



What is left unshared: using a third space lens to explore information sharing behaviour within scrum in agile software development

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Abstract

Introduction. Examines information sharing and withholding within the scrum framework (an agile software development methodology) through a third space lens. Transparency is vital within scrum. However, in practice, transparency is limited; team members frequently negotiate what information to share and what to withhold. A third space lens can explore transparency according to rigid, formal scrum framework requirements versus how transparency is practised in real-world teamwork. It forms a middle zone (third space) where rigid structures (first space) and informal, lived realities (second space) intersect. Here, different viewpoints, discourse styles, knowledges are created. A third space lens can reveal how culture, context and relationships shape what information is shared, withheld, or negotiated.

Method. Scoping literature review on information sharing in agile, scrum and software development literature and use of a third space lens, combined with findings from individual interviews from a use case to exemplify information withholding in scrum.

Analysis. Thematic analysis of literature and interview data.

Results. Information sharing and withholding are negotiated practices in scrum. Information withholding is often conscious, intentional personal or strategic decisions, indicating agency, power dynamics.

Conclusion. Further research on practical implementations might inform information behaviour research in other contexts and information sharing practices in scrum.

Introduction and rationale

Rapid and continuous technological developments put pressure on organisations to develop new business models and frameworks, and change their mindsets to accommodate adaptability, innovative thinking, and constant focus on satisfying market demands (Tshabalala and Marnewick, 2021). That is especially true for software development, where many companies are adopting agile methodologies (Muthucumaru, 2021) to adjust to ever-changing business environments, approaches, standards and practices. 'Agile methodologies are a group of software development methods based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organising, cross-functional teams and customers' (Kaur and Jajoo, 2015, p. 832). Numerous agile methodologies have been introduced over the years (e.g., Scrum, Lean, eXtreme Programming [XP], Kanban). Scrum is one of the most widely used project management frameworks in agile methodologies in the software industry (Dada and Sanusi, 2022; Kadenic et al., 2023). It is an incremental and iterative framework for software development that includes a set of values, principles, roles, events, and artefacts to create an environment that promotes transparency, flexibility, and adaptation (Kadenic et al., 2023). One of the key strengths of scrum is its emphasis on transparency, communication and information sharing (Petter, 2018). This serves as the life force that fuels collaboration, trust, mutual learning, and successful project delivery among cross-functional teams (Dixit and Bhushan, 2019; Downey and Sutherland, 2013; Lee et al., 2024). Transparency in scrum requires that all information relevant to the project must be shared and visible. However, in practice, transparency is limited, as team members frequently negotiate what information to share and what to withhold (Collignon et al., 2022; Diebold et al., 2015; Masood et al., 2020; Petter, 2018). Van der Valk et al. (2018, p. 23) define transparency 'as the degree/level of information that is shared' among all stakeholders involved in agile projects. Hosseini et al. (2016) note that transparency in agile is crucial for understanding the intended degree of information shared between partners, particularly with respect to openness, efficiency, and accountability, as well as for informed decision-making. Information sharing in scrum enables teams to track progress, identify issues, implement changes and overcome complex tasks (Petter, 2018). However, Petter (2018) points out that in practice, information is not always fully shared. He explains that team members may choose to withhold, reframe, remain silent or filter information due to the potential negative impact on team members, the organisation, or project outcomes.

As teams become more diverse and projects become more dynamic and complex, there is a need to understand transparency, information sharing, and withholding in ever-changing landscapes (van Engelenburg et al., 2019; Klein et al., 2010; Muthucumaru, 2021). Thus, it is essential to understand information behaviour and, in particular, information sharing practices from an information behaviour lens (Savolainen, 2019). Acknowledging a variety of information behaviour definitions (Bates, 2010; Case, 2012; Ingwersen and Järvelin, 2005; Savolainen, 2007; Wilson, 1999), this paper defines information behaviour as an umbrella concept that encompasses all information-related activities, including information sharing, seeking, encountering, withholding, avoidance, use, recognition, processing, articulation, and making sense of information needs (Fourie and Julien, 2014). Savolainen (2017, Discussion, para. 3) notes that limited research has been done on information sharing and withholding in comparison to information seeking and retrieval. Understanding transparency, information sharing, and information withholding within the scrum framework and in the lived realities of teams can offer a more realistic view of how collaboration unfolds in practice. But even more, it can highlight how individuals continuously negotiate what they share or withhold, often due to personal, strategic or protective reasons. To gain this understanding, the researchers explore the use of a third space as a theoretical lens.

Third space as a theoretical lens has been applied in various contexts, including education (Beck, 2024; Sedawi et al., 2023), library and information science (Elmborg et al., 2015; Kuhlthau and Cole, 2012), human-computer interaction and participatory design (Hansen et al., 2021), and linguistic

and cultural studies (Källén, 2021; Maddamsetti, 2023). Homi Bhabha (1994) introduced third space as a postcolonial theory. He defines third space as a liminal or in-between space where cultures intersect, creating hybrid identities, new meanings, and opportunities for resistance and challenge to dominant discourses (hegemonic narratives) (Bhabha, 1994). This space can be virtual, physical, or conceptual, where negotiation and translation among different cultures, discourses, and identities collide and merge to form something new (Hite et al., 2018; Jordan and Elsdén-Clifton, 2014). Thus, this lens offers the opportunity to examine how transparency in scrum emerges through practices of information sharing and withholding, which are shaped by context, culture, and power.

In essence, using a third space lens can allow us to understand scrum not as a rigid structure but as a dynamic, living environment where collaboration and information sharing are continuously renegotiated. With this in mind, the paper endeavours to address the following research question:

How can a third space lens be utilised to understand information sharing and withholding in scrum teams in agile software development?

Sub-questions to be answered include:

RQ1: What has been reported in the literature on information sharing, third space lens and scrum in software development?

RQ2: What can be learned from the literature in combination with empirical findings from individual interviews at a use case applying scrum to understand information withholding in software development teams?

RQ3: How can insights from RQ1 and RQ2 be combined to exemplify the potential of third space as a lens to understand information sharing and withholding in scrum?

Apart from the introduction and rationale, the paper will clarify key concepts (agile, scrum, information sharing, information withholding and third space); methods applied in the paper (an exploratory scoping literature review based on thematic analysis of information sharing, third space lens and scrum in software development combined with empirical findings from individual interviews on information withholding at a use case); mapping third space lens themes for application in use case; a discussion of findings from the literature and use case to exemplify the potential of third space as a lens to understand information sharing and withholding in scrum; recommendations for further work, and a conclusion. The use case was conducted in mid-August 2022 with a scrum team from an international automobile company.

This paper aims to shift our focus away from viewing scrum purely as a set of formal, rigid structures and instead explore how these ideals intersect with real-world practices in teamwork discourse and information sharing from a third space lens.

Clarification and contextualisation of concepts

Concepts are defined in the order they first appear in the text. A more detailed discussion is used to support the contextualisation of the concepts (not explained elsewhere in the paper) for purposes of the paper, thus providing a richer understanding of their meaning and application.

Agile methodology

Agile methodology (highly valued in software development) is an umbrella term for project management and software development approaches and practices (e.g., Scrum, Lean, eXtreme Programming [XP], Kanban) (Goyal et al., 2023; Hinderks et al., 2022; Muthucumaru, 2021). Agile is iterative, incremental, and evolutionary, allowing collaboration and rapid responses to changes in people, technology, and environments. It uses 'just enough ceremony' (e.g., scrum events) to meet the changing needs of stakeholders and society (Beck et al., 2001; Laanti et al., 2013; Pardo et al.,

2021). It is highly valued in software development (Muthucumaru, 2021). The paper will focus on the scrum framework.

Scrum

Scrum, a project management framework in agile (Beck et al., 2001), works by breaking large services and products into small pieces that can be completed (and potentially released) in short timeboxed iterations (also known as sprints) (Muthucumaru, 2021). Sprints can last between one and four weeks and occur consecutively with no breaks in between (Baxter and Turner, 2021). Each sprint begins with a sprint planning meeting, has daily progress sessions (daily stand-ups), and concludes with a sprint review meeting and a retrospective meeting. These scrum events offer a variety of communication mechanisms designed to enhance communication, information sharing, and feedback in product development (Baxter and Turner, 2021). Thus, creating a scrum information sharing ecosystem.

Information sharing

Sonnenwald (2006) defines information sharing as a

set of activities by which information is provided to others, either proactively or upon request, such that the information has an impact on another person's (or persons') image of the world, i.e., it changes the person's image of the world, and creates a shared, or mutually compatible working, understanding of the world. (Introduction, para. 1)

Savolainen (2007, p. 1) explains that 'in the broadest sense, information sharing may include providing information, receiving information provided by other people, confirming receipt of the information, and confirming that the information is jointly understood'. The process of information sharing thus includes two main aspects, that is, giving information to others, and receiving information provided by the information giver (Pilerot, 2012). Additionally, Gholami et al. (2022) highlight that 'information sharing as an activity is the result of cooperation and collaboration of individuals, enables participants to create collective knowledge, maintain collaborative awareness and create a common understanding' (p. 954).

Various related terms like information exchange, information transfer, and information giving appear in information behaviour literature. However, this paper focuses only on the term information sharing.

Operationally, 'information sharing behaviour describes the explicit and implicit exchange and sharing of data between people, groups, organizations and technologies' (Widén and Hansen, 2012, Information sharing section, para. 1). In addition, information sharing could occur synchronously (i.e., in real-time) or asynchronously (i.e., non-real-time) and can both take place through face-to-face dialogue as well as through online conversations as complementary forms of mutual exchange to achieve a common goal (Du, 2014; Pilerot, 2012; Savolainen, 2017).

Information withholding

Talja (2002, p. 153) discussed the occurrence of non-sharing, where respondents withhold relevant information or consciously refrain from disclosing acquired information to others. Hence, respectively, making two distinctions between non-sharing as withholding information and retaining information. Both concepts refer to participants who considered sharing information but ultimately decided not to do so. Almeahmadi et al. (2014) defined information withholding as 'a type of information sharing, i.e., deciding to keep it to oneself'. Haas and Park (2010) define information withholding as the 'intentional failure to share potentially useful information with others' (p. 873). Huisman et al. (2020) define it as the decision to share or not to share information due to a conscious consideration of keeping the feelings, wishes, and (information) needs of others in mind.

From an agile software development perspective, information withholding has been linked to employee silence (Petter, 2018). ‘Silence in IS [information systems] projects occur in a variety of ways, including withholding information, reframing information in a more positive light, or delaying the reporting of information’ (Petter, 2018, p. 43). Therefore, withholding (intentionally not sharing) information about an individual’s behaviours, thoughts, and feelings regarding their organisational circumstances.

Operationally, information withholding, described as a non-sharing behaviour, is the intentional decision to keep relevant information to oneself or choosing not to share information due to its perceived lack of relevance to a problem or context or the conscious consideration of others’ feelings, wishes, and information needs.

Third space

The concept of third space was originally developed to define a physical public space distinct from one’s home (first space) and work environment (second space), where informal meetings could take place, known as a Third Place. This place-based space has evolved over time also to include virtual, conceptual and imaginary spaces (Singh and Kender, 2023). Therefore, moving from Third Place, which is geographically bounded, to third space, which is more abstract, conceptual, and fluid.

Emphasis on nature and characteristics of the space: Initially, third space was seen as a social setting for interaction and dialogue (Oldenburg, 1989, p. 16), where individuals from diverse backgrounds can meet, share experiences, and create new meanings (Bussert-Webb and Lewis, 2021). However, there has been a shift from viewing third space as a space to a theoretical framework. Theorists Homi Bhabha (1994) and Edward Soja (1996) realised that this space offered much more than just a location (space), but a conceptual theory (lens) that provided new ways of viewing new identities, knowledges, and cultural meanings developed through hybridity and negotiation. Bhabha (1994) defines third space theory as an ‘*in-between* space in which identities and literate, social, and cultural practices developed characterized by *hybridity*’ (i.e., hybridity theory). Similarly, Soja (1996) describes third space as a hybrid, transformative space where traditional binaries and static notions of identities are challenged, allowing for new forms of cultural practices and social relations to emerge (i.e., spatial theory). Apart from this body of work, interest has also developed in using third space as a theory (lens) (Beck, 2024). This will be the focus of this paper.

Emphasis on the potential as theoretical lens: third space theory has been applied in several disciplines, for example, in education, it is used to bridge students’ everyday life experiences, cultural practices and languages, with academic knowledge to co-create new knowledge (Maniotes, 2005; Tatham, 2023; Veles, 2022); in communication and cultural studies to understand cultural hybridity, identity negation, and plurilingual (Källén, 2021; Maddamsetti, 2023), library and information science to understand social inclusion and co-construction of new worldviews (Elmborg et al., 2015; Kuhlthau and Cole, 2012); and participatory design to ‘challenge assumptions, learning reciprocally, and creating new ideas, co-creation of identities, understandings, relationships, and polyvocal (many-voiced) dialogue across and through differences’ (Preben et al., 2021, p. 42). The original concept of Third Place has also been noted in work on informal information sharing and information grounds (Fisher et al., 2005, 2007; Savolainen, 2009).

Operationally, a third space lens is defined as a space that is a hybrid, transformative space (which can be a physical, virtual, conceptual or imaginative space) where individuals negotiate their disciplinary boundaries (crossing boundaries), degree of information shared, establish a shared understanding, build trust, form new identities, and celebrate the richness of diverse cultures, languages, perspectives and experiences. Its purpose as a theoretical lens, explaining a phenomenon, is to transform discourse that addresses complex problems (e.g., moral and ethical

issues), promote transparency, and foster fruitful collaborations that enable a more innovative and interconnected society (Maaß and Buchmüller, 2018; Roundtree and Shirzadian, 2020).

Method and analysis

The paper is based on (i) an exploratory scoping literature review and (ii) empirical findings from a use case.

- (i) The exploratory scoping literature review aims to identify the information sharing practices in scrum teams during software development viewed through a third space lens. We, therefore, focused on:
 - studies looking at the use of third space as a lens in any context (theoretical grounding).
 - studies explicitly dealing with information sharing in agile, scrum and software development (study context).
 - studies mentioning the use of third space in agile, scrum and software development (theoretical application in study context).
- (ii) The empirical findings are from a multimethod qualitative information behaviour study conducted at an international automobile company in South Africa that uses scrum. Data were collected through observation, digital diaries and individual interviews in one scrum team. This paper will report only on the post-sprint face-to-face individual interviews conducted in mid-August 2022 with eight team members, providing deeper and richer insights into the reasons why information was intentionally not shared. Informed consent was received from participants, and permission from the institutional ethics board.

Search strategy and eligibility criteria for scoping literature review

Key library and information science, business, information technology and multi-disciplinary databases were searched such as Library and Information Science Abstracts (LISA), Library Information Science and Technology Abstracts (LISTA), Library and Information Science Source, Emerald Insight, Web of Science (Clarivate Analytics), ScienceDirect, EBSCOhost, ProQuest, Scopus, ACM Digital Library, ABI/INFORM Collection, IEEE Xplore, and SpringerLink were searched. To ensure we did not miss anything, Google Scholar was used as a complementary search tool to identify interdisciplinary and emerging work not consistently indexed in the selected databases. This extended the systematic search strategy described earlier. We performed the following searches on the aforementioned databases:

1. Third space theory or lens in combinations of title, abstract and keywords.
2. Information sharing (in the title of the document) in combination with either agile, scrum or software development, in combinations of title, abstract or keywords.
3. Third space in combination with either agile, scrum or software development, in combinations of title, abstract or keywords. This is to broaden the search, since limited literature is available.

The following eligibility criteria were applied for manual selection on all of the above searches: only full-text publications in English; articles, full-text conference papers, books and book chapters; and no limit on publication date. All retrieved documents were uploaded to Covidence, a systematic reviews tool that integrates PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), and reviewed by one author and subsequently checked by the other authors. These were the outcomes:

- Search one: a total number of 51 documents were retrieved. Twenty-three (23) duplicates were removed. The remaining 28 documents were screened and selected based on the aforementioned eligibility criteria. Eleven (11) documents were excluded due to not meeting the eligibility criteria (i.e., wrong scope and source type). Only 17 papers remained for the review.
- Search two: a total of 42 documents were retrieved. Eleven (11) duplicates were removed. The remaining 31 documents were screened and selected based on the aforementioned eligibility criteria. Twenty-five (25) documents were excluded due to not meeting the eligibility criteria (i.e., wrong context, wrong source type or wrong/limited concept use, i.e., articles focusing on agility rather than agile methodology or only referring to terms once) were excluded. Only six (6) papers remained for the review.
- Search three: a total of five documents were retrieved. Zero (0) duplicates were retrieved. The remaining five (5) documents were screened and selected based on the aforementioned eligibility criteria. One (1) document was excluded due to not meeting the eligibility criteria (i.e., use of concepts). Only four (4) papers remained for the review.

To structure the findings from the literature, we used thematic analysis. Thematic analysis is ‘a method for systematically identifying, organising, and offering insight into patterns of meaning (themes) across a data set’ (Braun and Clarke, 2012, p. 57). We identified themes related to information sharing in scrum for further analysis. These findings will be combined with the empirical findings to illustrate the potential of third space as a lens (i.e., third space theory) for understanding scrum teams’ information sharing and withholding during agile software development.

Several approaches exist for thematic analysis, for example, inductive, deductive, semantic, latent, (critical) realist, essentialist and constructionist approaches (Braun and Clarke, 2012). This paper followed an inductive approach. Thus, the content of the literature directed the coding and theme development.

Identifying themes from the literature

We start with analysing literature on (i) third space as a theory and lens, followed by (ii) examining literature on information sharing in agile, scrum and software development, and (iii) concluding with literature that explores the use of third space in agile, scrum and software development.

Theoretical grounding: Understanding third space as a lens

A total of 17 articles were identified that could substantiate our decision to use third space as theoretical lens to study information sharing and non-sharing behaviour in a scrum team. We specifically focused on how a third space lens is defined, applied and the purpose of using it within various contexts.

Definitions of third space as a lens are predominantly from education and cultural studies. Across the 17 articles, most studies began by defining third space as a concept (the space itself), for example, conceptual, physical or imaginative space, and then examining its application as a theoretical lens. Third space is first defined as a space, zone, territory, place or interstice (Benson, 2010; Bryant, 2013; Verbaan and Cox, 2014; Witenstein and Cervantes, 2020; Zhang and Yuan, 2019; Zhu et al., 2020) that offers a lens (theory) to view negotiations, knowledges, identities, and cultural boundary crossing, thus enabling various dialogues, meaning-making and collaborations to emerge (Balloo et al., 2024; Bartmes and Shukla, 2020; Sedawi et al., 2023; Levy, 2008). Delving deeper into what a third space lens can entail, the following themes emerged:

- (i) Hybridity and in-betweenness (liminal) (e.g., Balloo et al., 2024; Levy, 2008; Zhang and Yuan, 2019; Zhu et al., 2020).
- (ii) Co-construction and negotiation (e.g., Maddamsetti, 2023).

- (iii) Agency, identity and resistance (e.g., Beck, 2024; Benson, 2010; Bryant, 2013; Witenstein and Cervantes, 2020).
- (iv) Cultural and worldviews (knowledge systems) integration (e.g., Bartmes and Shukla, 2020; Idrus, 2015; Kang, 2017; Ramkellawan-Arteaga, 2020; Sedawi et al., 2023).
- (v) Transformation and educational dimensions (e.g., Jordan and Elsdon-Clifton, 2014; Tatham, 2023; Verbaan and Cox, 2014).

A condensed view of the 17 articles and how they define a third space lens is presented in Table 1, Appendix A.

Attention then shifts to how a third space lens is applied and its purpose. The same 17 articles were analysed. Across the literature, third space examines identity formation and negotiations across intersecting boundaries and hybrid contexts. Balloo et al. (2024) examine identity formation where professional boundaries intersect, highlighting the fluidity of identities within institutional structures. Bartmes and Shukla (2020) apply the lens to transformative intercultural learning to support decolonising education via blending indigenous knowledge and academic knowledge. Beck (2024) reviews third space use in teacher education, revealing depoliticisation and misapplication. Benson (2010) explores learner agency and literacy resistance to motivate for inclusive multimodal literacy practices, while Bryant (2013) examines agency and language as crucial sites for racial and gendered identity reconstruction.

Idrus (2015) links cultural values, personal experience, and curriculum texts to foster shared identity and intercultural understanding. Jordan and Elsdon-Clifton (2014) examine the formation of hybrid technological identities in education to challenge technocentric research binaries, and Kang (2017) investigates cross-cultural literacies as spaces of conflict, negotiation, and hybridity. Levy (2008) focuses on bridging home and school literacies to negotiate reader identity, while Maddamsetti (2023) examines teacher advocacy for emerging bilingual learners as a way of navigating tensions and challenging binary views. Ramkellawan-Arteaga (2020) highlights identity complexity and the role of educator support in moving beyond fixed labels. These studies emphasise the role of culture, context, and practice in identity negotiation in third spaces.

The remaining studies focus on the use of third spaces to promote culturally responsive and power-conscious practices. Sedawi et al. (2023) explore the blending of Indigenous knowledge and Western knowledge to explore culturally relevant, context-specific learning. Tatham (2023) examines identity negotiations and meaning-making in multicultural classrooms to foster agency and negotiate power dynamics. Verbaan and Cox (2014) analyse boundary crossing between academic research and professional services to understand hybrid roles, while Witenstein and Cervantes (2020) illustrate how familial and academic contexts merge to shape hybrid identities and gendered academic decisions. Finally, Zhang and Yuan (2019) examine the intersections of classroom practice, research, and policy to explore boundary crossing in identity formation, and Zhu et al. (2020) focus on student teachers' identity construction during teaching practicums, highlighting how reflective hybridity can bridge theory and practice.

Themes relating to the application of a third space lens and its purpose have been identified and are presented in separate sections to maintain clarity. The following themes emerged when focusing on the application of third space as a lens for:

- *boundary crossing and bridging practices* between home/school, Indigenous/Western knowledge, theory/practice, and academic/professional domains (e.g., Zhu et al., 2020);
- *tension negotiation, dialogue engagement, and co-creation of meanings* across professional, institutional and cultural boundaries (e.g., Tatham, 2023);
- *binaries, identity reconstruction, agency reclamation and challenge marginalisation* within diverse groups (e.g., Maddamsetti, 2023);

- *blending of academic, Indigenous and local knowledges* within education and research (e.g., Sedawi et al. 2023);
- *the transformation of pedagogical/learning environments and professional practices* to support collaboration (e.g., Bartmes and Shukla, 2020).

The following stood out when analysing the purposes for which a third space lens to deepen our understanding of how to:

- *transcend binary thinking and foster inclusivity* for holistic learning, knowledge and identity creation (e.g., Bartmes and Shukla, 2020; Maddamsetti, 2023);
- *recognise complex interactions* in co-transformations and co-meaning-making to construct shared interpretations (Benson, 2010; Idrus, 2015);
- *challenge dominant discourses* and empower *marginalised voices* to promote equal participation (Tatham, 2023);
- *validate multiple worldviews* and *decolonise knowledge systems* to promote inclusive and context-specific understandings, and (e.g., Bartmes and Shukla, 2020; Sedawi et al., 2023);
- *enable innovation* that leads to new ideas, insights, and practices (Levy, 2008; Zhu et al., 2020).

A condensed view of the 17 articles and how they applied a third space lens and the purpose of using it is presented in Table 2, Appendix B. Overall, in educational and cultural contexts, a third space lens is applied to examine and analyse boundary crossing, role and identity negotiations, agency reclamation, different knowledge systems, and transformation in pedagogical, professional practices. The third space lens is used to achieve a specific outcome (purpose), namely: to understand complex, fluid identities; challenge dominant discourses and binary thinking; validate multiple worldviews; and understand how innovation leads to new ideas, insights and practices.

The analysis of information sharing literature in agile, scrum and software development contexts will provide insights into information sharing behaviour, interactions, and communication in such contexts that can be combined with the theoretical grounding gained in this section to shape the third space lens that will be applied to study non-sharing in a use study applying scrum.

Information sharing in agile, scrum and software development

Huisman et al. (2020) note that few studies have focused on information sharing due to its multifaceted communicative manifestations, surrounded by prevailing conceptual multitude and vagueness (Pilerot, 2012; Savolainen, 2017). Almehmadi et al. (2014) developed a framework to support our understanding of the what, which, how and why information is shared. Although the aforementioned framework could be used to investigate the information sharing behaviour during scrum, it does not include why information is not shared (non-sharing). Thus, the authors will have to include the ‘why not’ (non-sharing) when analysing the corpus of work focusing on information sharing during product design in agile, scrum, and software development. Relatively few studies have focused on non-sharing (Grubb and Begel, 2012; Mombeshora and Dekoninck, 2013; van Engelenburg et al., 2019). A total of six studies were selected to be reviewed based on the eligibility criteria noted earlier. Table 3 presents how these studies relate to what (content shared), how (methods used), why (motivations) and why not (non-sharing) information was shared, based on an adapted list of information sharing dimensions from Almehmadi et al. (2014).

The following was evident:

Authors	Information sharing findings
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Cho and Song (2023)	What: Ideas; data structures (e.g., databases); algorithms; solutions; contextual information (i.e., about environment, situation).
	How: Internet of Things, applications, devices.
	Why: To support conceptual integrity in achieving the project purpose; managing complexities to solve problems; ensuring high-quality information; and empowering context awareness to provide suitable responses to changing requirements.
	Why not: Unstructured information in the wrong format.
Grubb and Begel (2012)	What: Source code; bug databases; testing plans; project specifications; release schedules; project schedules.
	How: Face-to-face, computer-mediated team meetings; emails; instant messages; phone calls; via entries on Collaborative IDE (i.e., coding platform).
	Why: To promote individual and group awareness (i.e., progress on a project in teams and problems); to perform work tasks.
	Why not: Poor communication practices; sense of control; failure to comprehend request; social biases (through team isolation); organisational culture; confidentiality requirements (sensitivity); legal issues; malicious intent; lack of trust; feel unauthorised to speak on behalf of team.
Klein et al. (2010)	What: Resource requirements; progress status; technical difficulties; competencies of core team members.
	How: Nothing mentioned.
	Why: To coordinate decisions (e.g., design and resource allocation decisions); cooperatively negotiating conflicting interests; gain incentive payments; and achieve functional and quality goals.
	Why not: Conflicting, competing stakeholder interests (i.e., misalignment of requirements); lack of or missing information (causing miscommunication); self-interest (misreporting information for an incentive, e.g., promotion, recognition or financial gain).
Mombeshora and Dekoninck (2013)	What: Supply chain and manufacturing process information; product and service information related to production and supply; eco-information (i.e., information on the environmental impact of products).
	How: Internet communication technologies (e.g., web portals).
	Why: To minimise costs; acquire resources and capabilities; create, sustain fruitful collaborations and relationships; make investment decisions; create environmental impact awareness of products.
	Why not: Security reasons, lack of trust.
Phuwanartnurak and Hendry (2009)	What: Knowledge base; project details, files.
	How: Wikis.
	Why: To support collaboration across locations; to encourage brainstorming; and to enable project tracking.
	Why not: Nothing mentioned.
van Engelenburg et al. (2019)	What: Metadata, access control information; context information; documents on detailed goods description; transactional data.
	How: Blockchain technology (e.g., distributed ledger system tracking origin, transformations and sharing of information on goods in a supply chain).
	Why: To improve safety and security (e.g., identifying information on smuggling of goods); perform risk assessments; enable decision making.
	Why not: Fear of sharing competitively sensitive information (vulnerability); becoming liable, not being compliant with the law; lack of incentives; keeping information confidential to prevent misuse; lacking trust to share due to others' opportunistic behaviour; cannot share unknown information

Table 3. Selected findings on information sharing studies in agile, scrum and software development contexts.

The thematic analysis of Table 3 identified the following themes to inform information sharing practices during agile, scrum and software development:

- *Multifaceted nature of content shared (what)* allows for both more abstract ideas (intangible) and more concrete (tangible) elements to take form (e.g., data structures, project-related information, practical solutions, contextual information) (e.g., Cho and Song, 2023).
- *Methods, mechanisms and tools of information sharing (how)* allow for sharing between organisations, individuals, individuals/groups, and individuals/technologies (e.g., Grubb and Begel, 2012).
- *Diversity of motivations for information sharing (why)* can be intrinsic, extrinsic, power-related or incentive-based motivations to drive project success, align actions with strategic goals, manage complexities, foster collaboration, and address both practical and ethical considerations (e.g., Mombeshora and Dekoninck, 2013; Phuwanartnurak and Hendry, 2009).
- *Varied influences and complex reasons behind the decision to withhold information (why not)* can involve social, individual, organisational, and legal factors (e.g., Klein et al., 2010; van Engelenburg et al., 2019).

Third space in agile, scrum and software development

Searching the aforementioned databases, no studies were found that mentioned the use of third space for scrum. Four articles were found that mentioned the use of third space in software development. Across these studies, third space has been contextualised as an in-between, evolving environment that enables collaboration that crosses traditional boundaries. Kendall et al.'s (2020) study explores a Third Design Space that offers practitioners and researchers a new intellectual perspective on corporate-communal engagements in software development. This shows its contradictory, unpredictable, and continually changing nature, which supports mutual understanding, equal participation, and community building through shared values such as transparency and meritocracy. Lutze (2020) applies the third space to the development of health and medical software for elderly people, focusing on the boundary region where analogue, digital, and conceptual discourses intersect and must be negotiated.

Maaß and Buchmüller (2018) describe third space as a mutual ground created through cultural probes as boundary objects, highlighting it as an in-betweenness space where collaboration, negotiation, inclusivity, mutual learning, and multidisciplinary participation and co-creation of identities and relationships take place. Similarly, White et al. (2021) use the third space to examine blended professional roles in higher education, presenting it as a flexible and dynamic space that allows for role and identity crossing, integrates academic and professional knowledge, and fosters shared learning, mutual respect, and collaboration.

A condensed view of the four articles discussed previously is presented in Table 4, Appendix C. Ultimately, the following themes were noted. A third space lens in software development studies offers:

- (i) hybridity between spaces for identity formation, cultural translation and inclusive discourses (e.g., Maaß and Buchmüller, 2018);
- (ii) co-meaning-making and knowledge creation (e.g., Maaß and Buchmüller, 2018);
- (iii) agency, empowerment and equal participation (e.g., Kendall et al., 2020);
- (iv) negotiation of differences (e.g., White et al., 2021);
- (v) a range of interactions and activities for shared learning (e.g., Lutze, 2020);
- (vi) support of transformative, collaborative and relational processes (e.g., Kendall et al., 2020).

These themes (cf. Table 4, Appendix C) correspond to the themes identified in the corpus of works focusing on third space as a lens, as presented in Table 2 (cf. Appendix B).

Mapping third space lens themes for application in use case

This section maps the themes identified in Tables 1-4 to demonstrate how a third space lens can be used in a use case. Table 1 (cf. Appendix A) identified themes based on what third space as a lens entails, Table 2 (cf. Appendix B) presented themes on the application and purpose of a third space lens, Table 3 highlighted findings on the information sharing behaviour in a specific context, and Table 4 (cf. Appendix C) illustrated the application of a third space lens in agile, scrum and software development contexts.

We mapped themes across Tables 1-4, and it became evident that the application of a third space lens in an information sharing study using scrum supports:

- (i) Hybridity and in-betweenness (liminal): This theme examines boundary crossing and bridge practices, with the purpose of transcending binary thinking and fostering inclusivity. Information sharing in this theme focuses on what is shared and reflects the nature, content, and knowledge brought into a space. In a scrum context, this theme supports identity formation, cultural translation, and inclusive discourses.
- (ii) Negotiation and co-construction: This theme examines tensions, dialogue engagement, and co-creation of meanings, with the purpose of understanding complex interactions in co-transformations and co-meaning-making. Information sharing in this theme can be considered as the process of sharing that is negotiated through dialogues and interactions using methods, tools, and mechanisms. In a scrum context, this theme supports co-meaning-making, knowledge creation, and equal participation.
- (iii) Agency, identity and resistance: This theme examines binaries, identity reconstruction, agency reclamation and challenging marginalisation, with the purpose of challenging dominant discourses, empowering marginalised voices and eliminating power dynamics (equal participation). Information sharing in this theme focuses on why tensions, challenges, and constraints of sharing may not be revealed, due to factors such as lack of trust, incentives, confidence, organisational barriers, and power hierarchies. In a scrum context, this theme supports negotiation of differences.
- (iv) Cultural and worldviews (knowledge systems) integration: This theme examines the blending of academic, Indigenous and local knowledges, with the purpose of validating multiple worldviews and decolonising knowledge systems (inclusive and context-specific understandings). Information sharing in this theme addresses why sharing occurs by revealing the reasons, motivations, and intent behind sharing, such as building trust, awareness, decision-making, collaboration, and understanding. In a scrum context, this theme supports a range of interactions, activities, behaviours, and knowledge.
- (v) Transformation and educational dimensions: This theme examines the transformation of pedagogical/learning environments and professional practices, with the purpose of enabling innovation that leads to new ideas, insights, and practices. Information sharing in this theme also addresses why sharing occurs. In a scrum context, this theme supports transformative, collaborative and relational processes.

These mapped themes can be viewed in Table 5 (cf. Appendix D). In summary, the following apply to a third space lens to study information sharing in scrum:

- Table 1: Hybridity and in-betweenness (liminal); co-construction and negotiation; agency, identity and resistance; and cultural and worldviews (knowledge systems) integration.
- Table 2: Boundary crossing and bridging to transcend binary thinking, fostering inclusivity; co-creating of meanings via dialogue interactions; negotiating tensions, identities, power dynamics, and discourse dominance; blending of worldviews, work roles and responsibilities; and transformation of professional practices.

- Table 4: Identity formation, cultural translation and inclusive discourses; co-meaning-making, knowledge creation and equal participation; negotiation of differences; support through various interactions, activities, behaviours and enablement of transformative, collaborative and relational processes.

Overall, a third space lens can reveal the nature of discourse spaces (e.g., physical, conceptual, virtual) and the accommodation of various worldviews, practices, and paradigms that are applicable to the scrum context. This can especially support transparency and information sharing. However, information is not always visible or shared in real-world scrum practices. To illustrate the value of a third space lens in understanding non-sharing, a selection of the mapped themes will be applied to verbatim quotes from the individual interviews in a scrum use case that specifically relates to non-sharing. They are: negotiations of tensions, power dynamics, and co-meaning-making.

Empirical findings from use case interviews and triangulation with findings from scoping reviews

To illustrate the value of a third space lens, a selection of the mapped themes in Table 5, Appendix D (i.e., negotiations of tensions, power and group dynamics, and co-meaning making) will be applied to verbatim quotes from individual interviews in a scrum use case that relates to non-sharing (cf. Table 6). The interview empirical findings discussed here are from a multimethod qualitative information behaviour study conducted at an international automobile company in South Africa that uses scrum. For the larger project, data were collected through observation, digital diaries and individual interviews during one project sprint, which spanned over two weeks in August and September 2022. This paper will report only on the post-sprint face-to-face individual interviews conducted within one scrum team. Written informed consent was obtained from the participants, as well as ethical clearance from the institutional ethics board, and permission from the company via the signing of a confidentiality agreement. Eight team members, fulfilling the role of Developers in the team, voluntarily participated in the interviews. They were given pseudonyms to ensure anonymity and privacy. Verbatim quotes are presented in a table to enhance transparency and analytical rigour, enabling readers to quickly appraise and compare how participants' words support the identified themes and interpretations.

Selection of third space themes applied	Verbatim quotes reflecting non-sharing at a use case
Negotiations of tensions (include emotional, relational, identity, epistemic/relevance tensions)	- Garnett notes that 'there might be things that I did not share, which I feel like there were problems with work done by other people.' For example, 'now you find that you are working on something and find out there are problems with the work. So, just not to cause tensions and problems. What you do as an honourable person or as a mature person is just fix things without having to shout out and say, this is a problem. You know?' (<i>Identity and relational tensions</i>) - Teagan mentions that 'I am not comfortable with speaking in a space where there are too many people.' Teagan offers the following example: 'office days used to make me so nervous that I would have to say something in front of people.' (<i>Emotional tensions</i>) - Charlie notes that 'we have to share information if it belongs to the project. We cannot keep it. I mean, we cannot hide it.' Charlie further explains that 'if it is not relevant, we do not need to share, but if it is relevant, we definitely have to share.' (<i>Epistemic/relevance tensions</i>) - Garnett says that 'if there are things that I can deal with myself, I will not share.' (<i>Personal and Epistemic/relevance tensions</i>) - Tyler explains that 'sometimes you can tell that people decided to take a certain path and then the information you want to share may sound irrelevant... or sounds like you want to antagonise them.' Tyler points out that you 'would be a better team player by agreeing with the team.' (<i>Epistemic/relevance and relational tensions</i>) - Garnett mentions that 'there is some deep personal stuff that I think I will reserve for myself.' Garnett explains that there is, however, 'personal stuff that I share so that they can understand' (e.g., feeling sick due to a vaccine). Garnett highlights that 'if you listen to how the people in the team respond' [<i>about being sick on short notice and missing work</i>], you would not want to easily miss work when you are sick.' Garnett then notes that 'I just didn't want to share this with anyone.' (<i>Personal tensions</i>) - Damian explains that 'oh, well, I do not share that I am going to fetch my daughter. I do not say I need to rush.' (<i>Personal tensions</i>)
Power and group dynamics	- Garnett emphasises that 'there is quite a lot' not shared regarding frustrations experienced. There are others that I vented out to. There are others that I did not vent out my frustrations.' (<i>Group dynamics</i>) - Garnett also notes that 'there are some frustrations that I may not vent out, like when I was new. You know, the challenges of a new person, I would request a meeting. Say, please, can we meet? Can we do this? A person said, I am busy. So maybe that person is the one who is the leader? You cannot complain.' (<i>Power dynamics</i>) - Sammy mentions that 'there are a lot of things that we do not share.' Sammy gives the following example, 'as a contractor, you are working for your next renewal. It is not like you are permanent and you are protected by the law and everything', and so information is withheld regarding workload and frustrations. Sammy further explains that if colleagues are rude, 'you just keep it to yourself [<i>and</i>] do not get involved in company politics.' (<i>Power and group dynamics</i>)
Co-meaning making of situations (via dialogue and reflection)	- Teagan states that 'something I decided not to share, but I chose not to do so because I saw that it was creating more work after we had done so much.' Teagan explicates that they decided not to share the specific event [<i>or information</i>] with the wider team, as 'it was being handled privately'. - Sammy explains that 'sometimes you just bad mouth a person. You do not know what they went through the previous day. So, you withhold to say, I did not find them. You just say they said they will come back to me.'

Table 6. Applying a selection of third space lens themes to non-sharing verbatim quotes from a use case.

As noted earlier (cf. Section: *Theoretical grounding: Understanding third space as a lens*), third space theory holds the potential to understand the complexities surrounding non-sharing and transparency by offering a lens to examine various themes (cf. Tables 1 and 2). In addition to what we know about information sharing and transparency, it is important to gain a richer understanding of situations where information is intentionally not shared (withheld). Therefore, the application of a selection of third space lens themes to non-sharing verbatim quotes (cf. Table 6) illuminated the negotiation practices, power dynamics, and co-meaning-making within complex group interactions. Providing us with a rich understanding of aspects influencing transparency and information sharing in scrum, thus exemplifying the potential of a third space lens.

Recommendations for future work and conclusion

Third space as a theoretical lens holds great potential to better understand how transparency and information sharing behaviour emerge within scrum context. It turns your attention to focus on power dynamics, tensions and co-meaning-making during collaborative activities and complex interactions. From a third space lens, one can examine transparency in the rigid, formal scrum framework versus how transparency is practised in real-world teamwork. In this liminal space, information sharing and non-sharing (often a conscious, intentional personal, or strategic decision) are viewed as negotiated practices that develop from emotional, relational, identity, or epistemic/relevance tensions.

The use of a third space lens makes it possible to understand transparency as a constant negotiation of information sharing and non-sharing between the formal requirements and informal practices of scrum. Therefore, non-sharing should not just be seen as a negative deviation from transparency, but rather as a form of meaning-making and negotiation, a process influenced by relations, culture, politics and collaboration. This can be seen in the non-sharing verbatim of the interviews. Additional third space lens themes can be applied to the interview data, for example, hybridity, identity formation, cultural differences and professional boundary crossing.

We have shown the potential of mapping the third space lens themes from Table 5 (cf. Appendix D) in a scrum use case. This can further be applied in other contexts. Further research can also move beyond the application of third space as a lens to also include the focus of third space as a concept/space within other contexts. For instance, applying third space further in hybrid contexts like interdisciplinary project teams (digital humanities, health informatics), professional communities of practice (academic industry networks, digital education groups), and roles that bridge technical and organisational domains (data stewards, knowledge brokers). A specific example can be of data stewards working in a third space between technical systems, institutional policies, and everyday research practices, requiring ongoing translation and information sharing. This demonstrates the possibilities for real-world application across diverse contexts, as it highlights how new meanings, identities, and practices emerge through interaction between different social, cultural, or institutional spaces.

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References

- Almehmadi, F., Hepworth, M. & Maynard, S. (2014). A framework for understanding information sharing: an exploration of the information sharing experiences of female academics in Saudi Arabia. *Information Research*, 21(4), paper isic01. <http://InformationR.net/ir/19-4/isic/isic01.html> (Archived by WebCite® at <https://www.webcitation.org/http://www.webcitation.org/6U4qtxJ53>)
- Baloo, K., Ramos, F., Crank, R., Crane, D., Hopkins, S., McGovern, M., Parkes, F., Penno, J., Singh, N., Todd, N., Wilson, V., Windsor, A. & Worsley, S. (2024). Exploring the identities of pathways educators through the lens of Third Space Theory. *Pedagogy, Culture and Society*, 32(5), 1549-1571. <https://doi.org/10.1080/14681366.2023.2230986>
- Bartmes, N. & Shukla, S. (2020). Re-envisioning land-based pedagogies as a transformative third space: perspectives from university academics, students, and Indigenous knowledge holders from Manitoba, Canada. *Diaspora, Indigenous, and Minority Education*, 14(3), 146-161. <https://doi.org/10.1080/15595692.2020.1719062>
- Bates, M.J. (2010). Information behaviour. In M.J. Bates & M.N. Maack (Eds.), *Encyclopedia of library and information sciences* (3rd ed.) (pp. 2381-2391). CRC Press. <https://pages.gseis.ucla.edu/faculty/bates/articles/information-behavior.html> (Archived by the Internet Archive at <https://web.archive.org/web/20170312062414/https://pages.gseis.ucla.edu/faculty/bates/articles/information-behavior.html>)
- Baxter, D. & Turner, N. (2021). Why scrum works in new product development: The role of social capital in managing complexity. *Production Planning and Control*, 34(13), 1248-1260. <https://doi.org/10.1080/09537287.2021.1997291>
- Beck, J.S. (2024). On the whitewashing of third space in teacher education, or don't cite this article. *Teaching and Teacher Education*, 152, 104786. <https://doi.org/10.1016/j.tate.2024.104786>
- Beck, K., Beedle, M., van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., Kern, J., Marick, B., Martin, R.C., Mellor, S., Schwaber, K., Sutherland, J. & Thomas, D. (2001). *Manifesto for agile software development*. <https://agilemanifesto.org/iso/en/manifesto.html> (Archived by the Internet Archive at <https://web.archive.org/web/20170426234434/http://agilemanifesto.org/iso/en/manifesto.html>)
- Benson, S. (2010). "I don't know if that'd be English or not": Third space theory and literacy instruction. *Journal of Adolescent and Adult Literacy*, 53(7), 555-563. <https://doi.org/10.1598/JAAL.53.7.3>
- Bhabha, H.K. (1994). *The location of culture*. Routledge. <https://dx.doi.org/10.4324/9780203820551>

- Braun, V. & Clarke, V. (2012). Thematic analysis. In H.E. Cooper, P.M. Camic, D.L. Long, A.T. Panter, D.E. Rindskopf & K.J. Sher (Eds.), *APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 57-71). American Psychological Association. <https://dx.doi.org/10.1037/13620-004>
- Bryant, C.L. (2013). Seeking peace: The application of Third Space Theory in Toni Morrison's *Sula*. *CLA Journal-College Language Association*, 56(3), 251-266. <https://www.jstor.org/stable/44329588>
- Bussert-Webb, K. & Lewis, K. (2021). Familismo and nontraditional educational possibilities in third space. In J. Keengwe (Ed.), *Handbook of research on innovations in non-traditional educational practices* (pp. 197-222). IGI Global. <https://dx.doi.org/10.4018/978-1-7998-4360-3.ch010>
- Case, D.O. (2012). *Looking for information: A survey of research on information seeking, needs and behaviour* (3rd. ed.). (Series editor: Amanda Spink). Emerald Group Publishing.
- Cho, S.S. & Song, M. (2023). Programming model for information sharing among IoT devices: Software engineering perspective. In *Proceedings of the 2023 IEEE/ACIS 21st International Conference on Software Engineering Research, Management and Applications (SERA)* (pp. 116-121). IEEE. <https://dx.doi.org/10.1109/SERA57763.2023.10197720>
- Collignon, S.E., Nazir, S. & Surendra, N.C. (2022). Agile systems development: Privacy theoretical lens to challenge the full information disclosure paradigm. *Information and Management*, 59(6), 103679. <https://doi.org/10.1016/j.im.2022.103679>
- Dada, O.A. & Sanusi, I.T. (2022). The adoption of software engineering practices in a scrum environment. *African Journal of Science, Technology, Innovation and Development*, 14(6), 1429-1446. <https://dx.doi.org/10.1080/20421338.2021.1955431>
- Diebold, P., Ostberg, J.P., Wagner, S. & Zendler, U. (2015). What do practitioners vary in using scrum? In *Proceedings of the International Conference on Agile Software Development* (pp. 40-51). Springer International Publishing. <https://doi.org/10.48550/arXiv.1703.10361>
- Dixit, R. & Bhushan, B. (2019). Scrum: An agile software development process and metrics. *Journal on Today's Ideas-Tomorrow's Technologies*, 7(1), 73-87.
- Downey, S. & Sutherland, J. (2013). Scrum metrics for hyperproductive teams: How they fly like fighter aircraft. In *Proceedings of the 46th Hawaii International Conference on System Sciences* (pp. 4870-4878). IEEE. <https://dx.doi.org/10.1109/HICSS.2013.471>
- Du, J.T. (2014). The information journey of marketing professionals: Incorporating work task-driven information seeking, information judgments, information use, and information sharing. *Journal of the Association for Information Science and Technology*, 65(9), 1850-1869. <https://dx.doi.org/10.1002/asi.23085>
- Elmborg, J., Jacobs, H.L., McElroy, K. & Nelson, R. (2015). Making a third space for student voices in two academic libraries. *Reference and User Services Quarterly*, 55(2), 144-155. <https://doi.org/10.5860/rusq.55n2.144>
- Fisher, K., Naumer, C., Durrance, J., Stromski, L. & Christiansen, T. (2005). Something old, something new: Preliminary findings from an exploratory study about people's information habits and information grounds. *Information Research*, 10(2), paper 223. <http://informationr.net/ir/10-2/paper223.html> (Archived by the Internet Archive at <https://web.archive.org/web/20201125060244/http://informationr.net/ir/10-2/paper223.html>)

- Fisher, K.E., Landry, C.F. & Naumer, C. (2007). Social spaces, casual interactions, meaningful exchanges: "Information ground" characteristics based on the college student experience. *Information Research*, 12(2), paper 291. <http://informationr.net/ir/12-2/paper291.html> (Archived by the Internet Archive at <https://web.archive.org/web/20201124185558/https://informationr.net/ir/12-2/paper291.html>)
- Fourie, I. & Julien, H. (2014). Ending the dance: A research agenda for affect and emotion in studies of information behaviour. *Information Research*, 19(4), paper isic09. <http://InformationR.net/ir/19-4/isic/isic09.html>
- Gholami, S., Sharifabadi, S.R., Shahrivar, A.A. & Farrokhzad, S. (2022). Analysis of the collaborative information seeking behavior's model among clinical units employees through educational intervention. *Iranian Journal of Information Processing and Management*, 37(3), 953-978. <https://doi.org/10.35050/JIPM010.2022.790>
- Goyal, S., Gupta, A. & Jha, H. (2023). Current trends in methodology for software development process. In V. Bhateja, J.R. Mohanty, W.F. Fuentes & K. Maharatna (Eds.), *Communication, Software and Networks* (pp. 621-629). Springer. https://dx.doi.org/10.1007/978-981-19-4990-6_58
- Grubb, A.M. & Begel, A. (2012). On the perceived interdependence and information sharing inhibitions of enterprise software engineers. In *Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work* (pp. 1337-1346). Association for Computing Machinery. <https://dx.doi.org/10.1145/2145204.2145403>
- Haas, M.R. & Park, S. (2010). To share or not to share? Professional norms, reference groups, and information withholding among life scientists. *Organization Science*, 21(4), 873-891. <http://dx.doi.org/10.1287/orsc.1090.0500>
- Hansen, P., Fourie, I. & Meyer, A. (2021). *Third space, information sharing, and participatory design*. Morgan & Claypool Publishers. <http://dx.doi.org/10.1007/978-3-031-02327-9>
- Hinderks, A., Mayo, F.J.D., Thomaschewski, J. & Escalona, M.J. (2022). Approaches to manage the user experience process in agile software development: A systematic literature review. *Information and Software Technology*, 150(2022), 106957. <https://doi.org/10.1016/j.infsof.2022.106957>
- Hite, R., Midobuche, E., Benavides, A. & Dwyer, J. (2018). Third space theory: A theoretical model for designing informal STEM experiences for rural Latina youth. In T.T. Yuen, E.P. Bonner & M.G. Arreguín-Anderson (Eds.), *(Under)represented Latin@s in STEM: increasing participation throughout education and the workplace* (pp. 189-202). Peter Lang Publishing. <https://doi.org/10.3726/b13022>
- Hosseini, M., Shahri, A., Phalp, K. & Ali, R. (2016). Foundations for transparency requirements engineering. In *Proceedings of the International Working Conference on Requirements Engineering: Foundation for Software Quality* (pp. 225-231). Springer. https://doi.org/10.1007/978-3-319-30282-9_15
- Huisman, M., Joye, S. & Biltreyst, D. (2020). To share or not to share: An explorative study of health information non-sharing behaviour among Flemish adults aged fifty and over. *Information Research*, 25(3), paper 870. <http://InformationR.net/ir/25-3/paper870.html> (Archived by the Internet Archive at <https://bit.ly/2QA1lhU>)

- Idrus, F. (2015). Examining classroom transformational spaces using the third space theory in developing students' sense of shared identity. *Theory and Practice in Language Studies*, 5(1), 28–37. <https://doi.org/https://doi.org/10.17507/tpls.0501.04>
- Ingwersen, P. & Järvelin, K. (2005). *The turn: integration of information seeking and retrieval in context*. Springer. <https://doi.org/10.1007/1-4020-3851-8>
- Jordan, K. & Elsdon-Clifton, J. (2014). Through the lens of third space theory: Possibilities for research methodologies in educational technologies. In *Proceedings of the 6th International Conference on Computer Supported Education, CSEDU* (pp. 220–224). Science and Technology Publications. <https://doi.org/10.5220/0004792402200224>
- Kadenic, M.D., Koumaditis, K. & Junker-Jensen, L. (2023). Mastering scrum with a focus on team maturity and key components of scrum. *Information and Software Technology*, 153(2023), 107079. <https://dx.doi.org/10.1016/j.infsof.2022.107079>
- Källén, C.B. (2021). Binary oppositions and third spaces: Perspectives on the interplay between gender, genre practice, instrument and cultural capital in upper secondary schools in Sweden. In S.V. Onsrud, H.S. Blix & I.L. Vestad (Eds.), *Gender issues in Scandinavian music education* (pp. 74–94). Routledge. <https://doi.org/10.4324/9781003038207>
- Kang, J. (2017). The study of east wind–west wind from the perspective of the third space theory. In *Proceedings of the 2017 International Conference on Humanities Science, Management and Education Technology (HSMET 2017)* (pp. 250–253). Atlantis Press. <https://doi.org/10.2991/hsmet-17.2017.51>
- Kaur, K. & Jajoo, A. (2015). Applying agile methodologies in industry projects: Benefits and challenges. In *Proceedings of the 2015 International Conference on Computing Communication Control and Automation* (pp. 832–836). IEEE. <https://dx.doi.org/10.1109/ICCUBEA.2015.166>
- Kendall, K.E., Kendall, J.E., Germonprez, M. & Mathiassen, L. (2020). The third design space: A postcolonial perspective on corporate engagement with open source software communities. *Information Systems Journal*, 30(2), 369–402. <https://doi.org/10.1111/isj.12270>
- Klein, M., Moreno, G.A., Parkes, D.C. & Wallnau, K. (2010). Designing for incentives: Better information sharing for better software engineering. In *Proceedings of the FSE/SDP workshop on Future of software engineering research* (pp. 195–200). Association for Computing Machinery. <https://dx.doi.org/10.1145/1882362.1882404>
- Kuhlthau, C.C. & Cole, C. (2012). Third space as an information system and services intervention methodology for engaging the user's deepest levels of information need. In *Proceedings of the Association for Information Science and Technology*, 49(1), 1–6. <https://doi.org/10.1002/meet.14504901074>
- Laanti, M., Similä, J. & Abrahamsson, P. (2013). Definitions of agile software development and agility. In F. McCaffery, R.V. O'Connor & R. Messnarz (Eds.), *Systems, software and services process improvement* (pp. 247–258). Springer. https://dx.doi.org/10.1007/978-3-642-39179-8_22
- Lee, P.T.Y., Lee, A.J., Chau, M. & Deng, B. (2024). How perceived transparency in information system development processes improves project quality in agile IT enterprises. *Industrial Management and Data Systems*, 124(6), 2284–2311. <https://doi.org/10.1108/IMDS-07-2023-0493>

- Levy, R. (2008). 'Third spaces' are interesting places: Applying 'third space theory' to nursery-aged children's constructions of themselves as readers. *Journal of Early Childhood Literacy*, 8(1), 43-66. <https://doi.org/10.1177/1468798407087161>
- Lutze, R. (2020). Digital twin based software design in eHealth-a new development approach for health/medical software products. In *Proceedings of the 2020 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)* (pp. 1-9). IEEE. <http://dx.doi.org/10.1109/ICE/ITMC49519.2020.9198546>
- Maaß, S. & Buchmüller, S. (2018). The crucial role of cultural probes in participatory design for and with older adults. *i-com*, 17(2), 119-135. <http://dx.doi.org/10.1515/icom-2018-0015>
- Maddamsetti, J. (2023). Elementary ESL teachers' advocacy for emerging bilinguals: A third space perspective. *Pedagogies: An International Journal*, 18(2), 153-181. <https://doi.org/10.1080/1554480X.2021.1975541>
- Maniotes, L.K. (2005). *The transformative power of literary third space*. (Unpublished doctoral dissertation). University of Colorado, Boulder, USA.
- Masood, Z., Hoda, R. & Blincoe, K. (2020). Real world scrum a grounded theory of variations in practice. *IEEE Transactions on Software Engineering*, 48(5), 1579-1591. <https://doi.org/10.1109/TSE.2020.3025317>
- Mombeshora, I.M. & Dekoninck, E. (2013). Supply chain eco-information sharing in the product development process through computer aided design software. In U. Lindemann, V. Srinivasan, Y.S. Kim, S.W. Lee, J. Clarkson & G. Cascini (Eds.), *DS 75-6: Proceedings of the 19th International Conference on Engineering Design (ICED13), Design for Harmonies*, Vol. 6: Design Information and Knowledge, Seoul, Korea (pp. 73-82). The Design Society.
- Muller, M. & Druin, A. (2012). Participatory design: the third space in HCI. In J. Jacko (Ed.), *The human-computer interaction handbook* (3rd. ed.) (pp. 1125-1154). Lawrence Erlbaum.
- Muthucumaru, A. (2021). The future of collaborative technology within scrum/agile practices. *The IJournal: Student Journal of the Faculty of Information*, 7(1), 1-10. <https://doi.org/10.33137/ijournal.v7i1.37897>
- Oldenburg, R. (1989). *The great good place: Cafés, coffee shops, community centers, beauty parlors, general stores, bars, hangouts, and how they get you through the day*. Paragon House Publishers. <https://doi.org/10.2307/jj.9561417>
- Pardo, C., Ortega, W. & Gómez, O.S. (2021). A reference model based on agile values, principles and aspects of scrum, XP and kanban to foster the adoption of agility in industry. *International Journal on Advanced Science Engineering and Information Technology*, 11(6), 2393-2399. <https://dx.doi.org/10.18517/ijaseit.11.6.13667>
- Petter, S. (2018). If you can't say something nice: Factors contributing to team member silence in distributed software project teams. In *Proceedings of ACM SIGMIS-CPR '18* (pp. 43-49). Association for Computing Machinery. <https://doi.org/10.1145/3209626.3209718>
- Phuwanartnurak, A.J. & Hendry, D.G. (2009). Understanding information sharing in software development through wiki log analysis. In *Proceedings of the 5th International Symposium on Wikis and Open Collaboration* (pp. 1-2). Association for Computing Machinery. <https://dx.doi.org/10.1145/1641309.1641356>
- Pilerot, O. (2012). LIS research on information sharing activities – people, places, or information. *Journal of Documentation*, 68(4), 559-581. <https://dx.doi.org/10.1108/00220411211239110>

- Ramkellawan-Arteaga, R. (2020). Just because we look alike doesn't mean we are the same: Using an examination of Indo-Caribbean identity to inform a third space lens. *Review of Education, Pedagogy, and Cultural Studies*, 42(2), 104-119.
<https://doi.org/10.1080/10714413.2020.1757958>
- Roundtree, S.V. & Shirzadian, M. (2020). Third space: A keyword essay. *Community Literacy Journal*, 14(2), 173-184. <https://dx.doi.org/10.1353/clj.2020.a772130>
- Savolainen, R. (2007). Information behavior and information practice: Reviewing the “umbrella concepts” of information-seeking studies. *The Library Quarterly*, 77(2), 109-132.
<https://doi.org/10.1086/517840>
- Savolainen, R. (2017). Information sharing and knowledge sharing as communicative activities. *Information Research*, 22(3), paper 767. <http://InformationR.net/ir/22-3/paper767.html> (Archived by WebCite® at <https://www.webcitation.org/6tTRz0IcS>)
- Savolainen, R. (2019). Modeling the interplay of information seeking and information sharing: A conceptual analysis. *Aslib Journal of Information Management*, 71(4), 518-534.
<https://doi.org/10.1108/AJIM-10-2018-0266>
- Sedawi, W., Ben Zvi Assaraf, O. & Reiss, M.J. (2023). Fostering Bedouin students' sense of place in the light of place-based education and third-space theory. In P.G. Patrick (Eds.), *How people learn in informal science environments* (pp. 373-396). Springer.
https://doi.org/10.1007/978-3-031-13291-9_19
- Singh, D. & Kender, K. (2023). Ecofeminist design for digital third spaces. *Interactions*, 30(4), 40-43. <https://dx.doi.org/10.1145/3600060>
- Soja, E.W. (1996). *Thirdspace: Journeys to Los Angeles and other real-and-imagined places*. Blackwell. <https://doi.org/10.1177/030981689806400112>
- Sonnenwald, D.H. (2006). Challenges in sharing information effectively: Examples from command and control. *Information Research*, 11(4), paper 270. <https://informationr.net/ir/11-4/paper270.html> (Archived by the Internet Archive at <https://web.archive.org/web/20260119194854/https://informationr.net/ir/11-4/paper270.html>)
- Talja, S. (2002). Information sharing in academic communities: Types and levels of collaboration in information seeking and use. *New Review of Information Behavior Research*, 3(1), 143-159.
- Tatham, C. (2023). A systematic literature review of third space theory in research with children (aged 4-12) in multicultural educational settings. *Pedagogy, Culture and Society*, 33(3), 867-886. <https://dx.doi.org/10.1080/14681366.2023.2283798>
- Tshabalala, M.M. & Marnewick, C. (2021). Agile as an enabler towards innovation-based organisational transformations. *South African Journal of Information Management*, 23(1), 1-10. <https://dx.doi.org/10.4102/sajim.v23i1.1309>
- van der Valk, R., Pelliccione, P., Lago, P., Heldal, R., Knauss, E. & Juul, J. (2018). Transparency and contracts: Continuous integration and delivery in the automotive ecosystem. In *Proceedings of the ICSE-SEIP '18: 40th International Conference on Software Engineering: Software Engineering in Practice Track* (pp. 23-32). ACM.
<https://doi.org/10.1145/3183519.3183543>

- van Engelenburg, S., Janssen, M. & Klievink, B. (2019). Design of a software architecture supporting business-to-government information sharing to improve public safety and security. *Journal of Intelligent Information Systems*, 52(3), 595-618.
<https://dx.doi.org/10.1007/s10844-017-0478-z>
- Veles, N. (2022). *Optimising the third space in higher education: Case studies of intercultural and cross-boundary collaboration*. Taylor & Francis.
<https://dx.doi.org/10.4324/9781003259527>
- Verbaan, E. & Cox, A.M. (2014). Occupational sub-cultures, jurisdictional struggle and third space: Theorising professional service responses to research data management. *The Journal of Academic Librarianship*, 40(3), 211-219. <https://doi.org/10.1016/j.acalib.2014.02.008>
- White, S., White, S. & Borthwick, K. (2021). Blended professionals, technology and online learning: Identifying a socio-technical third space in higher education. *Higher Education Quarterly*, 75(1), 161-174. <http://dx.doi.org/10.1111/hequ.12252>
- Widén, G. & Hansen, P. (2012). Managing collaborative information sharing: Bridging research on information culture and collaborative information behaviour. *Information Research*, 17(4), paper 538. <https://informationr.net/ir/17-4/paper538.html> (Archived by the Internet Archive at <https://web.archive.org/web/2025111194416/https://www.informationr.net/ir/17-4/paper538.html>)
- Wilson, T.D. (1999). Models in information behaviour research. *Journal of Documentation*, 55(3), 249-270. <https://dx.doi.org/10.1108/EUM00000000007145>
- Witenstein, M.A. & Cervantes, A. (2020). Unhinging the machismo binary through a third space lens: Reframing Latinx males postsecondary academic decision-making. *Journal of Higher Education Policy and Leadership Studies*, 1(3), 27-39.
<https://doi.org/10.29252/johepal.1.3.27>
- Zhang, H. & Yuan, R. (2019). Uncertain identities of non-higher-education-based EFL teacher educators: A third space theory perspective. *Teachers and Teaching: Theory and Practice*, 25(7), 874-889. <https://doi.org/10.1080/13540602.2019.1689491>
- Zhu, G., Mena, J. & Johnson, C. (2020). Chinese student teachers' teaching practicum experiences: Insights from transformative learning, third space, and dialogical-self theory. *International Journal of Educational Research*, 103, 101638.
<https://doi.org/https://doi.org/10.1016/j.ijer.2020.101638>

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Appendices

To improve readability and narrative flow, four of the six tables are summarised in paragraph form in the main text, with the full tables provided in the appendices to retain an at-a-glance overview of the supporting detail. Tables 3 and 6 are retained in the main paper for the reasons noted there.

Appendix A – Table 1

Article	Context	What third space as a lens entails
Baloo et al. (2024)	Higher education	Provide hybridity between non-academic and academic roles, where professional boundaries, norms and identities blur.
Bartmes and Shukla (2020)	Higher education	Provide hybridity to blend Indigenous knowledge (IK) and academic knowledge.
Beck (2024)	Higher education	Third space is linked to hybridity, power, politics, resistance and racism.
Benson (2010)	Secondary literacy education	Provide hybridity and liminality, merging everyday knowledge and academic literacies to overcome resistance and create new identities.
Bryant (2013)	Cultural and literacy studies	Provide hybridity, liminality and liberality to resist rigid racial, social, and patriarchal constructs.
Idrus (2015)	Multicultural literature education	Offers hybridity and transformation by bringing individuals together across social and cultural boundaries.
Jordan and Elsdon-Clifton (2014)	Teacher education	Offers in-betweenness, hybridity and transformation to challenge binary discourses, identities, and practices.
Kang (2017)	Cultural studies	Offers hybridity and integration of worldviews beyond binaries.
Levy (2008)	Early childhood literacy education	Offers in-betweenness where discourses meet.
Maddamsetti (2023)	Advocacy and teacher identity	Offers hybridity as an in-between negotiation zone that disrupts binaries.
Ramkellawan-Arteaga (2020)	Cultural studies	Provide hybridity between Indo-Caribbean identity, Indian and Caribbean cultures.
Sedawi et al. (2023)	Education	Provide hybridity to facilitate negotiations between Western and local Bedouin (nomadic/semi-nomadic Arab communities) worldviews (indigenous knowledge).
Tatham (2023)	Multicultural educational	Offers in-betweenness, hybridity for transformation and negotiation where cultural boundaries intersect and blur.
Verbaan and Cox (2014)	Higher education	Provide an emergent territory where tensions between academic and professional domains are challenged.
Witenstein and Cervantes (2020)	Higher education	Provide hybridity, liminality between cultural and identity constructs.
Zhang and Yuan (2019)	Teacher education	Offers hybridity as an in-betweenness.
Zhu et al. (2020)	Teacher education	Provide an 'And/also hybrid place' for a boundary-crossing.

Table 1. What literature reveals about third space as a lens.

Appendix B – Table 2

Article	Application as a lens	Purpose of the lens in research projects to deepen understanding
Baloo et al. (2024)	Examination of identity formation where professional boundaries intersect.	To explore opportunities and challenges of multiple, fluid identities within institutional structures.
Bartmes and Shukla (2020)	Encouragement of intercultural dialogue and perceptual shifts in students' knowledge via transformative learning.	To understand decolonised education by blending Indigenous knowledge and academic knowledge.
Beck (2024)	Reviewing top-cited teacher-education case uses of third space.	To explore challenges based on the misapplication and depoliticised use of third space theory.
Benson (2010)	Enabling agency and ownership in literacy resistance (traditional reading and writing tasks).	To explore the inclusive multimodal literacy practices.
Bryant (2013)	Identification of racial resistance and self-definition of identity, femininity and morality via language and agency.	To navigate oppression and recreate oneself (selfhood) via orality, naming, and gender role deviation. Identity reconstruction.
Idrus (2015)	Connecting students' cultural values, personal experiences and curricula texts.	To explore shared identity formation and intercultural understanding among multi-ethnic students.
Jordan and Elsdon-Clifton (2014)	Connecting teachers' personal and institutional uses of technology to create hybrid learning identities.	To explore the challenges of technocentric binaries (one lens, view or approach) in educational technology research.
Kang (2017)	Exploring cross-cultural literacies and identities.	To examine cultural conflict, negotiation and integration through hybridity.
Levy (2008)	Merging children's home and school literacies.	To negotiate reader identity via creatively bridging home and school experiences.
Maddamsetti (2023)	Examining how teachers negotiate dialectical tensions in their advocacy for emerging bilinguals.	To navigate advocacy tensions, challenge binary views, and cross work boundaries.
Ramkellawan-Arteaga (2020)	Studying identity complexity and role of educator support.	To navigate identity negotiations beyond fixed labels and reaffirm agency.
Sedawi et al. (2023)	Blending Indigenous knowledge and Western knowledge through outdoor learning.	To explore culturally relevant, context-specific learning.
Tatham (2023)	Examining multicultural classrooms where identity negotiations and meaning-making occur.	To examine power-dynamics and foster agency.
Verbaan and Cox (2014)	Boundary crossing between academic research and professional services.	To examine cross-boundary collaboration and hybrid roles.
Witenstein and Cervantes (2020)	Illustrating how familial and academic contexts merge to negotiate identities and navigate academic challenges.	To explore hybrid realities and the effects of gender identity on academic decisions.
Zhang and Yuan (2019)	Examining the intersection between classroom practice, research and policy.	To explore how hybridity and boundary-crossing shape identity formation.
Zhu et al. (2020)	Examining student teachers' identity construction in teaching practicums, where practical experiences blend with theoretical knowledge.	To understand how to bridge theory/practice gaps by creating hybrid reflective identities.

Table 2. Application and purpose of third space as a lens.

Appendix C – Table 4

Authors	Third space findings
Kendall et al. (2020)	Contextualisation: Propose the ‘Third Design Space’ that offers practitioners and researchers a new intellectual perspective on corporate-communal engagements in software development. Potential of third space lens: Present ‘Third Design Space’ as a transformative space that is contradictory, unpredictable and continually evolving, fostering mutual understanding, connections and equal participation. It crosses traditional boundaries by navigating differences in meaning, norms, and interests, and supports community building and shared learning through meritocracy, honesty, and transparency.
Lutze (2020)	Contextualisation: Use third space in the development of health and medical software for elderly people. Potential of third space lens: Delve deeper into understanding the boundary region that forms between the different discourses (e.g., analogue, digital and conceptual spaces).
Maaß and Buchmüller (2018)	Contextualisation: Use cultural probes, as boundary objects, to form a mutual ground and environment, as a third space, to support participatory design activities for and with older adults. Potential of third space lens: Explain that third space is an ‘inbetweenness’ space (common ground) where collaboration, negotiation, awareness, inclusivity, mutual learning, multidisciplinary participation and co-creation of identities, understandings, and relationships occur. These are based on Muller and Druin's (2012) set of attributes of third space experiences in human-computer interaction and participatory design (p. 2).
White, White and Borthwick (2021)	Contextualisation: Use third space to explore the creation of blended professionals between the academic and professional spheres in higher education. Potential of third space lens: Offers a dynamic, flexible space where border-crossing of roles, disciplines, and identities can occur, promoting shared learning, integrating diverse forms of professional and academic knowledge, facilitating negotiation of differences, nurturing mutual respect, and collaboration.

Table 4. Selected findings on third space studies regarding agile, scrum and software development.

Appendix D – Table 5

From Table 1: What third space as a lens entails themes	From Table 2: Third space lens application and purpose themes	From Table 3: Information sharing themes in a specific context	From Table 4: Third space lens applied in scrum context themes
Hybridity and in-betweenness (liminal)	Applied to examine <i>boundary crossing and bridge practices</i>. Purpose: To transcend <i>binary thinking and foster inclusivity</i>.	What is shared reflects the nature, content and knowledge brought to a space.	To support identity formation, cultural translation and inclusive discourses.
Negotiation and co-construction	Applied to examine <i>tensions, dialogue engagement, and co-creation of meanings</i>. Purpose: To understand <i>complex interactions in co-transformations and co-meaning-making</i>.	How the process of sharing is negotiated through dialogues and interactions via methods, tools and mechanisms.	To support co-meaning-making, knowledge creation and equal participation.
Agency, identity and resistance	Applied to examine <i>binaries, identity reconstruction, agency reclamation and challenging marginalisation</i>. Purpose: To challenge <i>dominant discourses, empower marginalised</i>	Why not reveal the tensions, challenges and constraints of sharing, due to lack of trust, incentives, confidence,	To support negotiation of differences.

	voices and eliminate <i>power dynamics</i> (equal participation).	organisational barriers and power hierarchies.	
Cultural and worldviews (knowledge systems) integration	Applied to examine the <i>blending of academic, Indigenous and local knowledges</i> . Purpose: To validate <i>multiple worldviews</i> and <i>decolonise knowledge systems</i> (inclusive and context-specific understandings).	Why reveals the reasons, motivations and intent of sharing to build trust, awareness, decision-making, collaboration, and understanding.	To support a range of interactions, activities, behaviours, and knowledge.
Transformation and educational dimensions	Applied to examine the <i>transformation of pedagogical/learning environments and professional practices</i> . Purpose: To enable <i>innovation</i> that leads to new ideas, insights, and practices.		To support transformative, collaborative and relational processes.

Table 5. Mapping themes across Tables 1-4