INTEGRATING ETHICAL, LEGAL AND SOCIAL ASPECTS INTO COMMON PROCEDURE MODELS

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ABSTRACT

Many different procedure models can be applied to the management of software development projects. Such models also consider the ascertainment and management of requirements – based on very different agile or classic approaches. The framework provided in particular by ethical aspects, legal constraints and social technology design issues (ELSA or ELSI) is not explicitly addressed in procedure models, which is why approaches such as the IEEE Standard Model Process for Addressing Ethical Concerns during System Design (IEEE7000-2021) have been developed. However, the lack of explicit integration of these issues into common process models such as SCRUM or V-ModellXT implies a lack of necessary space for reflection on ELSA within development projects. The article discusses this problem and highlights possible solutions for further discourse.

KEYWORDS

Procedure model, ethics, law, social technology design.

1. INTRODUCTION

Many different procedure models can be applied to the management of software development projects. Such models also consider the ascertainment and management of requirements – based on very different agile or classic approaches. The framework provided in particular by ethical aspects, legal constraints and questions of social technology design (ELSA, or ELSI) is not explicitly addressed in the procedure models. Since software is developed in part for a large number of future use cases – some of which have little specific context – this makes the challenge faced by procedure models more complex (for example, those cases affected are not yet concretely known and therefore cannot be involved; instead, other ways of taking their interests into account must first be identified). The lack of explicit integration of ELSA considerations into common procedure models such as SCRUM or V-Modell XT implies a lack of necessary space for reflection on ELSA within development projects. This contradicts the importance of ELSA aspects as found in the ethical guidelines of the German Informatics Society [1] and other scientific [2] and social [3] sources. This article discusses this problem and highlights possible solutions for further discourse, including in a workshop format.

The second section presents the current state of the art in science and technology. The basics of process models are summarised, after which the section looks at how ELSA is currently consideredin existing general procedure models. Procedure models that specialise in ELSA issues are also considered.

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The third section presents four theses on the future consideration of ELSA in software development projects. These theses are intended to stimulate further discussion and lead to the further development of a systematic consideration of ELSA.

2. STATE OF THE ART IN SCIENCE AND TECHNOLOGY

2.1. Procedure Models

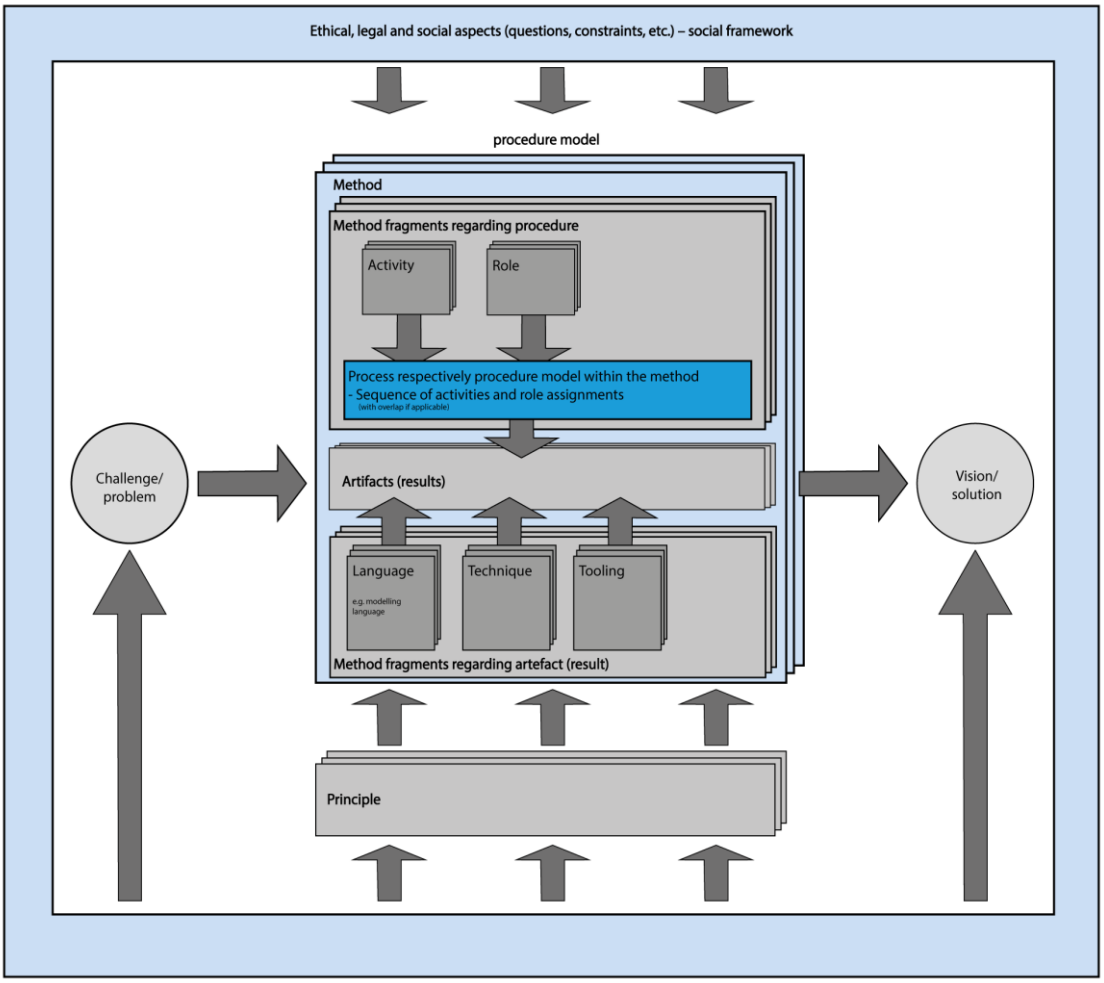

Figure 1. Ethical, legal and social aspects as a framework for procedure models (based on [4])

Software development projects are usually structured through organisational and, if necessary, project-specific adaptations of existing process models. As Figure 1 shows, procedure models are used – based on a certain starting point – to design the path to a particular goal. According to [5], a procedure model (also known as a 'procedure strategy') combines different methods or method fragments. The following components define a method [cf. 6]: The process (sometimes also known as a 'procedure model within the method') defines which activities are conducted in which order (with temporal overlap where applicable) and under which conditions by which roles. Activities and roles are shown separately in the figure; the additional boxes in the background of the figure show that there are several activities or roles within a single method. Modelling experts or moderators typically conduct these activities, with one or more roles able to be involved in performing an activity.

Artefacts (results) are generated by activities or within the framework of activities. In turn, some artefacts are also required as input in order to be able to perform other activities [6]. The following components are relevant here:

- Language: all results must be described in a certain language. This may take the form of natural language or a specific, potentially specialised format. Language definitions range from sentence templates [7, p. 57ff.] to tables and diagrams and even formalised models. The language should not only be syntactically defined for a highly formalised application, but its semantics should be clearly specified [5].
- Technique: this refers to 'the respective regulation for creating (and thus documenting) the results' [6, p. 88, own translation].
- Tools: these can be used within a method to, for example, support the technique. Tools may support different activities as part of a method, for example the tool-supported moderation of action planning (e.g. using Miro Board), enterprise modelling (e.g. using Horus Business Modeler), process modelling (e.g. using Camunda Modeler) and formulating user stories.

For software development projects, there are now a number of process models which contain these components to varying degrees and levels of intensity. A fundamental distinction should be made between the different philosophies of agile and classic, of which different representatives are used in practice [8].

2.2. Ethical, Legal and Social Aspects (ELSA) in Process Models

Procedure models for software development projects have no structural specific anchoring in terms of ethical, legal and social aspects. Anchoring through explicit elements (e.g. specific activities, roles or artefacts) does not exist in typical procedure models. Instead, ethical, legal and social aspects are typically considered when ascertaining requirements (if at all) and when ascertaining, agreeing on and documenting (concrete) non-functional requirements. The overarching consideration within the project – especially in terms of follow-up – is then factored into the requirements management process along with other non-functional requirements. This approach is used for other specific aspects (such as IT security) as well.

Due to the fact that functional requirements only gradually emerge during the project, agile process models call for an individual (functional) requirement to be ethically, legally and socially coordinated as an additional quality requirement. Within the Scrum process model, the quality requirements are defined under the 'Definition of Ready' [9]. This 'Definition of Ready' may then also contain requirements regarding the coordination of a (functional) requirement for ELSA. This approach within agile projects is also used for other specific aspects (such as IT security).

For agile process models, the agile manifesto [10] can be seen as a summary of the core philosophy surrounding the process. It was formulated in 2001 by 17 signatories as the lowest common denominator of various agile process models. The basic ideas are summarised in the form of four values and twelve principles. The first and third values are formulated as follows: The manifesto signatories value 'individuals and interactions more than processes and tools' and 'collaboration with the customer more than contract negotiation' [10]. The orientation towards natural persons promotes a human-centred approach as it also exists in the field of social technology design [cf. 11]. The principles of the agile manifesto turn the focus onto customers and subject matter experts (often business users) as well as developers and go into this in more detail. Other stakeholders in the field of technology design are not explicitly mentioned.

The option to consider ELSA-related aspects in a structured manner are indicated by special standards. However, a procedure model based on a special standard cannot be integrated directly into a typical software engineering procedure model. Instead, this model was created as an independent, autonomous procedure and can be used in projects if those responsible are aware of this and wish to implement it. An example of such a special standard is the IEEE standard 'IEEE Model Process for Addressing Ethical Concerns during System Design' (IEEE 7000-2021), which was first published in 2021. IEEE 7000-2021 provides for two phases: In the first phase – concept exploration – the concept of use and the context are explored in order to determine and prioritise ethical values. The second phase – definition of ethical requirements – begins with concept research and continues into the development stage. A design process reflecting ethical considerations is also part of this stage.

In the context of business ethics, there are various approaches for companies or their managers to arrive at decisions that take ethics into consideration. However, these approaches usually refer to the business model level rather than the level of technology design. Such approaches do provide the opportunity to learn about ethical considerations surrounding (information) technology [12] in general and, more specifically, the integration of ELSA into software engineering procedure models.

3. THESES FOR FURTHER DEVELOPMENT

The previous section described the current state of science and technology. The question is how science and technology will continue to evolve and how they can be actively developed. The following theses are intended to contribute to the discussion, to serve as a catalyst for the work performed by expert groups on procedure models and project management, and to inform science and practical considerations in general.

- Thesis 1: For the effective and efficient inclusion of ethical, legal and social aspects, it is not sufficient to consider them from a general perspective as a (social) framework for procedure models or development projects. This is because it fails to incorporate ELSA as a 'standard' consideration and does not sufficiently support either those responsible for the project or those actually carrying it out.
- Thesis 2: ELSA is too different (e.g. compared to other requirements) to be considered purely as 'incidental' in process models (e.g. requirements engineering) not specifically designed for this purpose (whether socially relevant, partly complex, etc.).
- Thesis 3: Further structural anchoring of ELSA is required in standard procedure models: specific activities (e.g. quality gates with ethics checks, involvement of 'affected parties' such as employee representatives, etc.), specific roles (e.g. ethics officers), concrete anchoring of activities and roles within a procedure model, specific artefacts (e.g. value register), and so on. Depending on the procedure model, this ensures that ELSA receives the requisite attention across the entire life cycle of systems. This also takes into consideration the fact that ELSA-related matters or requirements may change during the life cycle and have to be implemented, e.g. for 'maintenance' purposes.
- Thesis 4: Activities are required that are independent of any aspect of a procedure model. This includes the formation and maintenance of an organisation's core values. These values can then be used in the organisation's projects and serve as a working basis for coordination as part of cross-organisational projects (this will be based around non-negotiable values where compliance is mandatory if a project partnership with other organisations is to be established). Other measures include making certain professional groups in general and employees aware of ELSA through suitable education and training efforts (cf. GI Ethics Standard). In general, the implementation of thesis 4 will lead to a broad cultural change.

4. CONCLUSIONS

Those responsible for procedure model projects and those tasked with taking action at various levels continue to be called on to accept the requisite responsibility for ELSA or to craft design proposals for ethically responsible, legally permissible and socially good procedures and solutions. The topics presented in this publication are intended to prompt discussion and work regarding the systematic consideration and integration of ELSA into software projects. Discourse on this matter can be informed by designers of procedure models as well as prototypical but well-considered adaptations of procedures in specific contexts (company, project, etc.). Such discourse can be bolstered by scientific findings as desired, with general lessons able to be extracted from the respective contexts.

A broad exchange of integration options is required for the sustainable, cross-contextual integration of ELSA into procedure models in software projects. This can be fostered by seeking out individual contributions such as project reports on adapted procedures. It is hoped that further discourse will lead to adapted, context-independent process models. A first step towards adapting established process models in practice could then be to conduct training courses on the appropriate integration of ELSA into existing process models.

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