



Asking the right questions: The role of reflection for learning in and between projects

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ABSTRACT

Learning is crucial for project-based organisations to improve and survive. As reflection is essential for learning in and between projects, this article examines how reflection unfolds and under which conditions it can act as a project learning mechanism. Using five gate reviews at a Dutch contractor as an embedded single case study, we show that reflection is necessary for but cannot guarantee the learning in and between projects. Reflection is emerging from and embedded in the specific context of interpersonal project work. This reflection-for-action stimulates the learning for the ongoing project, incorporates experience made in previous projects, and draws implications for future projects. However, for reflection to become a project learning mechanism, the reflection process needs to proceed to later phases and higher intensities which depends on the relevance of the project issue at hand, the motivation of project team members to discuss this issue, and the reflection support they receive.

1. Introduction

Projects have become a prevalent mode of organising in many industries. They allow organisations to flexibly address complexities and dynamics of contemporary economic, societal, and environmental challenges. The one-off nature of projects represents both a source for creating new knowledge and a barrier to the continuous improvement of organisational routines (Ayas & Zeniuk, 2001; Wiewiora, 2023). The temporary configuration of task-dependant resources appears to stimulate learning within projects but limits the dissemination of this learning between projects and the wider organisation. It is this paradoxical learning potential of projects that has attracted much attention in the literature.

Reflection is seen as an essential ingredient for project-based learning (Sense, 2007; Söderlund et al., 2008; Duryan, 2023). Without reflection, experiences gained in projects cannot be transformed and shared; thus, organisational learning will not occur (Sergeeva & Duryan, 2021). It has been shown that project setting and environment can promote reflective habits that go beyond single projects (Ayas & Zeniuk, 2001). If organisations “systematically incorporate reflective practices into their project management processes” (DeFilippi, 2001, p.6), projects can contribute to the long-term success of these organisations.

Despite the importance of reflective practices for learning in project-based organisations, an in-depth understanding of how these practices unfold in project work and can act as a learning mechanism is still missing. Such understanding is important since establishing reflection practices in projects creates a learning dilemma from a managerial perspective. On the one hand, it is argued that reflection is only effective for learning if tightly knotted with the day-to-day actions of project leaders and project teams and embedded in their direct interaction (Edmondson et al., 2001; Söderlund et al., 2008; Oeij et al., 2017). Yet, stimulating learning-effective reflective practices as an integral part of project activities remains difficult (Oeij et al., 2017; Kowalski and Russel, 2020). On the other hand, a too strong formalisation of reflection practices, for example, in the form of post-project reviews, often decouples reflection, and thus learning, from the actual project work and casts doubts on its usefulness since the concrete application of possible learning outcomes is left uncertain (Newell et al., 2006; Hartmann & Dorée, 2015; Guinness and Heathcote, 2022). It is this dilemma between reflection as a hardly manageable practice in project work and reflection as a formally organised but detached project activity that asks for further enquiry into the role of reflection as a learning mechanism in projects.

In this research, we thus aim at further entangling reflection

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practices in projects and answering the questions: How does the reflection of project team members unfold to enable learning in and between projects, and under which conditions can reflection become a learning mechanism in projects? We develop a conceptual framework and apply it to five gate reviews at a Dutch contractor as an embedded single case study. As gate reviews are formally organised review moments within ongoing projects (Sethi & Iqbal, 2008), they are particularly suited for reflection and hence used here as the unit of analysis. Based on the investigated gate reviews, we will show that reflection emerges from and is embedded in the specific context of interpersonal project work. It creates the potential for learning within ongoing projects but can also contribute to the learning between projects. However, reflection does not guarantee that learning effectively takes place and will only unfold if project team members are motivated and supported to rethink relevant project issues for the adjustment and change of the ongoing project.

2. Conceptual framework

2.1. The potential of reflection for project-based learning

Reflection is a constitutive element for learning in organisations since it relates the thinking about and the assessment of ongoing or past events and situations experienced at the workplace to future behaviour and actions (Edmondson, 2002; Faller et al., 2020). It is a process through which individuals enquire their own personally relevant experience of a situation to make sense of it and to potentially generate a different understanding of it. This exploratory and transformative mode of creating meaning about work experiences makes reflection the propellant for organisational learning (Hilden & Tikkamäki, 2013; Reese, 2021).

If individuals become aware of the consequences of their actions, they can create new perspectives on and insights into their thinking and behaviour and eventually change them. This holds particularly for projects which, due to their temporary and idiosyncratic nature, often provide the organisational space to deal with new challenges and confront individuals with unexpected and surprising situations. Hence, projects are seen as the ideal setting for developing reflective practices and learning capabilities in organisations (Ayas & Zeniuk, 2001). At the same time, reflective practices are promoted as an integral part of project management to overcome contradictions between short-term project goals and long-term organisational learning strategies (DeFillippi, 2001; Lee-Kelley & Blackman, 2012; Duryan, 2023). They enable project managers to become improvement agents (Sundqvist, 2019) to be able to cope with complexity, dynamism, and uncertainty in project planning (Rotimi & Ramanayaka, 2015), to tackle critical and unforeseen incidents in projects (Oeij, et al., 2017), to span vertical and horizontal boundaries in project-based organisations (Duryan, 2023), and to encourage project team members to recognise their mental models (Chang et al., 2021). The latter indicates that projects are also conducive to reflective practices because they represent temporary social arenas where individuals interact and work together towards specific organisational goals.

2.1.1. Collaborative reflection in projects

Although, in the first place, reflection enables individuals to cognitively and introspectively transform their own experiences, the explicitation and sharing of these individual experiences in the organisational context of projects can initiate *collaborative reflection*. So can the diversity of knowledge that project team members bring to projects lead to differently experienced situations. Such variations in experiences and perceptions can create tensions and stimulate negotiations on the meaning of what happens, why it happens, and how to respond to it (Scarborough et al., 2004; Tan, 2021). Collaborative and individual reflections become intertwined in a reciprocal process of discursive and relational practices and enrich each other (Knipfer et al., 2013).

Engaging in collaborative reflection then not only enables team members to validate and challenge personal ideas, actions, and plans by reviewing others and developing a common understanding of project-related problems (Gil & Mataveli, 2018; Wiese & Burke, 2019). It also affords project teams to scrutinise cultural and organisational beliefs and assumptions taken-for-granted and underlying their work practices. Collaborative reflection is an important mechanism for the learning in projects and developing project competencies in organisations (Söderlund et al., 2008; Duryan, 2023).

2.1.2. Reflection modes and learning

Learning from reflection can be initiated through two basic reflection modes, which tend to occur at different points in time: reflection-on-action and reflection-in-action (Schön, 1987). The retrospective *reflection-on-action* takes place after a task is finished. Project team members evaluate the accomplished task, create meaning from the experiences gained during task accomplishment and draw conclusions for future tasks. This reflection mode heavily relies on the possibility of surfacing knowledge gained during a project and capturing it as implications to be transferred to subsequent projects (Sergeeva & Duryan, 2021). It has gained much attention in practice since it appears to be easily organised as separate, controllable, and repeatable task preferably at the end of projects (Inkermann, et al., 2020). The danger is that reflection becomes a ritualised practice detached from the context of the actual project work with rather vague, general, and uncritical outcomes and thus without learning emerging from it (Boud & Walker, 1998; Guinness & Heathcote, 2022). The situated *reflection-in-action* takes place while performing a task. As a response to their immediate work experiences, project team members interpret the current working situation and directly adjust their way of working to accomplish their ongoing task (Sergeeva & Duryan, 2021). Because of the embeddedness in ongoing practices, reflection-in-action is less controllable and repeatable outside these practices (Oeij, et al., 2017). With *reflection-for-action*, a third reflection mode has been proposed (Killion & Todnem, 1991; Thompson & Thompson, 2023). It stresses the particular purpose of rethinking a practice in a forward-looking manner to anticipate future events and plan future actions. In the project context, this can mean that project team members examine their past actions in an ongoing project to inform and change their upcoming project work (Hartmann and Dorée, 2015).

2.2. Reflection process and intensity

In this paper, we conceptualise reflection in projects as a discursive process of articulating, sharing, and negotiating individual experiences of project issues within project teams to reach a collective understanding of the experienced issues and draw conclusions for further actions (cf. Knipfer et al., 2013; Duryan, 2023). This collaborative process can occur separately from or be intertwined with the actual project work. We analytically divide reflection processes into four phases (cf. Prilla et al., 2015; Oeij, et al., 2017; Franken, et al., 2018; Inkermann, et al., 2020:

1. *Articulating experience.* Project team members articulate and communicate their pre-understanding of an individually and/or collectively experienced issue and describe their feelings attached to this experience. This can include negative issues creating discomfort or positive issues eliciting contentedness, and this cognitive dissonance often triggers reflection processes (Chang et al., 2021). Team members also elaborate on the contextual factors that, from their perspective, shaped the experience.
2. *Developing an understanding of experience.* Team members discuss their individual experiences to justify what happened and why it happened. Ideally, this leads to a shared understanding of the experienced issue. If such a shared understanding is reached, this sets the collective frame for evaluating the experience.

3. *Re-evaluating understanding of experience.* Team members evaluate their understanding of the experienced issue by linking relevant prior project or organisational knowledge or experiences to the experience they reflect on (Daudelin, 1996). This allows them to detect patterns of cause-effect relationships for the experienced issue (Boud et al., 2013) but also to challenge existing interpretations and groupthink, pose searching questions for alternative explanations, and explore different interpretations (van Woerkom, 2003).
4. *Drawing reflection outcome.* Team members agree on what a satisfactory outcome of the re-evaluation is. This can include an improved or different understanding of or a new perspective on the experienced issue, advice on behavioural changes, or plans for action related to the project and/or organisation (Boud et al., 2013).

Previous research on workplace learning has shown that the intensity of reflection can vary, i.e. the extent to which the issue is scrutinised in the reflection process (Høystrup, 2004; Fleck & Fitzpatrick, 2010). Therefore, we distinguish four levels of reflection intensity in projects:

Level 0 - Revisiting. Project team members only articulate their experiences of an issue without further elaboration. Although experiences are made explicit, the outcome remains rather unproductive for project learning (cf. Davis, 2006).

Level 1 - Descriptive reflection. The experienced issue is described and justified based on prior knowledge but without exploring alternative explanations and searching for new perspectives to understand it (Lee, 2005; Ward & McCotter, 2004). It mainly will lead to what Argyris (1999) calls single-loop learning: “an error is detected and corrected without questioning or altering the underlying values of the system” (p. 68).

Level 2 - Dialogic reflection. Team members deliberately step back from the experience to ponder the experienced issue from multiple perspectives and seek alternative explanations and new relationships with prior knowledge to re-organise or change project practices. Within the project context, assumptions on how project work must be done are often challenged, leading to double-loop learning (Argyris, 1999).

Level 3 - Critical reflection. At this level, team members also question assumptions about their project practices but go beyond the actual project context scrutinising important taken-for-granted beliefs and values on which project work in an organisation builds (Mezirow, 1990; Reynolds, 1998; Matsuo, 2019). A fundamental critique of the organisation’s ability to improve project practices is brought forward, which can become the origin of what has been coined as triple-loop learning (Tosey et al., 2012).

A higher reflection intensity is not necessarily better than a lower intensity level. The intensity will depend on the nature of the experienced issue. For example, descriptive reflection might be sufficient to understand project deviations and identify appropriate actions to bring the project back on track. On the other hand, critical reflection might be appropriate if project deviations systematically reoccur as the likely result of specific organisational rules underlying project practices.

2.3. Reflection conditions

The extent to which reflection in projects occurs is subject to several conditions pertaining to the project environment and team members. They can be categorised into three main groups: opportunity, ability, and motivation to reflect (cf. Kelloway & Barling, 2000).

2.3.1. Opportunity to reflect

Opportunity concerns conditions posed by the project environment in which the participants collect their experiences and engage in collaborative reflection. Reflection may take time. Particularly for reaching higher reflection intensities, sufficient time should be available

to explore an experienced issue from multiple perspectives and search for alternative explanations (Moon, 1999; Wallman et al., 2009; Groen, 2015). This remains a significant struggle in projects (Chronéer & Backlund, 2015; Wiewiora et al., 2020). Engaging in reflection processes often requires a specific reason to reflect, and that reason is often found in ongoing projects (Hartmann & Dorée, 2015). It may also need encouragement, support, and guidance by single project team members who initiate reflection processes, structure them efficiently, and increase their quality (Fleck & Fitzpatrick, 2010; Koole et al., 2011; Chang et al., 2021). Whether a project environment provides challenges is another condition for reflection since it allows for opportunities to create experiences outside someone’s comfort zone (Eraut & Hirsh, 2010). In combination with flexibility and creativity, it lays a fertile ground to learn by reflection (Kump et al., 2011).

2.3.2. Ability to reflect

Ability relates to the personal skills of the reflecting team members. This includes the mental capability of abstract thinking to create distance from the experience, take a helicopter view, explore causes and effects, and draw conclusions from experience (Groen, 2015). Negotiation and re-evaluating experiences in a collaborative setting also require communication skills of team members to elaborate on their experiences and for others to listen (Knipfer et al., 2013). Moreover, openness about mistakes is essential for reflection to be genuine and valuable for learning (de Groot et al., 2014; van Woerkom & Croon, 2008). It is the prerequisite for reaching a collective understanding of the mistake that can prevent it in the future. Reflecting itself is a skill that can be trained through repeated practices. Hence, reflection experience contributes to the ability to reflect (Ayas & Zeniuk, 2001; Ferguson, 2022).

2.3.3. Motivation to reflect

Motivation to reflect includes both intrinsic and extrinsic motivation of project team members. Intrinsic motivation concerns the willingness and inclination of team members to engage in individual or collaborative reflection, to share experiences, and to scrutinise the experience to learn from it (Knipfer et al., 2013; Nolan & Sim, 2011). Reflection practices of intrinsically motivated team members are triggered by discrepancies between the experienced issue and their mental models that create a particular curiosity to explore and understand the experience (Høystrup & Elkjaer, 2006; Chang et al., 2021). Extrinsic motivation relates to an external stimulus that encourages team members to participate actively in reflection (Fleck & Fitzpatrick, 2010). Related to motivation is trust. Without trust in collaborative reflection, participants will be reluctant to openly share their experiences and mistakes for fear of retaliation (Groen, 2015; Raelin, 2002). Høystrup & Elkjaer (2006) note that reflection in an organisation is not easy because management may not value the outcome, and employees might be afraid to reveal the shortcomings of the organisation or their superiors. Thus, trust is essential to question the organisation’s values and assumptions in collective reflection.

Fig. 1 depicts our conceptual framework of project-based reflection processes. It conceptualises reflection as a multi-dimensional collaborative process. This process is initiated by experienced project issues, affected by project-related conditions, uses experiences and knowledge from past projects and known organisational practices, and potentially yields learning outcomes for the current project, future projects, and the wider organisation.

3. Research method

As collaborative reflection practices are embedded in projects and involve sharing and negotiating experiences amongst project team members, we adopt a qualitative, embedded single-case study approach (Yin, 2009). This qualitative approach allows us to investigate how and to which extent project teams can make sense of experienced issues and draw implications for their project work. By comparing multiple project

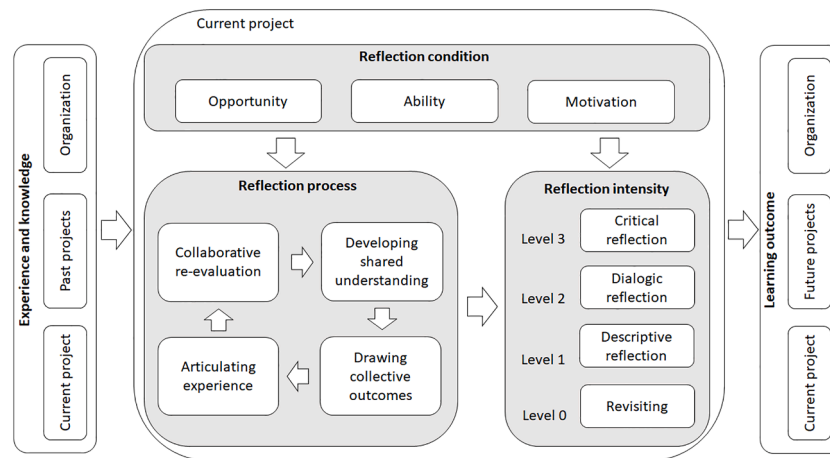


Fig. 1. Conceptual framework of reflection in projects.

contexts within the same organisation, we can better understand the role of reflection for learning in and between projects and how conditions that vary across projects influence this.

3.1. Embedded case study approach

The investigated case is a medium-sized Dutch civil contractor. It is a subsidiary of the largest contractor in the Netherlands with the core business of building concrete infrastructure (e.g., viaducts, locks, and tunnels) and executing the associated project management tasks. Recently, the contractor has started implementing gate review procedures for projects of 1 million euros and more. Five gate reviews are our embedded units of analysis.

3.1.1. Purpose and procedure of gate reviews

The purpose of the gate reviews is to provide management support to project teams from tender to closure based on assessed project performance. Moreover, the gate reviews are meant to provide the management board with early signs of deviant project trajectories and enable them to coordinate resources across projects. The gate review procedure knows eight fixed evaluation moments at different project phases at which several performance aspects (e.g., finances, organisation, contract management, risk management) are assessed. Based on the assessment, whether the project can proceed to the next phase is decided. All gates are mandatory except gates five, seven, and eight. Whether the project manager includes these gates depends on the project risks. For the case study, we selected the fourth, sixth, and seventh gate of five projects, which occur after the tender has been submitted. The fourth gate review is about preparing the project to get started. This can be followed by an optional fifth gate to review if all aspects of the preliminary design are deliberately thought about. Likewise, the final design is assessed in the sixth gate. The seventh and eighth gates are optional again. Their concern is whether the project team is ready for the start of the physical execution of the project and the transfer of the project to the client, respectively.

3.1.2. Organisational set-up of the gate reviews

While gate reviews are common for large-scale projects, how they are organised in the selected case is unique in the sense that the gate reviews are guided by facilitators who are independent and not involved in the reviewed project. Their role is to ask questions related to the assessed criteria and give a final verdict on the project's performance. The facilitator team consists of one permanent senior employee responsible for correctly utilising the gate review procedure, the lead gate reviewer. They are assisted in the reviewing process by another lead employee, known as the gate reviewer. The staffing of the facilitator team depends on the

criteria being reviewed. The facilitators often conduct multiple gate reviews on different projects. The reviewed project is represented by the team consisting of members in different roles (i.e. the participants). However, not all project team members are involved in the gate reviews, and reviews often only include those seen as essential to inform about the project's performance. The facilitators collect information in two ways. First, project documentations are studied and compared with organisational standards. Second, group interviews are held with project team members to understand the actions taken and decisions made. After the gate review, the facilitators present their assessment results. These are binding and can be either: (1) green, the project performance is sufficient, and the project can proceed to the next phase; (2) orange, the project does not fully meet all assessment criteria but can proceed with the precondition that recommendations are followed; or (3) red, the project does not meet the assessment criteria and cannot move to the next phase until critical issues are solved. After the review, significant findings are documented and shared with the project team and management board.

The gate reviews represent formally organised evaluation moments while being integrated into ongoing projects. They are set up to facilitate the discussion between participating project team members and facilitators on the project's current performance. This discussion is expected to be fed by the articulation, sharing, and negotiation of gained experiences of project team members. The gate reviews are, thus, very well suited to address the reflection dilemma in projects and explore the role of reflection for project-based learning. The selection of gate reviews as our unit of analysis was driven by a theoretical purpose. To allow for explanations of role and extent of reflection, we selected five gate reviews that show many similarities in the organisational setup (gates, number of participants, and facilitator) but also some differences, mainly in the criticality of experienced problems before the gate reviews and thus the evaluation results. Table 1 provides the main characteristics of the five gate reviews.

3.2. Data collection

Multiple data collection methods were used (Table 2): document analysis, nonparticipant observations, and interviews with participants and facilitators of the gate reviews.

The **document analysis** provided an understanding of the project context and the verification of gate review outputs. The documents studied included the general project documentation, the project management plan, the project planning, and the minutes of the observed gate review. The context concerned the type and size of the project, project goals, project client, project stage, and the issues at play before the gate review. Gate review outputs included topics discussed, points of

Table 1
The characteristics of the gate reviews.

	Gate Review A	Gate Review B	Gate Review C	Gate Review D	Gate Review E
Project reviewed	Road construction	Sewer pumping station	Sewage treatment plant	Wind park	Rail renewal
Gate	4	4,6&7	6&7	4&6	4
Duration	2:30	2:00	1:35	2:30	1:00
Number of participating project team members	2	3	2	2	5
Number of facilitators	2	2	2	2	2
Review result	Red	Green	Green	Orange	–

Table 2
Data collection methods.

	Gate Review A	Gate Review B	Gate Review C	Gate Review D	Gate Review E
Document analysis	General project documentation: project management plan, contract, planning Gate review plan Gate review minutes				
Observations	Non-participatory with audio recordings and field notes				
Brief evaluation	2 facilitators	2 facilitators	2 facilitators	2 facilitators	
Interviews	1 project team member	3 project team members	2 project team members	2 project team members	5 project team members 2 facilitators
Panel meeting	3 facilitators and 1 senior manager				

Table 3
Operationalization of the concept ‘reflection process’.

Phase	Description	Indicators (reflection activity)	References
Articulating experience	Participants describe the experienced issue, how they understand and feel about it, and its context.	Articulating negatively experienced issues	Knipfer et al. (2013); Koole et al. (2011)
		Articulating challenges or problems	Knipfer et al. (2013); Koole et al. (2011)
		Articulating positively experienced issues	Knipfer et al. (2013); Koole et al. (2011)
		Describing the issues in terms of what happened or what the problem is	de Groot et al. (2014); van Woerkom and Croon (2008)
Developing shared understanding	Participants discuss the experienced issue and reach a shared understanding of it.	Mentioning contextual factors of the experienced issue	Koole et al. (2011); Prilla et al. (2015)
		Mentioning own feelings and thoughts on the experienced issue	Atkins and Murphy (1993); Boud et al. (2013)
		Discussing and asking questions about what happened	Bittner and Leimeister (2013); Knipfer et al. (2013)
		Justifying the experienced issue and why actions taken were reasonable	Krogstie et al. (2013)
Collaborative evaluation	Participants critically evaluate the experienced issue by referring to prior experiences and knowledge, detecting patterns, challenge groupthink, and interpreting the meaning of it.	Reaching an agreement or convergence of what the experienced issue was	Bittner and Leimeister (2013); Knipfer et al. (2013); Krogstie, et al. (2013)
		Challenging existing interpretations of the experienced issue	Prilla et al. (2015); van Woerkom (2003)
		Adding perspectives for the evaluation of the experienced issue	Jung and Wise (2020); Prilla et al. (2015)
		Considering alternatives of what could have been done	Jung and Wise (2020); Prilla et al. (2015)
		Exploring the causes and effects of the experienced issue	Boud et al. (2013); Jung & Wise (2020)
		Linking an experienced issue to other experiences	Boud et al. (2013); Prilla et al. (2015); Tsingos et al. (2015)
		Linking an experienced issue to existing knowledge, rules, or values	Boud et al. (2013); Prilla et al. (2015); Tsingos et al. (2015)
		Posing searching questions to identify underlying reasons	Koole et al. (2011)
Drawing collective outcome	Participants agree on if and what the satisfactory outcome is of the re-evaluation and the implication of it.	Showing convergence in the understanding of reflection outcome	Daudelin (1996); Prilla et al. (2015)
		Giving advice or proposing solutions	Daudelin (1996); Prilla et al. (2015)
		Planning for action	Koole et al. (2011); Korthagen et al. (2002)
		Summarising findings and implications	Prilla et al. (2015)
		Translating insights into changed behaviour	Koole et al. (2011); Korthagen et al. (2002)

attention for the project, and implications. Gate review participants captured them, and we compared them with the outputs we derived from observations and interviews.

Nonparticipant observations of the gate review sessions were used to gather data about reflection phases, reflection intensity, reflection conditions, and the role of reflection for project-based learning. The gate review sessions were audio recorded. Field notes were taken to register behaviour, interaction, and discussion amongst participants based on the operationalisation of the main concepts. In addition, for Gate Reviews A, B, C, and D, a brief evaluation of the gate review was held with the facilitators at the end of the review. Tables 3, 4, and 5 present the indicators used to identify reflection phases, intensity, and conditions. Not presented in one of the tables are indicators for the role of reflection for project-based learning. This was assessed regarding the links that gate review participants made to other project experiences or

Table 4
Operationalization of the concept 'reflection intensity'.

Intensity	Description	Indicators	References
Level 0 Revisiting	An experienced issue is solely articulated without further explanation.	Articulation of an issue without justification of rationales and further exploration of the experience	Fleck and Fitzpatrick (2010)
		The value of the experienced issue is not considered	Muir and Beswick (2007)
Level 1 Descriptive reflection	An experienced issue is described, including an explanation and justification of actions or interpretation.	Explaining the experienced issue from a single perspective	Fleck and Fitzpatrick (2010)
		A single perspective is taken for justification and interpretation of the experienced issue	Ward and McCotter (2004)
		No alternative explanations are explored	Lee (2005)
Level 2 Dialogic reflection	An experienced issue is explored from multiple perspectives leading to alternative explanations and relationships between prior knowledge and experience.	The underlying values of the system are not questioned	Argyris (1999)
		Deliberate stepping back from the experienced issue and taking time to think about it	Daudelin (1996); Raelin (2002)
		Relating the experience to prior experiences and knowledge	Hatton and Smith (1995)
		Multiple perspectives are taken to explain, justify and interpret the experienced issue	Hatton and Smith (1995)
Level 3 Critical reflection	An experienced issue is questioned in terms of its contextual taken-for-granted assumptions.	Assumptions and consideration of the causes and effects of the experienced issue are challenged	Argyris (1999)
		Dialogic reflection leading to questioning of taken-for-granted assumption	Mezirow (1990); Reynolds (1998)
		Triple-loop learning: questioning if one is doing things with the proper justification of norms and values	McGregor and Cartwright (2011)
		Showing awareness of the organisational environment	Fleck and Fitzpatrick (2010)

organisational knowledge (e.g., strategy, standards) and the extent to which they drew implications from the review for the project organisation.

Semi-structured interviews with participants of the gate reviews complemented the observations. During these interviews, questions were asked related to the context of the project evaluated and the gate review process as experienced by the interviewee. In total, 13 interviews were conducted, lasting between 25 and 50 min. 12 interviews were held with project members – A (1), B (3), C (2), D (2), E (4) - and 1 interview with two facilitators (Gate Review E). For Gate Reviews A, B, C, and D, a brief evaluation of the gate review was held with the facilitators at the end of the review. All interviews and brief evaluations were recorded and transcribed for analysis.

After the five gate reviews, a panel meeting with three facilitators and a senior manager was organised. The meeting lasted 90 min and was meant to validate the findings from observations and interviews and identify practices for stimulating and supporting reflection in gate reviews. The meeting was held online and recorded for analysis.

3.3. Data analysis

Data were analysed within the individual and across gate reviews. For this purpose, project documents and gate review minutes, observation field notes, audio recordings of gate reviews, and transcribed interviews were coded. Directed qualitative content analysis was applied (Hsieh & Shannon, 2005). Initial codes were derived from the presented operationalisation of the reflection process (Table 3), reflection intensity (Table 4), reflection conditions (Table 5) and the role of reflection for learning (see 3.2). Then, we took four steps to code the recordings of the gate reviews. We also coded interviews, field notes, and documents in a fifth step. All coding was performed in ATLAS.TI 8.

3.3.1. Coding procedure

The **first step** aimed to identify all discussed topics of the recordings. Here, we differentiated between discussed topics, coded as reflection topics (between 18 and 42 per gate review), including reflection, and those that did not, coded as control topics. A topic is coded as a control topic when, for example, facilitators asked whether the project's schedule was on track, and the participants' responses did not lead to any discussion. Reflection topics included a reflection process covering a particular experience of participants and thus had a beginning and an end. Hence, a discussion topic was coded as a reflection topic when a single reflection activity indicated a specific reflection phase. Here, at least the elaboration of an experience by one participant and the response of another participant was needed to count for collaborative reflection (Fleck & Fitzpatrick, 2010). The **second step** was to determine the performed reflection phase for all identified reflection topics. This was done by coding the occurring reflection activities (see Table 3). For achieving a specific reflection phase, participants conducted at least one reflection activity corresponding to this phase. The **third step** comprised the coding of reflection intensity for each reflection topic (see Table 4). When multiple intensity indicators were present, the intensity was set at the level with the most indicators. For example, when a reflection topic had two indicators for descriptive reflection and one for dialogic reflection, the intensity level was set at the descriptive reflection. In the case of an equal number of indicators, the highest intensity was leading. In the **fourth step**, the discussed reflection topics were coded for the role of reflection for project-based learning. More specifically, if participants explicitly mentioned other projects to make sense of the experience they reflected, this was coded as linking to other project experiences. If participants referred to organisational procedures and standards to create an understanding of the experienced event, this was coded as linking to organisational knowledge. The drawing of implications was coded if participants explicitly expressed a cognitive or behavioural change or a required action for the project or the organisation. The **fifth and final step** included coding the reflection

Table 5
Operationalization of the concept ‘reflection condition’.

	Condition	Description	Indicators	References
Opportunity	Available time	Enough time is used for reflection so that a reflection outcome can be achieved	No mention of having to move on due to time constraints All topics of interest are discussed sufficiently according to the participants	Groen (2015); Knipfer et al. (2013); Moon (1999)
	Challenge in work	The work provides a challenge to create experiences and learn from them	Project uniqueness, according to the project members Gate review outcome Project complexity, according to the project members	Eraut (2004)
	Reflection support	Reflection is guided and stimulated by facilitators	Asking questions regarding the development of supposition, attending feelings and thoughts, future behaviour, and critical judgments Giving room for participants to speak (e.g. pausing and listening) Confronting participants with misconceptions	Koole et al. (2011); Moon (1999); Wallman et al. (2009)
Ability	Reflection experience	More reflection experience enhances the participant’s ability to reflect	Gate review experience	Knipfer et al. (2013)
	Communication	Ability to communicate and make oneself understood by others	Attentiveness Precise formulation and thinking out loud Common language and mutual dialogue	Groen (2015) Groen (2015) Argote, McEvily and Reagans (2003)
	Openness about mistakes	Mistakes made on the project are shared to learn from them	Participants mentioned they were open about their mistakes	de Groot et al. (2014); van Woerkom and Croon (2008)
	Abstract thinking	Searching for explanations, using analogies, searching for alternative explanations, organising the topics and relating them, evaluating relations	Prior experience to make sense Educational level	Groen (2015); Knipfer et al. (2013)
Motivation	Extrinsic motivation	External motivation and encouragement to engage in reflection and open-up	Incentives are provided to encourage participants to reflect	Argote et al. (2003)
	Intrinsic motivation	Willingness to reflect out of own interest and find it internally rewarding	A sense of inner discomfort created by challenges triggers the curiosity to explore the experience	Koole et al. (2011)
	Learning attitude	The drive of participants to improve behaviour and actions	Open-mindedness to new insight Questioning existing behaviour and actions	Moon (1999) Groen (2015)
	Trust	Participants can trust each other, and a safe reflection environment exists to let participants reflect without judgments	The facilitators create a safe environment A strong relationship between participants stimulates reciprocity (i.e. give and take) Participants can be open about mistakes without fear of retaliation	Koole et al. (2011) Argote et al. (2003) Raelin (2002); Vince (2002); van Woerkom and Croon (2008)

conditions based on the operationalised indicators (see Table 5). For this step, observational data were triangulated with interview data. For example, if participants had the impression that only some issues were sufficiently discussed, this was coded as needing more available time. Conditions are not specific to a particular reflection topic but similar for all reflection topics of a single gate review. The researchers repeated all the above steps in a separate round to increase the coding stability.

3.3.2. Gate review analysis

After the coding of data, each gate review was separately analysed. We first quantitatively expressed the extent (absolute and relative) of reflection phases and intensity reached over all reflection topics addressed in the gate review. This was followed by analysing how the identified reflection conditions could explain the attained reflection phases and intensities. We then analysed the relationship between the reflection phase and intensity and the role of reflection for project-based learning. We were particularly interested in the reflection phases and intensity levels for which participants use experiences from previous projects and organisational knowledge and draw implications for the project and organisation. In the next step, we compared the individual results of the gate reviews. Patterns could be discovered by analysing the differences and similarities across gate reviews to build empirical evidence. This provided insights into the relationship between the extent of reflection and the reflection conditions in projects and how this relationship can enable learning within and between projects.

4. Findings

In the following, we present our findings in line with our framework. It should be noted that ‘participants’ refers to all project team members and facilitators participating in the gate reviews.

4.1. Discussed topics

Although the gate reviews were primarily meant to control and assess the progress of the projects, reflection played an essential role in all reviews. From the discussed topics, between 61% (Gate Review D) and 78% (Gate Review E) involved reflection (Table 6).

Across the five gate reviews, 59% of the reflection topics related to negatively perceived project performance, whereas only 7% had a positive connotation. According to facilitators, discussing topics that are going well is time-consuming and not motivating for project team members as it does not contribute to the immediate improvement of a project. It also does not fit with the nature of gate reviews, focusing on project performance and correcting any deviations.

The facilitators initiated many reflection processes asking how

Table 6
The discussed topics in the gate reviews.

	Gate review A	Gate review B	Gate review C	Gate review D	Gate review E
Reflection topic	18 (64%)	20 (67%)	19 (66%)	26 (61%)	14 (78%)
Control topic	10 (36%)	10 (33%)	10 (34%)	16 (39%)	4 (22%)

specific project tasks were executed based on predetermined assessment criteria. The reflection processes evolved from an initial control aspect when participants reported challenges and difficulties. In three cases, we identified notable exceptions. In Gate Review B, three reflection processes were initiated by project team members themselves. In Gate Review D, project team members started the reflection three times based on their experiences. In Gate Review E, this happened five times. Another noticeable finding is that in Gate Review D, 6 of the 26 reflection processes occurred during the feedback moment at the end. According to project team members, different views of facilitators and project team members on the gate review initiated them.

4.2. Reflection phases

Although all reflection phases were covered in the identified reflection processes, not all were considered to the same extent (Table 7). All gate reviews show that later phases in the reflection process are less likely to be achieved. As initiating phase, *articulating experience* was present in all reflection processes. The next phase, *developing a shared understanding*, only occurred in 76% of the reflection processes. The last two phases occurred even less, with 67% for *collaborative re-evaluation* and 43% for *drawing collective outcomes*.

Particularly in Gate Reviews B, C, and D, attention was limited for the last two reflection phases, collaborative re-evaluation and drawing collective outcome. Participants focused on describing issues without evaluating whether an issue was seen as a challenge, problem, or positive experience. At the beginning of Gate Review D, the dialogue even went unstructured, and experiences were not placed as central discussion topics. Remaining descriptive implied an emphasis on checking the project's performance instead of learning from the issue at hand. The focus was more on understanding what happened than making sense of the experiences and improving the situation. A few reflection processes covered all phases in Gate Reviews B, C and D. Even though reflection outcomes were concluded in these processes, participants did not plan for actions or translate the outcomes into changed behaviour. No actions were yet taken based on the evaluation results two weeks after Gate Review B.

Participants performed many reflection activities in Gate Reviews A and E and achieved more reflection phases. Since both projects performed unsatisfactorily, challenges and problems were the main focus. Eventually, 61% of the reflection processes in Gate Review A and 50% of the reflection processes in Gate Review E achieved all reflection phases with much attention to the phases *collaborative re-evaluation* and *drawing collective outcome*. In both Gate Reviews, participants aimed to understand and learn from the experienced issues. In Gate Review A, the intention of the facilitators to understand and resolve these issues often led to the progression of the reflection process to the conclusion phase, in which the facilitators also gave much advice on how to improve. In four instances, the advice was built upon previous project experience. For example, for the problem of immature knowledge about the changes in the contract, one of the facilitators said: "*In prior projects, we have*

Table 7
The achieved reflection phases in the reflection processes.

	Gate review A	Gate review B	Gate review C	Gate review D	Gate review E
Articulating experience	18 (100%)	20 (100%)	19 (100%)	26 (100%)	14 (100%)
Developing an understanding of experience	14 (78%)	16 (80%)	14 (74%)	20 (77%)	10 (71%)
Re-evaluating understanding of experience	14 (78%)	13 (65%)	11 (58%)	14 (54%)	11 (79%)
Drawing reflection outcome	11 (61%)	8 (40%)	7 (37%)	7 (27%)	7 (50%)

invested in many lunch lectures about specific topics like contractual awareness and changes in the contract." In Gate Review E, the participants held a constructive dialogue in the *collaborative re-evaluation* phase by questioning each other's interpretations, adding perspectives, and determining the causes and effects of an experience. During the last reflection phase, they planned for action and explicitly stated implications for the organisation.

4.3. Reflection intensity

About 31% of all reflection processes could be characterised as *revisiting reflection*, 40% as *descriptive reflection*, 24% as *dialogic reflection*, and 5% as *critical reflection*. Most reflection processes concluded with the first two intensity levels (Table 8). Critical reflection is absent or seldom achieved. Noteworthy here is that *critical reflection* always resulted from reflection activities in the *collaborative re-evaluation* and *drawing collective outcome* phase. Most of the processes with a *dialogic reflection* also covered these two reflection phases. Reflection processes with a *revisiting intensity* remained within the first two reflection phases. When the number of achieved reflection phases increased, the intensity also increased. The reflection phases corresponded with the reflection intensities. This also means that gate reviews with more reflection phases achieved higher intensities. While in Gate Review E, 29% of the reflection processes finished with *dialogic reflection* and 14% with *critical reflection*, in Gate Review D, *dialogic reflection* was the highest intensity achieved in only 12% of the reflection processes. An explanation for the low intensities of Gate Review D is that participants often only explained an issue without exploring the underlying reasons for why it happened. This is in contrast with participants of Gate Review E. In this case, participants took multiple perspectives, questioned each other, and explicitly mentioned the broader implications of experiences.

4.4. Reflection role for learning

In all gate reviews, participants explicitly drew reflection outcomes for the project and the organisation (Table 9). 40% of all reflection processes finished with implications for the current project. In Gate Reviews A and E, most implications for the project per reflection process were concluded, 67% and 50%, respectively. Both gate reviews dealt with challenges and problems in the project, and participants mainly focused on improving the projects. In Gate Review D, implications for the project were only drawn in 15% of the reflection processes. Across all gate reviews, implications for the project mainly regarded the planning for action to change working practices in the ongoing project.

The number of implications drawn for the organisation varies less across gate reviews, and only in 14% of all reflection processes were such implications the outcome. In Gate Review B, the relatively high number of organisational implications compared to project implications can be attributed to the well-performing project through which the discussion focused more on what other projects may learn. For example, project team members explained that the client and the project team assess each other's work, and a facilitator concluded: "*I think this is a best practice which we need to implement further within the organisation*". However, in all gate reviews, the organisational implications were often

Table 8
The achieved reflection intensity in reflection processes.

	Gate review A	Gate review B	Gate review C	Gate review D	Gate review E
Revisiting	4 (22%)	8 (40%)	7 (37%)	11 (42%)	4 (29%)
Descriptive reflection	9 (50%)	6 (30%)	6 (32%)	12 (46%)	4 (29%)
Dialogic reflection	4 (22%)	5 (25%)	6 (32%)	3 (12%)	4 (29%)
Critical reflection	1 (6%)	1 (5%)	0%	0%	2 (14%)

Table 9
The role of reflection for learning in the gate reviews.

	Gate review A	Gate review B	Gate review C	Gate review D	Gate review E
Drawing implications for the project	12 (67%)	7 (35%)	7 (37%)	4 (15%)	7 (50%)
Drawing implications for the organisation	2 (11%)	4 (20%)	2 (10%)	2 (8%)	3 (21%)
Linking to other projects	8 (44%)	6 (30%)	3 (15%)	6 (22%)	3 (21%)
Linking to organisational knowledge	3 (17%)	1 (4%)	2 (10%)	0%	1 (3%)

not concrete actions but proposals for taking up specific issues at the organisational level and using well-experienced practices in other projects. For example, in Gate Review A, the lack of tender assumptions was discussed, and one of the facilitators stated: “We should really learn as an organisation to determine the target quantities and monitor the targets during the design process.”

There is a general tendency in all gate reviews that the more the reflection progressed, the more implications were formulated. While in 40% of the reflection processes that achieved the *articulating experience* phase, implications for the project were drawn, this was the case in 67% of the reflection processes with the *drawing collective outcome* phase. Likewise, implications for the organisation resulted from only 14% of all reflection processes with the *articulating experience* phase, whereas 33% of the processes with the *drawing collective outcome* phase finished with such implications. However, not all processes with many achieved reflection phases and a high intensity had implications for the organisation or the project. In Gate Review C, even in one reflection process, only a few reflection activities were conducted, but it finished at a *dialogic reflection intensity* and with implications for the organisation. Here, the topic regarded the use of 3D designs, which was already discussed in another gate review with the same facilitators and one of the project team members. Consequently, as they referred to the other gate review, the participants only needed a little discussion.

The analysis of the five gate reviews also revealed that with higher reflection intensities and more reflection phases achieved, experiences from other projects and organisational knowledge are more likely to be mobilised in the reflection process. In 26% of the reflection processes, the participants referred to experiences made in other projects, and in 8% of the processes, organisational knowledge was activated. Particularly in the phases *collaborative re-evaluation* and *drawing collective outcome*, project team members explored a project issue by comparing it to their existing cognitive frames built upon prior project experiences and accumulated organisational knowledge in the form of standards and

Table 10
The reflection conditions in the gate reviews.

	Gate review A	Gate review B	Gate review C	Gate review D	Gate review E
Opportunity	Time pressure (-) Challenging project (+) Guided dialogue (+) Little attention to the experience of the project team (-)	Guided dialogue (+) Little attention to the experience of the project team (-)	Time pressure (-) Lack of concentration (-) Focus on control (-) Little attention to the experience of the project team (-)	Time pressure (-) Simple project (-) Unexperienced facilitator (-) Little attention to the experience of the project team (-)	Challenging project (+) Open questions (+) Attention to the experience of the project team (+) Experienced facilitators (+)
Ability	Open about mistakes (+) Little discussion within the project team (-)	Little openness about mistakes (-) Little discussion within the project team (-)	Use of graphical material (+) Little discussion within the project team (-)	Lack of understanding (-) Little discussion within the project team (-)	Effective dialogue (+)
Motivation	Willingness to improve the project (+)	Willingness to improve the project (+)	Value of gate review was not seen (-)	Active participation of project team (+)	Discussion set by the project team (+) Active participation of project team (+)

(+) positive influence on reflection; (-) negative influence on reflection.

procedures. Across all gate reviews, this was done to emphasise that similar issues were encountered in other projects, to stress the relevance, to understand the causes and effects of the current issue, to propose solutions, and to provide advice. In Gate Reviews A, B, and C mainly, the facilitators made links to other project experiences and resorted to organisational knowledge. In Gate Review B, project team members explicitly asked how other projects deal with the issue. The facilitators then explained the procedures followed in other projects based on their experience and knowledge.

Notably, 10 of the 13 organisational implications resulted from discussions in which references were made to previous projects. The discussions revealed the relevance of a project issue for the broader organisation since the issue was already experienced in other projects in similar ways.

4.5. Reflection conditions

The emergence of reflection in the gate reviews was subject to several conditions relating to the opportunity, the ability, and the motivation to reflect (Table 10).

4.5.1. Opportunity to reflect

The facilitators played a critical role in shaping the reflection opportunity in the gate reviews. They did so by asking open questions, providing feedback, articulating their opinion, referring to previous experiences and knowledge, and giving advice. On the one hand, these activities contributed to the progression of reflection processes and gaining higher reflection intensities. On the other hand, the extent of engagement of facilitators, particularly in Gate Reviews A, B, and C, limited their attention to the opinions and perceptions of the project team members. The facilitators often dominated the conversation, a question-and-answer session rather than an open discussion.

Gate Review D additionally underscores the critical role of the facilitators. Here, the support for reflection was lacking. At the beginning of the gate review, the discussion was unstructured because the facilitators did not divide tasks between taking minutes and guiding the dialogue. One facilitator did both tasks making it difficult for him to focus on the discussion. The other facilitator did not actively participate. He had little experience with gate reviews and struggled with guiding the dialogue, asking critical questions, spurring reflection, and tapping the learning potential. For example, one reflection process started very promisingly, with a project team member elaborating that the way of organising projects needs to fit the time pressure associated with wind turbine projects. However, the facilitators did not pick up this chance to explore the organisational systems’ assumptions and instead focused on how the project team coped with the situation. The potential implications for the organisation were not exploited.

In Gate Review E, the facilitators chaired the gate review and

strongly emphasised making the gate review a dialogue between participants. They were critical during the review and asked searching questions to get to the bottom of the experience, letting participants reflect more intensely. There was a dialogue between the project team members and the facilitators and amongst the project team members. They questioned each other's interpretations, added relevant information if needed, and provided new perspectives on the experience, resulting in higher reflection intensities.

In Gate Reviews A, C, and D, facilitators repeatedly mentioned that the gate review should progress due to time constraints. For example, in Gate Review A, the reflection stopped in three processes, and the facilitators pushed the discussion to the following topic: "*We have to move to that topic considering the time left*". Although the time constraint limited the reflection opportunity, interviewed participants mentioned that all topics were sufficiently discussed. In Gate Review C, however, project team members felt the dialogue was rushed, and some issues were insufficiently discussed. This resulted in fewer reflection phases and lower reflection intensity per reflection process than in other gate reviews. Here, the facilitators also stated that they were tired due to conducting two gate reviews after each other and, therefore, were less focused.

4.5.2. Ability to reflect

The role of the facilitators already points to differences in the communication pattern between gate reviews. The facilitators in Gate Reviews A, B, C, and D, the dialogue was mainly driven by the facilitators and took place between them and the project team members and less amongst the project team members. This also included that the facilitators mainly provided conclusions with little involvement of the project team members. As a result, particularly in Gate Review D, project team members had a different understanding of project issues and did not agree with all conclusions. In Gate Review B, conclusions were not accounted for and did not lead to changes in the project. In Gate Review D, the facilitators also paid much attention to the project documents and thus lost focus on the dialogue. In Gate Review C, communication was additionally hampered as the facilitators were distracted due to tiredness. However, in this gate review, visual adds such as drawings and examples from other projects helped to reach a common understanding between project team members and facilitators. In Gate Review E, the experienced facilitators participated less directly in the discussion, stimulating and guiding the dialogue amongst project team members. Project team members entered a mutual discussion, challenged each other, and added multiple perspectives leading to a greater extent of reflection.

There are also differences in the openness about mistakes, particularly between Gate Reviews A and B. In Gate Review A, project team members explicitly spoke out their mistakes which contributed to the progress of the reflection process since project team members were willing to understand and solve critical issues. In Gate Review B, the openness to talk about problems was limited. A project team member contained himself during the discussion and awaited the implicit approval of the project leader to elaborate on problems. From the perspective of the interviewed project team member, around 5% of the topics were sugar-coated, making the reflection less genuine and thus of less value.

4.5.3. Motivation to reflect

Project team members of Gate Reviews A and E were highly motivated, as they saw the gate review as an opportunity to discuss critical project issues and receive feedback on improving the project. Their willingness to delve deeper into what went wrong and how to change current practices positively affected covered reflection phases and reflection intensity. In Gate Review A, project team members were considerably open to the facilitators' feedback and suggestions for improvement. In Gate Review E, the project team participants even prepared the gate review in advance and predetermined the topics for

discussion. The reflection became more relevant for them as they saw direct benefits from the reflection outcomes. The participants showed awareness of the organisational context, allowing them to question assumptions and actively draw implications for the organisation. In the other gate reviews, project team members actively participated without being critical of their actions and the innate drive to change the ongoing work. One project team member in Gate Review C explicitly stated that conducting a gate review on a well-performing project is less relevant.

5. Discussion

While previous studies emphasise the importance of reflection practices for project-based learning (Söderlund et al., 2008; Wiewiora, 2023; Duryan, 2023), an in-depth understanding of how reflection processes unfold and under which conditions reflection can become a learning mechanism is lacking. To address this knowledge gap, we disentangled reflection practices and investigated reflection processes, intensities, and conditions in five gate reviews of a Dutch contractor. Our findings suggest that reflection is a situated practice (Lave & Wenger, 1991) in projects and resembles the reflection-for-action mode since the main driver for reflection is the ongoing project. This reflection-for-action primarily creates the potential for learning within the current project. However, while reflecting on relevant project issues, links to previous projects are made, and implications for subsequent projects and the broader organisation are generated. Reflection-for-action in projects also acts as a mechanism for the learning between projects. To become a mechanism for learning within and between projects, reflection processes need to reach later phases and higher intensities. The chance of reaching them increases if project team members are motivated and supported to rethink relevant project issues for the adjustment and change of the ongoing project. We elaborate more on our main findings in the following sections.

5.1. Reflection-for-action as a learning mechanism in projects

In our research, gate reviews were the organisational settings in which reflection was triggered. The gate reviews exposed challenging and problematic issues that project team members experienced and perceived as relevant to the ongoing project. Hence, they were generally motivated to discuss them further. Our research suggests that reflection as a collaborative process of making sense of an experienced project issue is initiated when the issue is considered relevant to the project's performance. This reflection mode is neither fully retrospective and detached from the actual project work (reflection-on-action) nor thoroughly entwined with ongoing activities and immediately responsive (reflection-in-action). It instead addresses a relevant issue as part of ongoing project work so that the project team makes sense of the issue and eventually draws conclusions for further actions dealing with it. It thus resembles the *reflection-for-action* mode (Thompson & Thompson, 2023) situated in the context of an ongoing project. Our findings suggest that reflection-for-action can resolve the reflection dilemma in projects by being close enough to the daily work of the project team and, at the same time, creating a greater sense of managerial control for learning processes.

5.1.1. The potential to learn in and between projects through reflection

The desire of project team members to improve their understanding of a relevant project issue and to plan for further actions on this issue is the reason that in 40% of the reflection processes, implications for the current project were identified as to how the working practices could be changed. However, implications were not restricted to ongoing projects. Albeit, to a lesser extent, in 14% of all reflection processes, implications for the broader organisation were drawn. These implications often emerged from an issue encountered in other projects as well. They were an initial impetus to address this issue at the organisational level rather than planning for concrete actions. Our findings resonate with the

project-based learning literature that has pointed to the paradoxical nature of projects for learning (Swan et al., 2010; Bakker et al., 2011). Projects represent working environments that, in the first place, can stimulate reflection for learning within projects but provide fewer incentives to rethink work practices for learning beyond project boundaries. Our findings even show that reflection processes can take place without resulting in any implications or concrete actions for the project or organisation. Reflection is an essential ingredient of interpersonal project work to create the potential for project-based learning (Söderlund et al., 2008) but cannot guarantee that this potential is used.

Our analysis also shows that in 26% of the reflection processes, the participants mobilised experiences made in other projects, and in 8% of the processes, organisational knowledge was activated. Project team members discussed their understanding and framing of issues fed by these prior project experiences and organisational knowledge. This allowed them to interpret their understanding and enrich or adapt their cognitive frames (Crossan et al., 1999; Chang et al., 2021). Activating previous project experiences and organisational knowledge also helped identify and justify implications for the project or organisation. It was driven by the aim to improve the performance of the ongoing project (Zhao et al., 2022). In line with Hartmann and Dorée (2015), our research stresses the role of reflection as a learning mechanism through which knowledge from previous projects is enacted to create meaning and understanding and institutionalised in project work practices. Through reflection-for-action, the learning in projects can be interlinked, constituting the learning between projects.

5.1.2. The influence of reflection process and intensity on the potential to learn

Our research suggests that the chance for reflection-for-action to become a mechanism for the learning in and between projects increases if the reflection process progresses to later phases and attains higher reflection intensities.

While in 40% of the reflection processes that achieved the *articulating experience* phase, implications for the project were drawn, this was the case in 67% of the reflection processes with the *drawing collective outcome* phase. Likewise, implications for the organisation resulted from only 14% of all reflection processes with the *articulating experience* phase, whereas 33% of the processes with the *drawing collective outcome* phase finished with such implications. With the progress of the reflection process, it is also more likely that experiences from other projects and organisational knowledge are mobilised. This particularly holds for the phases *collaborative re-evaluation* and *drawing collective outcome*.

The chance for drawing implications for the project or organisation and activating prior experiences also increases with the reflection intensity. Here, project implications relate to descriptive and dialogical reflection intensities, whereas organisational implications are mainly linked to a critical reflection intensity. This is not surprising since critical reflection intensity is characterised by scrutinising project work's underlying assumptions and beliefs (Matsuo, 2019). This in-depth enquiry into a project issue and giving sense to it can also explain that participants referred to prior project experience in 60% of the reflection cycles with critical reflection.

These findings indicate that the intensity of the reflection correlates with the performed reflection phases (Jung & Wise, 2020). Reflection processes that at least covered the phase *collaborative re-evaluation* showed higher reflection intensities than processes with fewer phases. This also implies fewer processes with higher intensities than lower ones since processes including all phases occurred to a lesser extent. The correlation between the reflection phase and intensity can be mainly traced back to the reflection activities performed in the phase *collaborative re-evaluation*. Exploring causes and effects, adding different perspectives, and challenging existing interpretations are all essential activities for a deeper consideration of an experienced issue (Fleck & Fitzpatrick, 2010).

5.2. Reflection context

Being a situated practice embedded in localised, variegated, and interpersonal project work (Edmondson, 2002; Swan et al., 2010), reflection does not naturally lead to learning. The differences in the extent of reflection between the investigated gate reviews indicate this. The investigated reflection practices were contextually embedded in an interplay of issue relevance, project team motivation, facilitator role, and time.

5.2.1. Relevance and motivation as a key driver for reflection

Our findings show that the perceived relevance of an issue and the project team's motivation to explore this issue are key drivers for initiating and propelling reflection-for-action processes in projects. This combined effect of relevance and motivation also accounted for the achieved reflection phases. If project team members did not see the relevance of exploring an issue further, they mainly remained within the first two phases. The reflection processes in Gate Reviews A and E more often went through all phases than in the other three gate reviews. Both reviews related to projects that were perceived as difficult and problematic. Project team members were not only interested in sharing their experience of an issue. They also tried to identify possible causes for the occurrence of the issue, develop different perspectives on and alternative explanations for the issue, and formulate actions and advice for improving it. Particularly in Gate Review E, the project team prepared for the review by determining the issues they wanted to discuss. It is also unsurprising that most of the implications were drawn in Gate Reviews A and E. Because of the difficulties and problems they faced, participants focused more on potential project changes or improvements than other gate reviews.

5.2.2. The role of the facilitator for reflection

Conducting complete reflection processes and achieving high reflection intensities are not only a matter of relevance and motivation. Reflection-for-action as collaborative practice in projects also needs to be facilitated. This is in line with Chang et al. (2021), who posit that project leadership is essential for making the mental models of project team members explicit and resolving conflicting models. However, the facilitating role in reflection-for-action processes goes beyond merely discussing and evaluating mental models. As our findings suggest, facilitators need the capability to guide the dialogue between project team members and support them in opening up to experienced project issues, revealing their own experiences with these issues, mobilising prior experiences with similar issues, referring to inconsistencies and assumptions in the reasoning of other, and proposing ways of dealing with the issues (Hilden & Tikkamäki, 2013). Fulfilling this facilitating role directly helps project team members enhance their work practices on which reflection occurs (Helyer, 2015). Here, the role does not need to be taken by the leader of a project but can be assumed by other project team members and persons external to the project as well. In the five gate reviews, this role was taken by contractor employees working for central departments and being involved in other organisation projects. Although project leaders might be predisposed to broker learning within project teams (Wiewiora et al., 2020), our results indicate that for reflection to emerge, it is not so much the position of the facilitating person that matters but rather their capability of asking the right questions.

5.2.3. Time for reflection is necessary but not sufficient

Time for learning and reflection is often reoccurring in literature (Keegan & Turner, 2001; Swan et al., 2010; Hartmann & Dorée, 2015). Time also played a role in the investigated gate reviews. However, stopping the discussion did not always mean the reflection process was prematurely interrupted. Issues were often sufficiently discussed before the time constraint was mentioned. Our results indicate that time is a necessary but insufficient condition for project reflection-for-action.

When time is lacking, project team members cannot reflect satisfactorily (Sense, 2004). Nevertheless, when ample time is available, reflection does not necessarily increase. Whether the available time is sufficient depends on the number of relevant issues to be discussed and the extent of this discussion. The more reflection phases and the higher the reflection intensity, the more time is needed. Here, it is again the role of the facilitator to allow for an effective reflection process by sensing the relevance of issues, guiding the reflection process, and highlighting when issues were sufficiently discussed to move on to others.

6. Conclusions

Although there is consensus amongst scholars that reflection is essential for learning in and between projects, prior research has not further expounded the role of reflection as a learning mechanism in projects. Our study on five gate reviews provides deeper insights into how reflective practices unfold in projects to enable learning and under which condition reflection can become a learning mechanism. Our research particularly suggests reflection-for-action as the reflection mode that can tap into the learning potential of projects and resolve the learning dilemma in projects. Reflection-for-action keeps close contact with the immediate work of project teams while being a manageable practice. However, our research also demonstrates that reflection does not guarantee that learning effectively takes place. For reflection to become a project learning mechanism, the reflection process needs to proceed to later phases and higher reflection intensities. Achieving such a more significant extent of reflection strongly depends on the relevance of the issue at hand, the motivation of project team members to discuss this issue, and the reflection support they receive during the discussion.

6.1. Practical implications

Our findings have two managerial implications. First, project-based organisations should give reflection-for-action a place in project work to stimulate learning in and between projects. This does not mean decoupling reflection from daily practices but rather putting more attention to reflection as an ingredient of these practices. The investigated gate reviews show how reflection-for-action can be triggered by discussing project-relevant issues. In general, project meetings and team sessions are organisational settings in ongoing project work in which reflection can be facilitated to increase the understanding of project issues and planning for change or improvement. Here, asking the right questions to guide project teams through the reflection process and achieve higher reflection intensities will be essential. Such questions should create awareness for project issues, bring together different perspectives on these issues, incorporate experiences made in previous projects, and scrutinise taken-for-granted assumptions.

Our second managerial implication then refers to the role of the facilitator in encouraging project team members to consider project meetings and team sessions as opportunities to reflect. In their role, the facilitators should ask the right (critical and searching) questions about relevant project issues to elicit the experience of project team members about the issues, the underlying causes, and whether issues and causes are shared between them. They should also stimulate and guide the discussion amongst project team members and help them make sense of experienced issues by referring to similar experiences in other projects and organisational knowledge and pointing to other possible perspectives on the issue. On a practical note, our conceptualisation and operationalisation of reflection phases and intensities (Table 3 and Table 4) could support facilitators in this respect.

A challenge for project-based organisations is to decide whether a person should be appointed to the facilitating role or whether the role should naturally emerge. The first option might be favourable in settings that more formally check the progress of projects, such as gate reviews and milestone sessions. The second option might be suitable for settings not representing designated project checkpoints, such as regular team

meetings. In both cases, the participation of project team members in reflection training can help build the required reflection capabilities and create awareness for reflection benefits.

6.2. Limitations and future research

In the presented research, gate reviews were the organisational settings where reflection-for-action occurred. This can be seen as a limitation of our study since gate reviews' "checkpoint" character may induce a strong focus on project performance. Thus, reflection-for-action may become the predominant reflection mode. Other reflection modes could prevail in project settings with a less formal character. Future research could investigate the extent and mode of reflection in these settings and their role for project-based learning. Here, it would be particularly interesting to study regular project meetings, the opportunities they offer for reflection, and the manageability of the reflection process in these settings. The latter points to the role of the facilitator, and future research may examine the extent to which project team members take up this role.

The single case of a Dutch contractor limits the generalizability of our research. In other industries, business processes are often less organised through projects, with organisations using projects strategically to develop and implement new services and products. Our findings would benefit from further research on reflection in these industries and its role for the learning from projects for organisational practices rather than the learning between projects.

Another limitation of our study is its cross-sectional nature. Our research only explicates how reflection practices create the potential for learning in and between projects by enacting knowledge and experiences gained in previous projects and drawing implications for project work beyond the current project's fences. A worthwhile avenue for future research is the more longitudinal exploration of reflection as a practice linking different projects and, by doing so, forming learning trajectories across projects. The extent to which such implications are taken up in the context of subsequent projects and enriched through contextually embedded reflective practices may then further advance our understanding of the effectiveness of reflection as a project learning mechanism.

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