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# LEGIT Methodology: Towards Capturing Legal Compatibility of Design Science Artifacts

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**Abstract.** Higher legal standards with regards to the data protection of individuals such as the General Data Protection Regulation (GDPR) are increasing the pressure on developers of IT artifacts. Typically, when developing systems, we subsequently evaluate them with users to elaborate aspects such as user experience perceptions. However, nowadays, other evaluation aspects such as legality and data policy issues are also important criteria for system development. For this purpose, we introduce LEGIT (legal design science evaluation), which provides developers with guidance when considering legal requirements. We use the case of the GDPR to illustrate the feasibility, applicability, and benefit to the development process. With this novel method adapted from law research, we are able to derive actionable guidance for developers to evaluate developer efforts in increasing legal compatibility. To illustrate our methodological approach, in this paper, we describe the key steps of the method with respect to the evaluation of a learning assistant. We develop an AI-based learning assistant for university students to demonstrate the application of the novel evaluation method. We briefly discuss how this procedure can serve as the foundation for a new evaluation method of legally compatible systems in design science research.

**Keywords:** Legal Compatibility, Evaluation Methodology, Design Science.

## 1 Introduction

One major goal of design science research (DSR) is the development of innovative and novel artifacts to solve real-world problems of business and society. However, these novel IT artifacts bring new risks, e.g., legal risks, which are sometimes not anticipated correctly beforehand [1]. Consider the practical cases during the COVID-19 pandemic to illustrate this area of conflict between useful IT artifacts and legal risks quite well: video conferencing tools such as Microsoft Teams or ZOOM were (and still are) facing legal disputes questioning their legality and legal compatibility. Numerous COVID-19 tracing apps have dealt with conflicts related to how to balance the usefulness in tracking and meethind regulation rules such as the GDPR. Thus, legal and data policy aspects have always been important for many companies to avoid reputational risks but gaining

importance due new conditions such as novel IT artifacts, negative media reports and increasing end-user interest in legal aspects.

Typically, when developing systems, we subsequently evaluate them with users to elaborate on if our system design is appropriate, e.g., regarding usability, user experience perceptions, or outcomes of IT use, which we evaluate through evaluation frameworks such as [2] or [3]. However, nowadays, other evaluation aspects, such as legality and data policy issues, have also become important criteria for system development. Nonetheless, we usually do not evaluate legal aspects when deploying these systems, oftentimes caused by the lack of appropriate evaluation methodologies for legal aspects when considering novel systems. In this context, simulations are a great support for IT development. They help to visualize and play through abstract content quickly and without great effort [4]. As a rule, individual parameters can be easily varied to achieve the best possible results. In consequence, we draw on these advantages for evaluating legal aspects by imitating real-world usage of systems. With the possibility to play through different system development parameters under realistic conditions, changes can be made relatively easily during the development. Thus, the simulation study introduced by the law discipline [5] provides a method-based foundation to evaluate technology in a practical manner concerning legal compatibility.

Therefore, we propose in the following a comprehensive evaluation methodology, which we call LEGIT (legal design science evaluation), that provides developers with guidance when considering the legal requirements in DSR, especially related to the GDPR. For the application of the novel evaluation methodology, we develop an AI-based learning assistant for university students, with two overarching but somewhat conflicting design goals: (1) a high user experience that offers as much support during learning processes as possible but (2) also considers legal compatibility, i.e., achieving a higher legal standard than is required by law. LEGIT allows us to implement and evaluate our ideas for a legally compatible AI-based assistant to get feedback at an early stage, which can be used for the further development of the AI-based assistant.

## **2 Theoretical Background and Related Work**

### **2.1 Legal Compatibility**

We have to pay attention to the requirements from various disciplines to develop design science artifacts, such as user experience, ethical, and legal requirements. Requirements such as user experience are given much attention during the development, while legal requirements are often addressed to a minimum extent in order to be compliant with the minimal requirements of law [6]. Today, higher legal standards with regards to the data protection of individuals increase the pressure on development [7]. Data protection is gaining importance, and thus the storage and processing of personal data are becoming an integral part of system design. Legality decides on the market approval of novel technologies, which means the fulfillment of minimum legal requirements, and is still common practice in many system developments projects. Legal compatibility goes further than mere legality and is defined as the greatest possible compliance with higher-order legal goals to minimize the social risks from technical system use [6].

However, the technology neutrality of law always leaves some room for maneuvering in the implementation and interpretation of the legal requirements, which leaves developers and companies uncertain about whether they have achieved legality. In times where data policy issues have been gaining in importance for developers, especially since 2018 due to the GDPR, there is a growing body of literature that recognizes the importance of the relevance of the consideration of data protection in technical systems, so we should keep legal aspects in mind early on in the development [8–10].

## 2.2 Legal Evaluation Methodologies in Design Science Research

In DSR, evaluation is a central and essential activity in conducting rigorous research [11]. According to Sonnenberg et al. [2, p.386], “Prior work already pointed out that evaluation in DSR may address either the artifact design (i.e., the artifact characteristics) or the actual artifact as it is used by some relevant stakeholders.” Aspects critical to law are only revealed through real use; thus, the use of the artifact in a real-world scenario by relevant stakeholders should be an evaluation under real-world conditions. Peffers et al. [12] distinguish between ex-post evaluation methodologies in DSR that provide the foundation for an evaluation of legal disputes in real-world scenarios. Combining these real-world conditions with the previous influence on the boundary conditions of the real-world use by simulating a real-world case setting, we demonstrate how to consider legal requirements in the up-front design of the DSR evaluation.

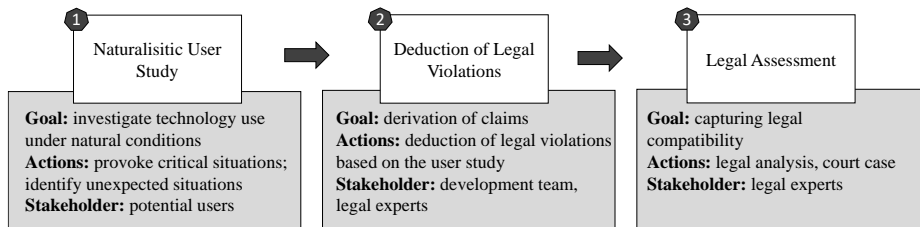
In contrast, from the legal discipline, we know the approaches of [13], and [1] and how simulating legal violations can be used as a method to evaluate technology in a practical manner in regard to their legal compatibility, which is well-known as a simulation study among lawyers in European law [13]. Similar forms of the simulation study are already used in legal education in America and are called moot courts. In contrast to moot courts, the simulation study involves real judges and lawyers with practical experience and does not pursue the education of lawyers but rather the evaluation of novel technologies. Along these lines, the simulation study, as a form of preventive technology design, can make a substantial contribution towards socio-technical design [5]. In the following, we adapt the simulation study to achieve our goal—the introduction of LEGIT as an evaluation of DSR artifacts to capture legal compatibility.

## 3 Key Steps of LEGIT

In the following, we describe how we deduced our LEGIT methodology on evaluating the legal compatibility for DSR projects (see Figure 1). Thus, the first part of LEGIT is characterized by the fact that it allows the simulation of realistic usage scenarios while real (user) damage is prevented. This was achieved by letting participants use the technology under real-world conditions that were as realistic as possible [1]. However, as there were no imminent dangers in the fictional usage situations for the participants, it was desirable to provoke critical situations and situations of conflict that would not occur in such a high concentration [5].

In summary, conducting the user study should have two things in mind. First, by provoking critical situations, the user study will provide insights into the handling of the situations by the user. Second, through the interaction with the artifact in a real-world situation critical situation can also arise that were not previously considered.

In the second part of LEGIT, we move slightly away from the users to get a reliable judgment on the legal compatibility of the developed artifact. In this part, legal violations based on the user study are derived. As described above, the violations were either provoked by designing the evaluation setting, in which case some violations may occur, but some that are expected do not occur in reality, or the legal variations were derived from usage without expecting them in advance. Thereupon, legal experts create court infringements to negotiate in court.









**Fig. 1.** Key Steps of LEGIT

The third part of LEGIT includes simulated court cases based on the deducted legal violation. Thus, the legal assessment can be conducted as realistically as possible with claims that could arise from the practical use. The simulated court cases are built on the outcomes of the first part of our study. The situations of conflict that were previously provoked will be discussed and judged by legal experts, simulating a real court trial. The selection of a range of cases to trial during the legal assessment that are of high importance in the daily use of the technology is an important step towards the success of the evaluation. Early evaluations (especially smaller projects) should use at least one experienced legal expert for this purpose. Extensive and advanced projects, on the other hand, should evaluate the simulated court cases as realistically as possible in several proceedings in order to avoid subsequent legal violations. The legal experts should have completed at least the second state examination and have initial practical experience.

## 4 Application of LEGIT

In this section, we demonstrate the application of LEGIT that was embedded in a larger AI-based assistant development project (see [14, 15]). The developed AI-based assistant should support a university course by providing individual learning support. A special feature of these systems is the individual adaptation to the user, which requires a large amount of user data. Among the user data are also personal data that are considered particularly worthy of protection according to GDPR guidelines. Consider, for example, the case of Amazon's Alexa, which activates itself when nobody is home or serves, as a consequence of its data collection efforts, as a witness in court (see also [16]).

Thus, AI-based assistants are a good way to apply LEGIT to evaluate the legal compatibility of this novel class of systems (see Figure 2).

Step	Naturalistic User Study	Deduction of Legal Violations	Legal Assessment
Stakeholder	 System User	 Legal Experts  Developer	Per court case (in total 4 court cases):  Judge  Lawyer Defendant  Lawyer Plaintiff
Data	<ul style="list-style-type: none"> <li>• Diary of practical use</li> <li>• Interviews with users</li> </ul>	<ul style="list-style-type: none"> <li>• Feedback from user study</li> <li>• Documentation of user study</li> <li>• comparable legal violations in the last 10 years (including practical experience of legal experts)</li> </ul>	<ul style="list-style-type: none"> <li>• Statement of defense</li> <li>• Four pretrial proceedings</li> <li>• Recordings of 4 court cases</li> <li>• Group discussion with legal experts</li> </ul>

**Fig. 2.** Application of LEGIT in the case of AI-based learning assistants

The goal of our evaluation is to evaluate an AI-based assistant. Our use case for deploying the learning assistant was a course for business administration that was taken by about 150 students. Thus, in the first part of our evaluation, we offered a course that, in addition to the lecture, allowed students to prepare for the upcoming exam together with the learning assistant. The user study allowed us to capture possible conflicts with the law beforehand. The deduction of legal violations included legal experts as well as the developer team. One exemplary cause of action was the disclosure of the learning data of individual students beyond the actual purpose—the use in preparation for the exam—for the decision of a job posting at the university. The legal assessment included four court cases in which the developed claims were negotiated.

## 5 Further Work and Expected Contribution

Our next steps include the establishment of LEGIT as an evaluation methodology in IS research. Thus, we will apply the methodology in different scenarios to derive adjustments to the methodology. For this purpose, we are working closely with legal experts. We contribute to DSR by transferring a method from law science to application development to anticipate the legal constraints both within the design process and after prototyping the use context of the future application. We furthermore add to the DSR methods a novel evaluation approach that has high external validity for anticipating the legal compatibility of novel applications before actually bringing them to market or even before building them. The application of LEGIT in a large development project demonstrates how legal requirements and their implementation may be evaluated early on and thus may derive feedback on the implementation and possible legal infringements. So far, the method has been limited to European law, which goes hand-in-hand with the fact that the European legal system is one of the strictest in terms of data protection [17]. Nevertheless, as part of the new scenarios, we will adapt the methodology for a legal system that is as international as possible.

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