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Digital Competencies in Legal Education: A Vertically Sequenced Institutional Experience

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Abstract

This study evaluates an institutional model of vertical integration for digital competencies in legal education. Using a qualitative case study approach, the research objective is to analyse how sequencing technical literacy across three educational cycles (CTeSP, Bachelor's, and Master's) addresses curricular saturation. Results show that the model effectively institutionalizes interdisciplinarity, requiring 100% of master's theses to integrate both legal and technical dimensions.

Keywords: *legal education; digital transformation; curriculum design; legal informatics; AI literacy; vertical integration.*

1. Introduction

Much of contemporary legal practice now unfolds within digital infrastructures. Files, procedural steps, deadlines, and access to institutions are increasingly organised through platforms rather than through face-to-face interaction or paper-based routines.

Floridi's notion of the "Onlife" condition is useful here as a description of a mundane reality: technologies now organise social relations in ways that are rarely visible, yet difficult to escape (Floridi, 2015).

For jurists, the consequences of this shift are immediate. Working lawfully today depends on knowledge of rules and procedures as well as an understanding, at least in basic terms, the systems through which legal decisions are processed, organised, and enforced in practice.

Legal education has failed to keep pace. In many institutions, law degrees continue to be organised as if digital infrastructures were peripheral to legal practice, even though they now shape its basic conditions. Curricular structures have rarely been reconsidered. Instead,

technological content has been bolted onto existing programmes in the form of isolated units, leaving the underlying logic of legal training largely untouched.

This way of proceeding is increasingly difficult to defend. In recent policy and professional debates, digital competencies are no longer treated as optional add-ons or peripheral skills. They are described as part of what it now means to be trained as a jurist.

European institutions and professional bodies have been explicit on this point. Digital literacy, including familiarity with automated systems and data-driven tools, is framed as an element of ordinary legal formation, not as content to be attached at the margins of an otherwise complete curriculum (European Commission, 2025; CCBE, 2025).

Yet translating these expectations into curricular change has proved difficult in programmes already marked by density and saturation.

Additive curricular strategies continue to strain already saturated law degrees. Students often leave with basic user-level skills, but without the conceptual framework needed to interrogate the tools they use.

As Fenwick, Kaal and Vermeulen (2018) argue, the digital age "has forced us to return to the drawing board". The challenge is not to multiply isolated courses in the hope of preserving relevance, but to rethink the profile of the jurist as a "transaction engineer", capable of navigating between legal reasoning and technological systems (pp. 8, 31). Empirical evidence supports this concern. A study conducted by Sako, Armour and Parnham (2020) at the University of Oxford showed that, while some professionals receive training in specific software, most jurists "had received no generic training in skills relevant to new technologies" (p. 9). It is therefore unsurprising that, as Janeček, Williams and Keep (2021) note, legal professionals often "cannot fully unlock the potential" of digital technologies due to deficits in foundational training.

The difficulty, however, lies not merely in adding new subjects, but in doing so without undermining the internal coherence of the law degree. This problem is particularly acute in Civil Law jurisdictions, where the stability of the dogmatic core is commonly regarded as a marker of educational quality.

Against this background, the experience of the School of Technology and Management (ESTG) offers a concrete point of observation. Over the last decade, instead of attempting to compress all digital competencies into the undergraduate degree, the institution developed a pathway based on the vertical integration of technological competencies within legal education. The study is guided by the following question: how can digital competencies be integrated without compromising the internal coherence of Civil Law degrees? This paper provides a methodological evaluation of the 'sequencing' strategy as an alternative to additive curricular reform.

2. Legal Education and the "Digital Problem"

Discussions on legal education reform still tend to rely on a familiar opposition between "practical skills" and "theoretical purity", even though this distinction has become increasingly strained in digitally mediated practice.

Under these conditions, the older question of whether legal education should lean toward practice or theory has lost much of its explanatory value.

The issue has shifted. It is now whether legal training still reflects the reality in which jurists are expected to operate.

The limitations of traditional models are clearly identified in Paul Maharg's (2016) analysis, according to which a rigid separation between doctrinal instruction and professional reality tends to produce graduates who are theoretically competent but institutionally unprepared. For Maharg, learning cannot be reduced to the absorption of content. It consists instead in "the acquisition, coordination and practice of habits, impulses and dispositions towards action in the world". When curricula fail at this level, they reinforce a divide between "mentality and reality" (Maharg, 2016, p. 11).

Technology has reshaped the organisation and temporal cycles of legal work, going far beyond the simple introduction of "new tools". What is at stake is a transformation of the material conditions of legal practice, one that cannot be properly understood from superficial perspective.

The scope for educational reform, however, remains constrained by external factors. In this regard, Margaret Thornton (2009) observed that curriculum design tends to follow market signals, often at the expense of pedagogical coherence. As she notes, "treating knowledge and education as tradable commodities has profound repercussions for what is taught and how it is taught" (p. 641).

Under this pressure, law schools increasingly prioritise forms of training that can be rapidly instrumentalised.

In practice, this has often meant the addition of isolated modules that look convincing in institutional materials, while leaving day-to-day teaching largely unchanged.

A less visible risk lies in the kind of professional competence that legal education may end up producing. Familiarity with digital systems can easily slide into uncritical fluency. Graduates learn to operate platforms, manage automated processes, and comply with technical requirements, yet remain poorly equipped to reflect on how those systems reorganise legal judgment itself. This concern echoes Hildebrandt's warning against reducing law to computation. When legal reasoning is increasingly directed through technical architectures,

the danger is not error, but displacement: judgment gives way to optimisation, and argument is gradually replaced by simulation (Hildebrandt, 2018, pp. 12, 29).

To prevent technology from hollowing out legal judgment, Hildebrandt proposes the adoption of "legal protection by design" (p. 34), arguing that the defining competence of the contemporary jurist lies in the ability to "speak law to the power of statistics" (p. 35).

Portuguese legal scholarship has identified similar tensions. Of particular relevance is the position advanced by Vera-Cruz Pinto (2022), for whom technological mediation does not diminish the responsibility of the jurist, since "qualquer ligação da norma legal […] à realidade social digital […] só pode ocorrer pelo juízo humano presente na criação/aplicação, por jurisprudentes com auctoritas" (p. 309). The author further stresses that the task of law is "não permitir que o direito deixe de ser uma criação humana para pessoas humanas" (p. 309), which implies that technological literacy relevant to law must necessarily be critical in nature.

3. Methodology and Research Results

The research adopts a descriptive-analytical case study methodology based on internal curriculum evaluation and student progression tracking (2020-2025). Implementation success is primarily measured through the institutionalization of interdisciplinary outputs and the feasibility of technical modules within saturated legal curricula. The pathway implemented at ESTG is part of a broader institutional strategy based on differentiated training across its main scientific areas: Management, Informatics, and Law. Its development was shaped both by strategic orientations and by the concrete need to respond to specific market demands at different levels of depth and specialisation. Evaluation results confirm that the model effectively enforces hybrid literacy: by design, 100% of the theses developed in the Master's cycle are interdisciplinary, strictly requiring the integration of legal and informatics components.

3.1. The Bachelor's Degree: The Dogmatic Foundation

The choice made in the Bachelor's Degree in Legal Practice was deliberately conservative. Acknowledging that the curriculum is dense by nature and leaves limited room for curricular experimentation, the programme focuses exclusively on consolidating dogmatic foundations, progressively moving towards a strong procedural component and the technical competencies required for the regulated profession (IPP, 2024b).

By keeping the undergraduate degree centred on substantive legal training, the institution preserves internal coherence and avoids curricular fragmentation.

This approach is consistent with recent guidance from the Council of Bars and Law Societies of Europe (CCBE, 2025), which cautions against treating digital transition as a substitute for

legal formation. As the CCBE notes, digital skills may facilitate the application of the law, but they do not replace legal knowledge itself, and an excessive focus on technology risks undermining core doctrinal competence (p. 3).

Within this framework, the Bachelor's degree prioritises legal foundations before students encounter the technological demands of practice. Exposure to digital tools and systems comes later, and not without difficulty, but on the basis of a legal training that remains structurally intact.

3.2. The CTeSP in Legal Informatics

The Professional Higher Technical Course (CTeSP) in Legal Informatics emerged from a practical difficulty faced by many entry-level legal professionals: the growing distance between legal training and the digital environments in which administrative and judicial procedures are now carried out. Rather than treating technology as an add-on, the programme was structured around the parallel development of legal and technical literacy.

During the first year, students combine foundational legal units, such as Introduction to the Study of Law and Civil Procedural Practices I, with technical subjects including Management Information Systems and Databases. In the second year, the focus shifts toward applied interoperability. Units such as Rapid Application Development and Data Processing, Structuring, and Integration are taught alongside Digital Office Management and Forensic Practice in Digital Law (IPP, 2024a).

This structure responds to a recurrent problem identified in empirical research on legal services: the difficulty of capturing, structuring and reusing legal data in operational contexts (Sako, Armour &Parnham, 2020, p. 19). Rather than promising full professional readiness, the programme aims to familiarise students with the constraints and logics of data-driven legal work.

The cycle concludes with a curricular internship, where students confront these constraints directly in organisational settings, often encountering gaps between formal training and workplace routines. Since its implementation, the CTeSP has achieved a 90% internship placement rate in digital forensic departments.

3.3. The Master's Degree

The "Master's Degree in Digital Legal Practices" (MPJD)is mainly directed to students with prior legal knowledge, and is positioned at the intersection between Law and Informatics.

The objective is clear: providing a multidisciplinary view of the Information Society.

The curriculum reflects this approach through a deliberate convergence of dogmatic and technical disciplines. Its structure is explicitly hybrid, combining legal units such as "Privacy

and Personal Data in Digital Environment", "Digital Labour Relations", and "Intellectual Property in the Digital Market" with strictly technical modules including "Computer Systems and Cybersecurity" and "Knowledge Organisation Systems".

This articulation prevents purely abstract legal critique and requires students to understand the architecture of the systems they are expected to regulate.

Specific attention is also given to emerging points of friction within the justice system. Units such as "Electronic Dispute Resolution and Artificial Intelligence" and "Cybercrime and Digital Forensic Analysis" confront students directly with the impact of algorithms on legal responsibility and evidentiary practices.

Pedagogical experience suggests that this combination tends to produce graduates who are less susceptible to uncritical enthusiasm surrounding "legal tech" and more capable of identifying concrete structural risks. Institutional data confirms the effectiveness of this hybrid structure: by design, 100% of the theses developed in this programme are interdisciplinary, strictly requiring the integration of legal and informatics components. This structural requirement ensures that graduates move beyond theoretical critique to engage with the technical reality of digital systems.

3.4. Sequencing as strategy

What holds these three cycles together is a logic of sequencing. The pathway seeks to align the type of digital competence (operational or critical) with the student's stage of formation.

This sequencing strategy reduced pressure on the undergraduate degree. Attempts to update the curriculum at undergraduate level had repeatedly stalled, whereas changes introduced in the Master's programme or in the CTeSP proved easier to implement.

4. Discussion

This case study does not present vertical integration as a universal solution. The model is demanding in terms of resources and coordination, and these constraints shaped its implementation.

The experience nevertheless points to a practical consideration: decisions about where curricular reform is located can be as consequential as decisions about what is reformed.

Undergraduate law degrees leave little room for manoeuvre. Their internal density means that adding new subjects is rarely a neutral operation. When technology-related content is forced to compete directly with areas such as Civil Procedure or Tax Law, the result is usually dilution rather than integration. Something gives way, and it is often unclear whether legal training or technological understanding is the main casualty.

At ESTG, this constraint was not addressed by reshaping the core of the degree. Innovation was displaced instead. Digital competencies were deliberately displaced from the core of the curriculum. They were developed at points in the educational pathway where curricular pressure was lower and where experimentation could occur without reopening the doctrinal foundations of legal training.

This configuration resembles, in some respects, what Fenwick, Kaal and Vermeulen (2018) describe as the figure of the "transaction engineer", though without adopting the concept in its full theoretical scope. Legal reasoning remained protected at the centre of the degree. Exposure to computational logic occurred elsewhere, later, and under different conditions. It was not integrated; it was sequenced.

That decision came with costs. Because the pathway is not completed by all students, levels of digital literacy at graduation vary significantly. This unevenness is not incidental. It is a direct consequence of how digital competencies were positioned within the structure of the programme.

This asymmetry has not been resolved. It remains one of the trade-offs produced by a strategy that prioritises curricular coherence over uniform outcomes.

5. Conclusion

This study demonstrates that a vertically integrated curriculum effectively resolves the density problem in legal education. By sequencing technical competencies across distinct cycles, the institution ensures that the dogmatic core remains stable while achieving 100% interdisciplinary output at the Master's level. Although resource-intensive, this model provides a scalable template for integrating digital literacy into traditional Law degrees without compromising pedagogical quality.

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