many more. However, many do not possess the adequate digital skills as has become particularly evident in recent years, where digitalisation has been promoted with more vigour. To tackle the digital skills gap and promote strategies and projects to improve the level of digital skills in Europe, the European Commission (EC) established a new Digital Education Action Plan (2021-2027). The plan outlines the Commission's vision for high-quality, inclusive and accessible digital education in Europe and has two strategic priorities:

> To foster the development of a high-performing digital education ecosystem;
> To enhance digital skills and competences for the digital transformation.

Moreover, EC has designed and offers an Open Educational Framework (OpenEdu) to promote openness in all educational dimensions including ten strategic pillars: Open Strategy, Leadership, Recognition, Research, Pedagogy, Open Access, Technology, Open Education Resources OER-Content, Collaboration and Education Quality (dos Santos et al., 2016).

As in other sectors, the nature of work in the public sector is rapidly changing and the

capabilities of public servants and those who lead them are required to adjust in line with these changes. To keep pace, governments look for new ways to develop and manage digitally skilled workforces that are essential in order to make digital government happen (Chinn et al., 2020). In France, a mentoring program called DINSIC, which includes private-sector digital professionals, has been established as a solution to improve digital service leadership and interoperability in public services, supporting senior public sector executives to improve their digital and leadership skills (Pezziardi and Verdier, 2016). Moreover, the relevant OECD Framework for digital talent and skills in the public sector highlights the need to create the right working environment, secure the right skills and evolve a workforce that is able to support a progression from e-government to digital government (Organisation for Economic Cooperation and Development [OECD], 2021).

As the current trend leans towards markets that rather neglect degrees and ask for specific practical abilities, specific Information and Communication Technology (ICT) competences are in high demand. Associated with a professional profile, the required knowledge, skills, attitudes and behaviours that lead individuals to achieve specific results are defined as competences. Hence, it is important to develop and certify digital abilities because they can determine an individual's professional development within a constantly transforming technological environment (Van Laar et al., 2017). The relevant competency frameworks that were developed lately help to identify the required knowledge, skills, and attitudes per professional profile to achieve measured results and allow for compatibility.

Recognising this trend, the European Union and other organisations promote specific competency frameworks, both horizontally and at the level of specific categories of professionals. The horizontal frameworks include the OECD's core digital skills, which consists of 21 competencies and the European Digital Competence Framework (DigComp) for citizens' digital skills. In the professional context, the presence of the e-Competences Framework, e-CF for IT, which identifies 41 skills, the framework for teachers and even the framework for cyber security (cyber-security skills) and Geospatial Data Defence (GEOINT) are important. Apart from the personal dimension, the European Commission promotes the European Framework for Digitally Competent Educational Organisations and the EntreComp, the Entrepreneurship Competence Framework to support and assess all levels of administrative capacity according to the analytical OECD framework.

The capacities and capabilities necessary for a sound digital government policy in Greece began by focusing on the level of priority attributed to the development of different types of digital skills for public servants. The National Centre of Public Administration and Local Government (EKDDA), the responsible authority for promoting digital skills in Greece, supports the government in boosting a values-driven culture and leadership, developing skilled and effective public servants. The scope of these programs is to ensure that public services are fit for purpose for today's digital policy challenges and capable of taking the public sector into the future. EKDDA established a digital section to promote these skills to the appropriate profiles of public servants and special focus was given to high-level em-

ployees at the regional and central government level. Moreover, EKDDA adopted the Open Educational Framework that enhances the digital transformation of the public sector and offers, among others, open educational resources (Mikroyannidis and Papastilianou, 2021).

As a consequence, the inclusion of legislative leaders, as a distinct administrator's profile, the definition of the skills that govern law-making and the method of production and development of such executive digital skills are recognised and promoted by EKDDA. This effort takes the fact into consideration that according to the InCiSE 2019 ranking, the performance of Greek public administration is rather low in several sub-sectors, which also include: the skills of the employees, the production of laws and regulations, the digitisation, public policy making and transparency (InCiSE, 2019). The aim is therefore for new executives to receive an even more specialised profile that meets the relevant service needs of their departments. These profiles include, among others, basic competences such as 'good regulation of public policies', 'legislative-technical training principles for regulatory acts' and 'legislative analysis of public policies'.

As the enabling conditions for digital transformation across levels of government include interoperable and clear regulatory and legislative systems, EKDDA promotes all levels of interoperability (Papastylianou et al., 2019), including legal interoperability. Between EKDDA's priorities, a building block and policy levers are in place to secure a new system for legislative preparation and the elaboration of regulations, in order to support the coordination efforts for better regulation and good governance across the different sectors of government. However, though the decision to develop legislative leaders constituted an important innovation, there was still no relevant competence framework that the law-making and management.

ESDDA (the School), which is a distinct entity within EKDDA (the Centre), followed these developments. ESDDA's curriculum was reformed in view of the interconnection of the educational process with the recent developments in the organisation and digital operation of the Greek public administration. These changes that have been introduced in the legal order through law 4622/2019 on the "Executive State". Furthermore, following evacuation of the InCiSE 2019 report, ESDDA has adjusted/reformed its curriculum for the production of profiles. As a result, among the new curriculum's dimensions, one may locate law policy levers to streamline the institutional process and promote new methods for an improved national system of regulation.

3. Course methodology, implementation and evaluation

ESDDA designed and offered different types of courses and workshops, making a learning path for legal professionals consisting of, but not limited to: Good Legislation in Practice: Drafting of Regulatory and Accompanying Texts, Drafting of Public Documents, Public Consultation, Legislative Preparation and Elaboration of Regulations Workshop and most recently Laboratory for Legislative Drafting and the Processing of Regulatory Texts. The

latter constitutes the vehicle based on which the interoperability laboratory was structured and is going to be closely discussed. These courses have the potential to advance law-making capabilities within the public administration.

To design the learning workshop "Laboratory for legislative drafting and the processing of regulatory texts" a new mixed-method was utilised using open collaboration, co-creation and leverage with IT tools (Valverde-Berrocoso et al., 2020). This approach included simulation of the law preparation and consultation process with a project and problem-based learning method (De Graaff & Kolmos, 2007), to extract specific results in all building steps (Chen & Yang, 2019). E-learning techniques enhanced the participative dimension by using various open tools, open standards and mechanisms such as Google collaboration tools, the LEOS app and the European Legislation Identifier (ELI).

In particular, as an innovative collaborative initiative, this laboratory (eventually turned into a workshop, see section 4) aimed at familiarising the students with the procedures of co-formation of legal rules through their active participation and simulation of the entire process using standard tools and an adapted Salmon e-learning methodology (Zalavra & Papanikolaou, 2022). The workshop has been run via an e-learning management tool using additional cooperative IT tools. During the workshop, students actively participated, adopting specific roles in legal preparation processes, via special breakout teams inside Webex and giving feedback (Mateescu et al., 2021).

The design and delivery process passed through the following six-step process: instructional design; community building; collaborate learning; law co-formulation; simulation in real environment and optimisation and course evaluation (see Figure 1). The first step included the preparation by educators of specific material with empirical data that was given to students via e-class, EKDDA's e-learning system. The entire project was designed in different phases and the appropriate deliverables were described step by step.

Figure 1: The laboratory's six-step design and delivery process.

The next step (#2) foresees the making of virtual teams with equal rights to communicate and collaborate inside the digital Webex environment. This was followed by the learning process (#3) to define the structure and key features to formulate appropriate legal documents. Policy requirements were formulated using standards such as core vocabularies (Core Public Service Vocabulary Application Profile (CPSV-AP)) and facilitating the drafting of regulatory texts via LEOS.

In the fourth step, students try to apply what they have learned. The application of basic standards and ontologies for the development of legal texts is conducted under the educator's guidance. They also find and mark the semantic and legal metadata of the legal texts and identify the building blocks of legal documents. The fifth step sees the students simulate the full process of consultation and/or law-making while acting in different roles (co-formulation). Emphasis is placed on the role of a staff member in the formulation of institutional/policy rules.

The role and opinions of the stakeholders during the open consultation process through www.opengov.gr are also to be discussed and taken-into-account. During this step, stu-

dents experiment with real data to manage and optimize the law-making process. This step contributes to the optimisation of knowledge on law-making techniques, the utilisation of consultation feedback to improve law-making and the acquiring of techniques to understand the identification, referencing and reuse of legal information. Ultimately, the course is systematically evaluated throughout the learning process. Evaluation is conducted by all partners, students, teachers and instructional designers who give constructive and immediate feedback.

4. Laboratory and course description

On 15 April 2020, the ESDDA management issued two decisions in relation to the drafting of the educational material and designating the course trainer, respectively. As there was no prior experience (nor material) to rely on, the relevant manual and the technical preparations for the lab needed to be designed from scratch. According to the School's curriculum for the semester, the course had to take place between the end of May and mid-June 2020, thus there was limited time available to put together the necessary resources. A working group of three experts (coordinator, drafter and expert) took over the making of the training material (manual), which was eventually uploaded as an e-book to the School's online repository eClass by early May. The manual's language is Greek. At the same time, preparations were made to set up a state-of-the-art computer lab as a training facility to host the course and future courses.

These preparations came abruptly to an end shortly after the above management's decision as it became clear that due to the pandemic it would no longer be possible to hold classes or organise laboratories with physical presence in the coming semester. In effect, the management decided that the course needed to be held online. This change had a profound effect on the course's preparation, as an actual laboratory could not be set-up in the School's premises. Under the pressure of time and uncertainty during this period, the decision was made to authorise the trainer to lestablish the necessary ICT infrastructure locally, including the installation and configuration of the necessary software tools. The course would take place online –via the Webex video conferencing tool and the legal informatics tools and processes would therefore be visually demonstrated.

Eventually, the course, which was titled Laboratory for Legislative Drafting and the Processing of Regulatory Texts, took place fully online. Following the original plans for physical teaching and interacting with state-of-the-art law-making tools, the online course was separated into three teaching units of four hours each that together are estimated to correspond to a half (0.5) ECTS credit. Table 1 briefly summarises the contents of each teaching module.

Table 1: Teaching units.

Module	Date	Duration [h]	Title
1	27/05/2020	4	Legal informatics theory and standards
2	03/06/2020	4	Legal informatics in practice
3	10/06/2020	4	Methodology of legislative drafting

The first module links the course with previous courses within the ESDDA environment, such as E-Government and Digital Transformation and Information Systems and Databases and introduces the basic notions of legal informatics. The basic legal documentation standards and ontologies are discussed, particularly Akoma Ntoso (AKN), European Legal Identifier (ELI) and Data Catalog Vocabulary (DCAT), followed by a series of system case studies from the European Parliament and US Congress. The second module offers a structured approach in the application of methods of advanced modelling and analysis of legal documents. The texts are broken down to their ontological and semantic elements, which are then matched to the attributes of existing standards and vocabularies. The evolution and state-of-play of authoring tools are discussed, while putting an emphasis on LEOS, its architecture, basic configuration and limitations. The final module is fully dedicated to the study of a use-case from the Hellenic legal order. Using LEOS, the selected legal document is gradually transferred into AKN-compatible XML format and metadata is added. The course concludes with the evaluation of the transformation product and a structured discussion on the future of legal informatics systems in the public service, during which the students' thoughts are captured using online polling.

The course has a dual purpose: on the one hand, to promote the broader understanding of the need for drafting and managing of structured legal documents and to familiarise students with the configuration and use of appropriate software tools, on the other. During the course, the students had the opportunity to acquire both general and specialised knowledge on legal informatics theory and tools. Through the practical nature of the course, students developed important skills that provide them added value as public administration employees and managers. The development of a positive attitude towards upcoming technological challenges has the potential to transform students into "ambassadors" of similar systems, thus increasing diffusion of specific knowledge in broader areas of the administration.

The decision to locally install and configure LEOS (R3.0.0), an ISA2 solution and a web-based authoring tool that facilitates cooperative drafting of legislative texts [24], had serious implications in the organisation of the interoperability lab. Lacking a physical computer lab and technical assistance from the school's side, an alternative solution had to be sought, given the considerable technical complexity for installing, configuring and parametrising the open-source tool. The Hellenic OCR Team, https://hellenicOCRteam.gr, a scientific crowdsourcing initiative and an expert network for the processing and analysis of governance and parliamentary data volunteered to provide the necessary services. With

assistance from its development group and guidance from the LEOS Team at the Directorate-General for Informatics (DG DIGIT) of the European Commission, a functional LEOS instance was made available within a couple of weeks.

From the beginning it was clear that the online demonstration would hamper student's interaction with the tool. Early ideas to support students installing standalone instances of the software on their personal computers were abandoned due to configuration complexity and the limited time available for relevant preparations and testing. Shared desktop solutions for direct interaction have also been taken into account but left aside for future consideration, as the overall course time for the purpose was limited to one module (see module 3). Other open-source software used in the framework of the interoperability lab included the Notepad++ text editor (with the XML Tools plug-in), https://notepad-plus-plus.org and Protégé (R4.3) for ontology development, https://protege.stanford.edu. Their analytical description, however, evades the scope of this article.

With the software in place, a proper use-case needed to be determined, in the form of a concise and preferably recent legal document, to demonstrate LEOS functionality in a laboratory environment. For educational purposes, the choice was made to select a short regulatory text, rather than an excerpt from a lengthier one, so as to showcase the tool as a potential end-to-end solution.

As the laws of the Hellenic Republic are usually lengthy legal documents, a one-pager, a presidential decree (proedrikó diátagma, PD) was selected for the purpose (PD 16/2020, Government Gazette A'29). This decree has specific key structural elements shown in Figure 2, which were modelled on the embedded AKN template that LEOS legal documents rely on, e.g. title, references, articles, date and signatures. In particular, during the course, a detailed mapping of the steps required to fully transfer the above legal document into the LEOS environment and export it as open legal data was attempted (walkthrough). It is noted that the LEOS editor does not yet provide for a dual-column layout. This traditional format however does not necessarily need to apply, nor is it practical in the early law-making phase.
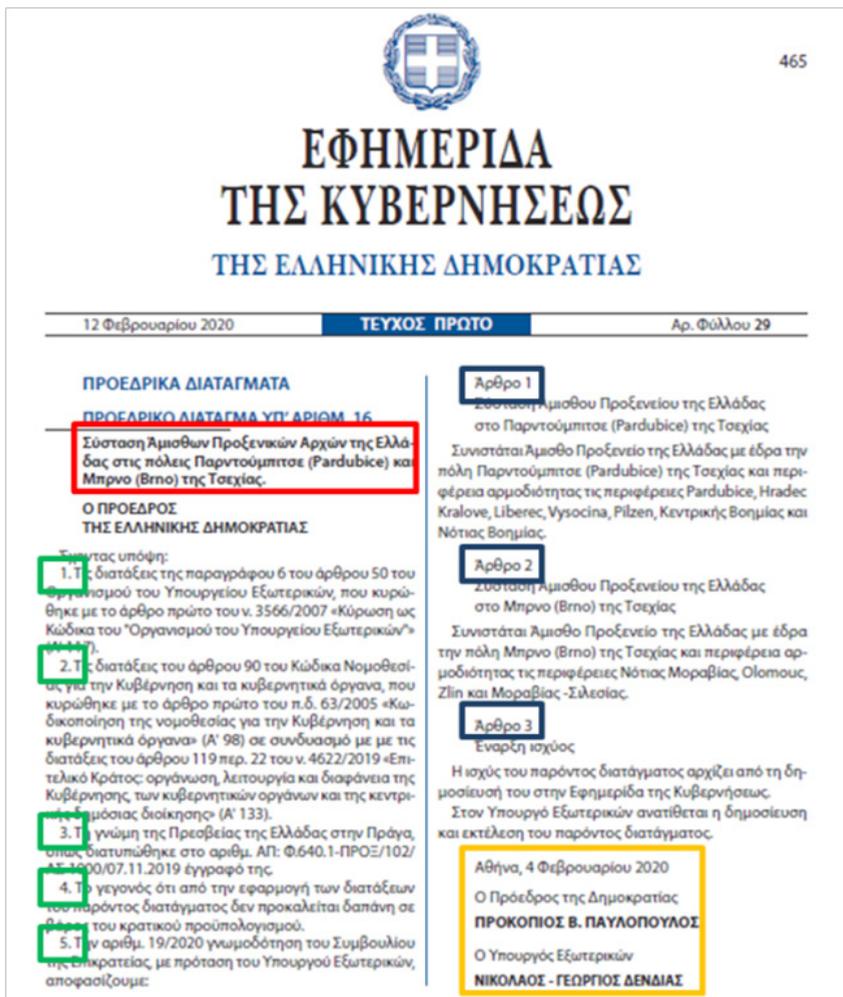
Figure 2: Document breakdown. Coloured boxes indicate different elements: title (red), references (green), articles (blue), and date and signatures (yellow).

Several technical and other challenges needed to be tackled, some of them already mentioned, to successfully offer the course. One of them had to do with the use of technical language. Once again, it needs to be highlighted that this was a selection course offered to interested students with different backgrounds, both technical and non-technical. Hence, the presentation of this emerging topic with a highly technical background needed to be carefully prepared and, in a way, not to scare-off or quickly disinterest non-technical savvy students. Figure 3 shows the distribution of the student's major academic degrees for this pilot course:

- Law, 10%
- International Studies, 20%
- Computer Science and Engineering, 30%
- Economics, 40%

Overall, ten students from the 26th ESDDA class took the course. To further assist the students in the understanding and studying of the greater topic, a "digital backpack" was made available to them, in addition to the manual. This included the lab's outline, the online presentations and rich supplementary material such as legal texts, scientific articles, reports and software.
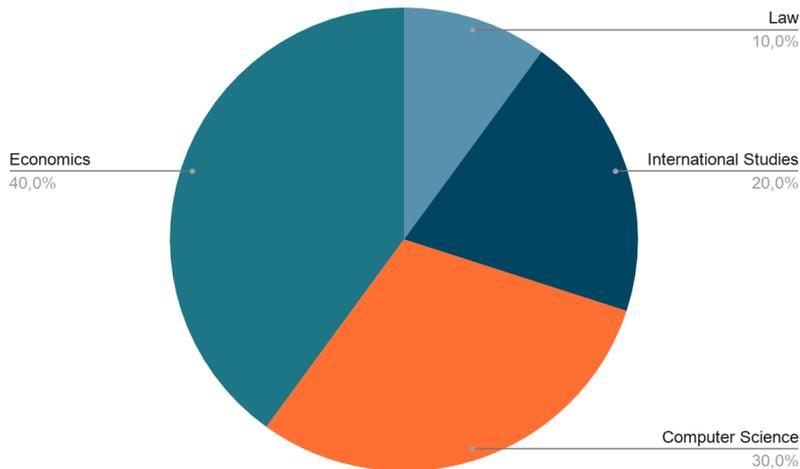
**Figure 3:** The pilot class' academic background.

The lab and the use-case together made a proof-of-concept that can be immensely useful when considering the implementation of similar legal informatics tools and related services in the public sector. Therefore, all steps, internal and external to the School, were meticulously designed and documented. For this, different metrics were captured for course evaluation and lessons-learned were recorded (see section 5 and section 6, respectively). This publication constitutes further evidence of this structured approach.

5. Evaluation of results and discussion

The tools and course were thoroughly evaluated using a variety of data collected during and after the educational process. An ESDDA survey evaluated the laboratories of the 26th

educational series. These results are presented and discussed vis-à-vis the outcomes from the interoperability lab, which took place during the second special study phase. This phase hosted eight laboratories with a total of 102 students. Ten students attended the interoperability lab. Overall, 88 students responded to the questionnaires (response rate R = 86.2%). Evaluation was both qualitative (regular expressions allowed; some are quoted below) and quantitative (10-point Likert scale, value: L).

Figure 4 (left) shows the outcome of the evaluation for five distinct laboratory parameters mostly in relation to organisational issues, such as course organisation, course content, content coverage, quality of training material and examination type. While the rest of the labs generally perform well (mean average L = 8.9, standard deviation σ = 0.22), when it comes to the LEOS lab, there is a significant difference of approximately -9% on average for the same parameters (σ = 0.38).
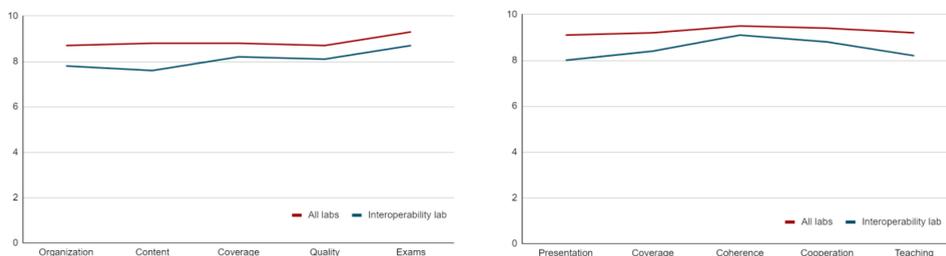
Figure 4: Laboratory (left) and training (right) evaluation.

On some occasions, lower grading can be rationally explained. This is, for instance, the case in the course's organisation that also takes into account the teaching hours necessary to cover the topic – a number that is 50% lower than that originally envisaged. The limited course time and the interaction with the tool were not left uncommented on by the students, who noted that 'maybe it would be better to restrict the introductory modules … to spend more time in learning the program'.

It is interesting to see that differences also exist where they should not, such as in the examination type (performance in laboratories is principally not graded). This was criticised by students who would have wished a performance 'evaluation with grading' criteria. Yet, the overall consistent difference in course grading, also true for the training parameters, could be attributed to structural circumstances rather than occasional discrepancies.

The training dimension was captured when evaluating the relevant parameters, i.e. the attributes of the laboratory that are linked to the trainer's performance. The parameters that were evaluated here are: presentation of the topic; content coverage; coherence/consistency; co-operation; and means/ways of teaching (see Figure 4, right). The results here are similar to those highlighted above (mean average L = 8.5 / σ = 0.40, for the interoperability

lab; mean average L = 9.3 / σ = 0.15, for all other labs). Regarding teaching, quantitative results appear not to be in-line with the qualitative results. The lab and the related course were tagged as 'very good initiative(s)', as well as 'necessary … for the newly established (legal informatics) sectors'. Some students went even further to suggest the 'horizontal application of the course in each phase of studies'.

Before stating the deeper reasons for the clear deviation, one must first bear in mind that a direct comparison between established and pilot laboratories might be an unfair one. Moreover, it needs to be underlined that the (pilot) interoperability lab was at this stage the only actual computer lab in an otherwise theory dominated institution; all other laboratories offer practical insights, methods and approaches without the use of ICT means. Moreover and to a certain degree, deviation may stem from the lack of interaction with LEOS, in that how 'good' can a computer laboratory be, when there is no physical interaction with it? This feeling is further supported by students who would have wished for a 'real presentation of the tool' and for the lab to be hosted 'in the premises of EKDDA for the students to be able to handle and explore the program and its features'.

An issue to resolve in future laboratory courses is the lack of information towards prospective students. Frankly speaking, they did not know what to expect. Ex-ante provision of adequate information to students about the content and relevance of the interoperability lab and the related course, which can also filter-out students with different expectations, are considered paramount to avoid classes with different learning paces and intensities. Also, the benefits to the institution and to the students' career should have been highlighted in the original invitation to the course.

Several aspects of LEOS, such as its functionality, user-friendliness and technical specifications, were studied during the evaluation process. Those parameters provide for a clear picture of the pros and cons of this digital solution for a web-based cooperative law-making solution. Figure 5 displays a graphical summary of the results obtained via the *Mentimeter* online polling tool. The tool's functionality has been acknowledged by all students (100% describe LEOS as 'good' or 'very good'). User experience was sufficient, as 90% perceived it as 'good'. Technical specifications were surprisingly seen mostly as 'good' (80%) (for all the above, R = 100%).
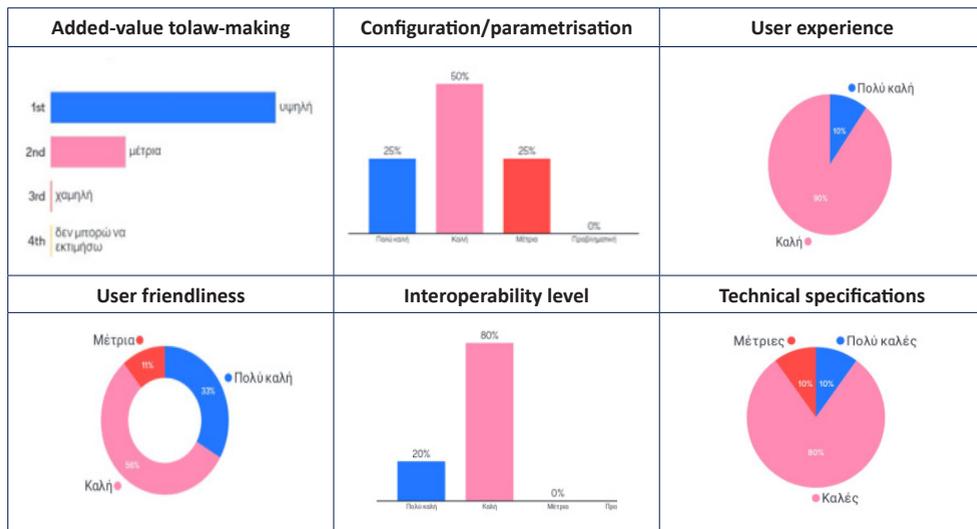
Figure 5: LEOS evaluation using online polling (original online polling output).

Overall, 78% of students believed that LEOS could provide 'high' added-value to the law-making process. Similarly, user friendliness is significant, with 89% having at least a 'good' opinion about the tool. Ultimately, its configuration, a matter of concern, was received with mixed feelings (for the latter three questions, R = 90%). These results are consistent with verbal comments from the School's evaluation conducted ex-post and are overall indicating a successful proof-of-concept of this solution for interoperability.

6. Concluding remarks and outlook

The article presented the current structured efforts towards setting up an interoperability laboratory and the accompanying course, in the framework of the Hellenic National School of Public Administration and Local Government. Ultimately, the lab was successfully organised and the course was conducted online. An ISA2 solution, LEOS, served as an authoring tool and the primary interoperability hub. The whole exercise was also a feasibility study, as LEOS turns out to be increasingly interesting for public administrations as an authoring tool for legal documents. While in operation, good functionality and user experience were recorded. Therefore, it is concluded that the tool can potentially offer added-value to the law-making process due to the reduction in time and effort of the drafting and processing of bills. On the other hand, current installation and configuration issues, the tool's open-source nature and its midline position in the development pipeline, may form high-entry barriers.

The lessons-learned during the implementation of this proof-of-concept, have helped to

build a solid base for the development of linked interoperability labs and extension courses, while a connection with the newly formed Interoperability Academy (n.d.), which runs under the ISA2 umbrella, can promote the exchange of good-practice within an ever-changing framework (Kalogirou et al., 2022). Nonetheless, this interoperability lab also had severe limitations, the most important being its virtual nature. Thus, the transformation of this pilot concept to a wider (and physical) demonstrator has already been proposed to the School and an operational LEOS installation in the pre-production phase within EKDDA could further strengthen local expertise, help engage other stakeholders from the public service and beyond and gradually create a community of practice at the national level.

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