

Adherence to Scrum Values in Virtual Environment

An exploratory study of Virtual Scrum Team

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Abstract

Adherence to Scrum Values in Virtual Environment

Scrum has been a prominent project management framework for managing software development projects. The scrum team embodies values such as commitment, focus, respect, courage, and openness to develop trust, which serves as the foundation of the scrum framework. However, in recent years, scrum teams are shifting towards a work-from-home environment which is relatively new to most of them and known to present various challenges. Looking at the benefits of adhering to scrum values, this study aims to investigate the challenges scrum teams experience in adhering to scrum values while operating virtually, as well as to explore practical strategies to overcome the identified challenges, particularly during the storming stage of team development.

This research employed a qualitative methodology using semi-structured interviews with scrum team members who have experience working in a virtual environment. Through qualitative content analysis of semi-structured interviews, this research identifies significant challenges within five main categories: communication, collaboration, interpersonal dynamics, the virtual work environment, and personal workspace issues. However, beyond the challenges, the study reveals practical strategies as well for successful team dynamics and higher efficiency. The strategies derived from team members' experiences are categorized into six categories: enhanced meeting management, leveraging in-person engagements, optimizing tools & technology, effective communication strategies, team-building, and nurturing a positive work culture.

Keywords: Agile, Scrum Framework, Scrum Team, Scrum Values, Virtual Scrum Team

Kurzreferat

Die Einhaltung der Scrum-Werte in einer virtuellen Umgebung

Scrum ist ein bekannter Projektmanagementrahmen für die Verwaltung von Softwareentwicklungsprojekten. Das Scrum-Team verkörpert Werte wie Engagement, Fokus, Respekt, Mut und Offenheit, um Vertrauen zu entwickeln, das als Grundlage des Scrum-Rahmens dient. In den letzten Jahren verlagern sich Scrum-Teams jedoch immer mehr auf die Arbeit von zu Hause aus, was für die meisten von ihnen relativ neu ist und bekanntermaßen verschiedene Herausforderungen mit sich bringt. Mit Blick auf die Vorteile der Einhaltung der Scrum-Werte zielt diese Studie darauf ab, die Herausforderungen zu untersuchen, die Scrum-Teams bei der Einhaltung der Scrum-Werte erleben, während sie virtuell arbeiten, und praktische Strategien zu erforschen, um die identifizierten Herausforderungen zu überwinden, insbesondere während der Storming-Phase der Teamentwicklung.

Bei dieser Untersuchung wurde eine qualitative Methodik angewandt, bei der halbstrukturierte Interviews mit Scrum-Team-Mitgliedern geführt wurden, die Erfahrung mit der Arbeit in einer virtuellen Umgebung haben. Anhand der qualitativen Inhaltsanalyse der halbstrukturierten Interviews wurden in dieser Studie bedeutende Herausforderungen in fünf Hauptkategorien identifiziert: Kommunikation, Zusammenarbeit, zwischenmenschliche Dynamik, virtuelle Arbeitsumgebung und persönliche Probleme am Arbeitsplatz. Neben den Herausforderungen zeigt die Studie jedoch auch praktische Strategien für eine erfolgreiche Teamdynamik und höhere Effizienz auf. Die aus den Erfahrungen der Teammitglieder abgeleiteten Strategien werden in sechs Kategorien eingeteilt: verbessertes Meeting-Management, Nutzung von persönlichen Treffen, Optimierung von Tools und Technologien, effektive Kommunikationsstrategien, Teambildung und Förderung einer positiven Arbeitskultur.

Keywords: Agil, Scrum-Rahmenwerk, Scrum-Team, Scrum-Werte, Virtuelles Team.

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1.Introduction

1.1. Starting Point and Objective

The world has come a long way from using one version of the software for years to having new releases every now and then. This has happened in response to meeting the ever-changing requirements of stakeholders. As what needs to be delivered is changing dynamically, it is not a surprise that traditional project management approaches where detailed requirements are needed as a starting point are not effective anymore (Jorge et al., 2011). In contrast, today's marketplace needs an adaptive approach to manage dynamically changing requirements and as a result, agile methodologies have emerged as an effective solution.

Agility is described as the ability to respond effectively to changing conditions. The concept of agility was first mentioned in social sciences in the 1950s. But in recent decades it has acquired a lot of attention in organizational theory (Lacey, 2015, p.7). Today, the focus on agility is mainly in the IT industry in the area of software development (McGreal & Jocham, 2018, p. 58). Agile methodologies such as scrum, kanban, and lean have revolutionized the way software is developed and delivered today. In order to respond quickly to the mentioned changing stakeholder needs, scrum emphasizes adaptive planning by using iterative work processes. Additionally, they also focus on continuous improvement for which they have regular meetings to reflect on the progress. Further, the scrum framework put emphasis on early stakeholder engagement (Sutherland, 2014, p. 24). This is mainly to gain feedback and identify areas for improvement at an early stage. Various studies have reported that this leads to increased efficiency and better coping with uncertainty (Lacey, 2015, p.21; McGreal & Jocham, 2018, p.61). The scrum team resides at the core of the framework and is intended to be responsive to changing market requirements. This makes their ability to adapt quickly very critical for the success of the organization.

To achieve agility using the scrum framework, the official scrum guide suggests that scrum practitioners need to adopt the appropriate attitudes and behaviors. By that, it means embodying the scrum values of commitment, focus, openness, respect, and courage. Co-author of scrum guide, Jeff Sutherland and Ken Schwaber, argue that the adoption of these above-mentioned values establishes trust among team members. Trust also serves as the foundation of the scrum framework and enables three pillars of scrum: transparency, inspection, and adaptation. Trust is a direct influence on the team's efficiency (Andre L. A. & Riyanto J., 2022). Furthermore, it is also essential to achieve the Performing stage of team development described by Bruce Tuckman. Schwaber and Sutherland (2016) describe the importance of five scrum values in a gist as:

“Successful use of Scrum depends on people becoming more proficient in living five values: Commitment, Focus, Openness, Respect, and Courage. These values give direction to the Scrum team with regard to their work, actions, and behavior.” (The Scrum Guide - Schwaber & Sutherland, 2020, p.4)

Viscardi (2013) also emphasizes the transformational character of scrum values in team dynamics and their ability to replace hostility with trust. The author mentions,

"The Scrum values are important, because they transform the way teams work and create collaboration opportunities between business stakeholders and teams, ultimately replacing hostility with trust. [...] team that embodies and lives the values will excel." (Viscardi, 2013, p.178)

In the scrum framework, scrum teams are introduced as colocated teams. Several studies have also shown that co-located scrum teams that adhere to the abovementioned scrum are effective at delivering efficient results. However, the COVID-19 outbreak has caused a disruption in how they work (Valgeirsdóttir, H. et.al., 2022). The common norm of working from one place is rapidly changing and working from home has become the new normal over time. Interestingly, many firms have also announced the formal adoption of virtual work environments. To give an example, Airbnb has developed explicit policies that allow employees to work from anywhere (Airbnb, 2022). In contrast, there are also some organizations for example Meta and Space X who are in opposition to remote work and asking employees to start coming back to the office.

Further, the concept of working in a virtual environment is also relatively new for many of the scrum teams. In the past, this concept was usually practiced for outsourcing projects. Studies have shown that working in a virtual environment presents challenges for teams (Ågren, P. et. al. 2022; Rebeka D., 2022; Obdržálková, E. & Moravcová, M., 2022). By considering the significance of scrum values in transforming mindsets to become agile, scrum teams must address any challenges that may limit the complete adherence of scrum values in this new working environment. The first objective is to explore the specific challenges that scrum practitioners face in adhering to scrum values in a virtual environment. The second objective is to explore potential solutions to the challenges discovered in the first step. Further, this study focused on the storming stage of the team development model.

1.2. Research Question

The following research question has been developed by examining the key concepts and the objective and scope of the research:

Main research question:

What challenges does the scrum team encounter in adhering to the scrum values within a virtual setting?

Sub questions:

1. What obstacles does the scrum team face in adhering to the values of commitment, focus, respect, courage and openness in a virtual environment?
2. What steps can be implemented to ensure the effective adoption of scrum values for enhancing the efficiency of scrum teams in the Storming stage within a virtual setting?

1.3. Structure

This thesis is structured in seven sections. The first section starts with an introduction where as a starting point the need and concept of being agile is explained along with the importance of scrum and its values while highlighting the challenges of the virtual environment. Subsequently, the research objectives and research questions are introduced.

The Literature review starts with an introduction to scrum framework by illustrating the scrum process. The purpose is to explain how various roles in scrum team interact with each other through different events and artifacts to deliver value in an incremental way. In the following subsection scrum values are explained to demonstrate how these values play roles in changing mindset and becoming agile. Further characteristics and challenges of a virtual scrum team are expressed by focusing on the first traditional scrum team, then the virtual team.

In the third section methodology used for the research is explained including the reasoning behind the choices made to address the research question. It includes research philosophy, research approach, research design, methodological choice, research strategy, and data collection and analysis.

The fourth section highlights the research findings. It presents the findings from the qualitative analysis of semi-structured interviews. It has two subsections. The first section reveals the challenges described by scrum practitioners and the second section covers the practical strategies they have been using to overcome the challenges in order to achieve higher efficiency.

In the fifth section discussion and interpretations are explained. It also includes limitations and recommendations for future research. The subsequent section provides recommendations for the different roles in the scrum team. And finally, a conclusion is drawn together with the limitations of this study and recommendations for future research.

2. Literature Review

This section aims to provide a concise introduction to key concepts relevant to the research topic. Adherence to scrum values in a virtual environment is a fundamental component of this research. The literature review starts by describing the scrum framework, and its process. Additionally, it describes the significance of scrum's core values and their application to different roles in the team. Further, it delves into the unique characteristics and challenges of scrum teams, as well as of virtual teams.

2.1. Scrum Framework

Kerzner (2006) describes project management as the discipline of planning, organizing, and executing projects effectively within scope, time, and budget constraints. Over time, project management methodologies have evolved as volatility in the market has grown. This means customers asking for quick solutions to their changing needs. In order to meet these needs organizations have been moving towards the adoption of agile methodologies. Evidence of this is mainly visible in the IT industry in the area of software development. Among the methodologies and frameworks which are based on agile principles, scrum framework is most widely used for managing complex projects with rapidly changing requirements.

Before the introduction of the agile methodologies, traditional project management approaches like the waterfall model were practiced to manage software development projects (Jorge et al., 2011). What was different in these approaches is that they used a linear and sequential approach to project management. Furthermore, they put a higher emphasis on long-term planning and documentation. In this approach, the project was divided into several distinct phases, which started from requirements gathering, to design, to implementation, to testing, and finally the release of it and afterward maintenance of the software. In the distinct phases mentioned above, each phase has to be completed before the start of the subsequent phase. This is because the output of the previous phase is used as input for the following phase (Schwaber, 2007, p.22; McGreal & Jocham, 2018, p.309).

The waterfall model had several limitations, out of which inflexibility and faster delivery to market was marked as the biggest limitation (Jorge et al., 2011; McGreal & Jocham, 2018, p.57-58). As this model defines requirements in the very first phase, this characteristic of the waterfall model makes it unsuitable for projects where requirements are unknown or likely to change. Further, this model focuses on long-term planning which makes it more inflexible. In order to address these limitations, agile methodologies came into practice.

Agile methodologies such as scrum follow the principles of the Agile Manifesto. It was designed and signed by a group of software professionals in 2001 (Beck, 2001). The manifesto put emphasis on collaboration and teamwork, with self-organized, cross-functional teams (Schwaber, 2004, p.54; Viscardi, 2013, p.18; Agile Alliance, 2023). Additionally, it promotes a culture of continuous learning and improvement, enabling adaptation to changing requirements. Furthermore, agile methods are versatile and have been adopted by projects of all sizes and types, from small start-ups to large enterprises (Schwaber, 2007, p.3, Rigby et al., 2018).

Looking in the past at the origin of the term “scrum”, Verheyen (2017) mentioned that it was originally inspired by the rugby formation of the same name. There it emphasizes teamwork and collaboration. In the field of software development, Hirotaka Takeuchi and Ikujiro Nonaka used the term for the first time in 1986 in their paper, “The New New Product Development Game”. Later, in the early 1990s, two developers Jeff Sutherland and Ken Schwaber developed the scrum framework (Schwaber, 1997). The co-creators of scrum were also part of the 17 signatories of the agile manifesto (Agile Manifesto 2023). Schwaber (2007, p.85) mentions in his book that the scrum framework aims at enabling teams to deliver high-quality products in an incremental way. Since its ideation, the framework has proven to be effective in being agile (Rigby et al., 2016b). It is hardly surprising that it has grown to be the most popular agile methodology in the IT industry today. In the official guide, scrum is defined as:

"Scrum is a lightweight framework that helps people, teams and organizations generate value through adaptive solutions for complex problems." - The Scrum Guide (Schwaber & Sutherland, 2020, p.3)

Scrum Process

Roman Pichler describes *"Software development is full of unknowns; uncertainty and risk go hand in hand with innovation."* (Pichler R., 2010, p.99), this means that organizations need to adopt new methodologies, using which they can manage uncertainty and mitigate risk. Further, he continues by mentioning how scrum helps in achieving that as *"Scrum provides the means to work incrementally, to bring the product to life step by step, each sprint building on the results of the previous ones."* (Pichler, 2010, p.97-98). In other words, it means, not all variables affecting the progress of a project are visible in advance. Therefore, a flexible and responsive way is required. scrum suggests doing that by working in small cycles of one to four weeks, also known as sprints (Schwaber & Sutherland, 2020, p.7). Each sprint involves planning, designing, developing, and testing to release a working product increment. Roman Pichler also highlights the results of working in sprints with an example as

“Salesforce.com experienced an amazing 97% increase in the number of features delivered by establishing short, steady release cycles.” (Pichler R., 2010, p.77)

The scrum process is highlighted in figure 2.1. The process starts with a product backlog where the feature requests from customers, end users, and internal or external stakeholders are incorporated. The product owner decides upon priorities of the features in the product backlog. Top priority features are developed in upcoming sprints by developers. Regarding backlog management, McGreal & Jocham (2018) mention that it is crucial for product owners to say no to feature requests which do not align with the product vision else the product backlog becomes unmanageable.

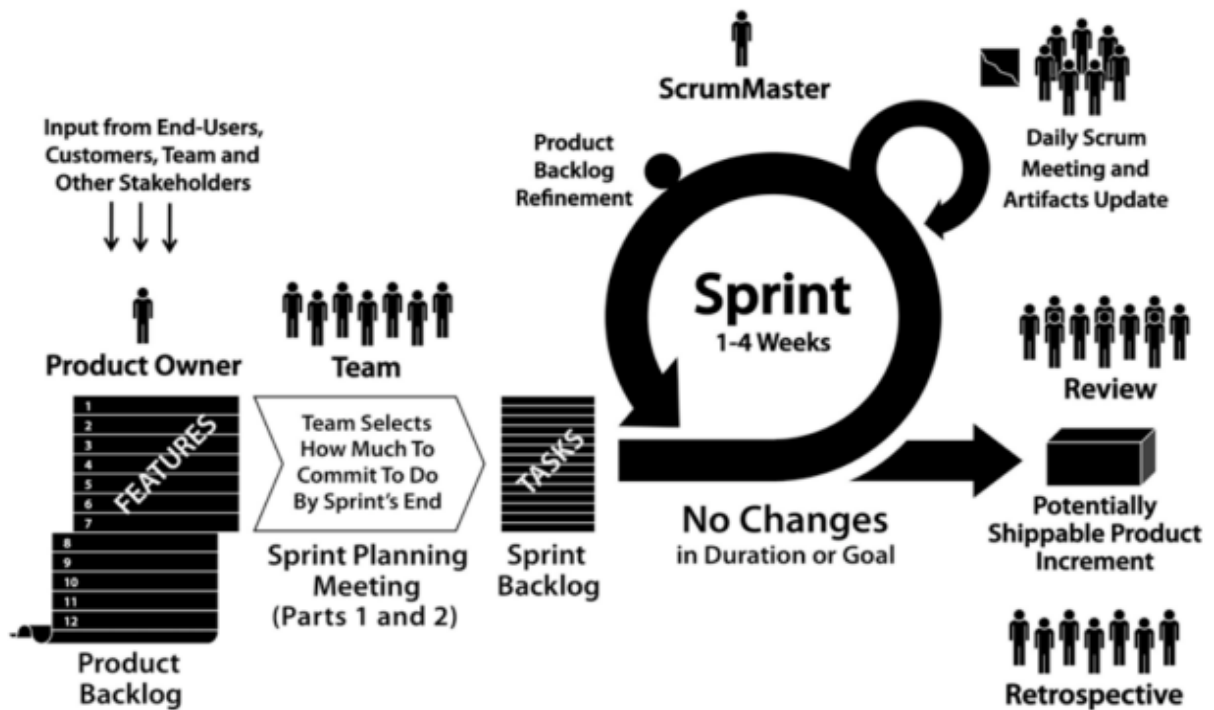


Figure 2.1 The Scrum Process (Deemer, Benefield, Larman & Vodde, 2010, p.5)

A Sprint planning meeting happens before starting a new cycle of work. During this event, the product owner presents detailed requirements of the top priority backlog items and the scrum team estimates them in terms of effort and looking at their average sprint velocity they commit to work for the coming sprint. The committed backlog items then become sprint backlog. As a part of this meeting sprint goal is set which is aligned with project goals and the team commits to achieving it. Once the sprint is started scrum advises to not make any changes in committed work or duration of the sprint as this might serve as a distraction for the team (Viscardi, 2013, p.198).

During the sprint execution, the team starts sprint execution which is typically from one to four weeks of time. During the sprint execution, the developers meet once

daily for updates about their progress and if there are any obstacles that are hindering the team members from progressing further. The team also meets once for a backlog refinement meeting to prioritize the items for the next sprint. At the end of every sprint, the team releases a product increment. During the sprint review meeting, stakeholders give feedback on the work completed during the sprint.

Further, when the sprint ends, the team meets for a sprint retrospective meeting. In this meeting members share their feedback with each other. In this meeting, two things are discussed: what went well? and what can be improved? And as a result of the meeting, an action list is made to act upon in upcoming sprints. Overall this enables transparency via different scrum artifacts and focuses on incremental delivery and regular engagement with stakeholders so that inspection can take place and planning can be adapted as needed.

Measure of efficiency in Scrum

Sprint velocity is a metric used in scrum framework, to measure the amount of work a team can complete within a single sprint. Sprint velocity is an effective metric for tracking the progress of a scrum team and measuring their efficiency. Sprint velocity is used to plan capacity for future sprints (Cohn, 2004, p.119).

As per scrum framework, sprint velocity can be calculated by summing the total number of points assigned to completed product backlog items that were finished in the sprint. A point-based scheme, such as the Fibonacci Sequence (1, 2, 3, 5, 8, 13, and so on), is typically used to assign these points. These points reflect the relative effort needed to complete a backlog item. Very often product owners use user stories for defining requirements in the backlog items. The developers estimate a sample user story and assign story points. This story point and the effort needed to complete the story serve as a basis for estimating the other user stories (Cohn, 2004, p.215; Deemer et. al., 2012, p7). Since sprint velocity is used to measure the capacity of a team to deliver working functionalities, for its calculation only finished stories are considered. To have a shared understanding of when an item or user story is completed, scrum teams use the definition of Done (DoD). It is nothing but a clear agreement between the product owner, developers, and stakeholders (Pichler, 2010,p.99; Deemer et. al., 2012, p8; McGreal & Jocham, 2018, p.223).

The total points allocated to the product backlog items that were finished during each sprint are added up, and the number of sprints divided by that result gives the average velocity. Therefore, average sprint velocity is important because it helps teams to understand their performance over time and is more reliable (Cohn, 2004, p.119).

The simplicity of sprint velocity makes it easy to explain and share with stakeholders, providing a clear understanding of the team's performance and progress. It provides a baseline for planning the release. Furthermore, with the help of sprint velocity teams can track their performance and make adjustments to enhance efficiency. For example, when the velocity of a team declines, it means the team is delivering comparatively less so they can take action to improve performance (Kenneth, 2012; Lacey, 2015).

Furthermore, in complex and large projects, accurate planning is crucial for success. Sprint velocity can help teams make predictions about their future capacity (Deemer et. al., 2012, p9). For example, if the total number of product backlog items that need to be completed for the next product release is 56 points, and the scrum team's average velocity is 7, then it can be determined that the team takes 8 sprints to complete all of the remaining backlog items. Therefore, a release can be planned after 8 sprints. If the sprints are 2 weeks long, the release can be planned in 4 months.

The significance of maintaining a consistent average sprint velocity in scrum teams is crucial for effective planning and delivery. A decline in the team's velocity can have detrimental effects on an organization's ability to meet its commitments and goals. Therefore, In order to successfully complete the planned work within the deadline, it is essential for the team to closely monitor their velocity and continually work to increase it. Overall, sprint velocity is an important metric for measuring the team efficiently.

2.2. Scrum Values

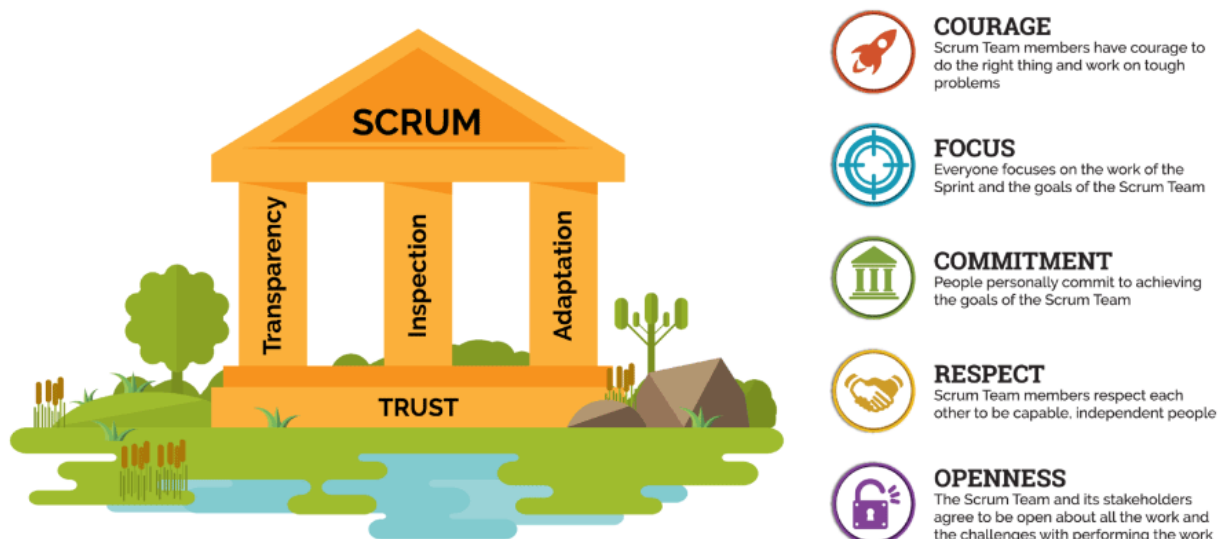
“Changing practices is one thing; changing minds is quite another” (Cohn, 2009, p.3)

Through the above citation, Cohn highlights that simply adopting new practices, such as scrum, does not guarantee a fully agile approach; similar to how knowing the rules of chess doesn't ensure success in every game. Therefore it requires a shift in mindset. The author argues by highlighting the importance of scrum values that adoption of them is crucial to become agile. Lacey (2015) also agrees with Cohn and shares the same thought by putting emphasis on scrum values as;

“Implementing Scrum correctly requires teams to be willing to make the following changes:

- *Develop an understanding of Scrum’s underlying values.*
- *Undergo an often enormous shift in mindset.” (Lacey, 2015, p.8)*

Literature mentions that the scrum values of commitment, focus, respect, courage, and openness have been serving as the guiding principles for the scrum practitioners in the full adoption of scrum framework. Schwaber and Sutherland added the values to the official scrum guide in its revised version in 2016. In the guide, the authors added that these values lead to a high level of trust which is a crucial aspect as mentioned in Figure 3.2. It brings together the different elements of a scrum team and enables three pillars of scrum, transparency, inspection, and adaptation (scrum.org, 2023).



Credit: ABN AMRO Bank N.V.

Figure 2.2 The Scrum Values (Reference: Scrum.org, 2023, <https://www.Scrum.org/resources/what-is-Scrum>)

In the three pillars shown in the figure, transparency ensures that everyone is aware of the work being done and any challenges that arise, inspection enables the team to identify any deviations from its goals. And adaptation enables the team to adjust their approach and continuously improve. The scrum values which ensure the successful adoption of the scrum framework and agile mindset are described in the following sections.

2.2.1. Commitment

In simple words, the value of commitment relates to the team's dedication to achieving committed project goals. Lacey (2015, p.8) defines commitment as the ability of a team to keep its promises and support each other. The below-mentioned citation put emphasis on not making commitments lightly because if a team overcommitted and fails to fulfill their commitment made during the sprint planning meeting, it would mean not having a working product increment at the end. As a consequence, the entire idea of adopting scrum for delivering incremental values would fail.

“A commitment is a pledge or promise, an obligation to deliver. Commitments should not be made lightly—they should be made with as much information as possible.” (Lacey, 2015, p.8)

Further, the citation focuses on making informed commitments based on as much information as possible. As described in scrum process, before starting a new sprint team have a sprint planning meeting, during this meeting developers commit to implementing a specific set of items in the next sprint. This commitment is made by looking at sprint velocity and how the items are estimated. To make a realistic commitment estimate of backlog items should be done with as much information as possible. After estimation, the team commits to achieve a few of the backlog items and a sprint goal is formed by looking at the committed work.

The value of commitment applies to different roles in the scrum. As an example, product owners are committed to building the product vision and refining the product backlog in line with the product vision (McGreal & Jocham 2018, p.337). As the developers are the ones who are responsible for developing. Testing and releasing the product increment, the value of commitment applies slightly differently to them. For developers, commitment means being dedicated to delivering product increments of the highest quality (Schwaber, 2004, p.48; Viscardi, 2013, p.183; Sutherland, 2014). As supporting each other is also described as showing the value of commitment, the scrum masters act as a facilitator and are dedicated to ensuring that the team can follow the framework (Schwaber, 2004, p.30; Viscardi, 2013, p.183).

2.2.2.Focus

Focus is another core value of scrum, it means the ability of the scrum team to focus on the tasks in the sprint backlog that they committed to during sprint planning. Lacy describes it as,

“To focus means to concentrate, to direct attention on something. In Scrum, the team must have focus if it is to accomplish everything that needs to be done to deliver a potentially releasable increment of functionality.” (Lacey, 2015, p.8)

As cited above, the primary focus of the team is on achieving the working product increment. Lacy mentioned that maintaining a clear understanding of project goals is highly important in developing focus. This helps in aligning their efforts and bringing focus to them. Highlighting the importance of this value, Viscardi (2013, p.197) mentioned that having focus is important for ensuring that a team can maintain a sustainable pace of work.

There are many arguments available on the benefits and consequences of multitasking. It is interesting to see the thoughts of Sutherland when he argues that *“The people who multitask the most just can’t focus.”* (Sutherland, 2014, p.59). This means that teams that multitask have more frequent context switching and difficulty in prioritizing their work. In contrast, teams with a higher amount of focus are able to align their cumulative strength in the right direction which ensures fulfillment of the commitment made during sprint planning meetings. It is also interesting to see how the different scrum values interrelate with each other. For example, the ability to focus also helps the team stay motivated and engaged, which helps the team to achieve their commitment (Viscardi, 2013, p.198).

The scrum framework itself also enables the team in adhering to focus in many ways. For example, The team set the sprint goal, and the team members focus on achieving that goal. Additionally, another key artifact, sprint backlog also helps in achieving focus as it is typically updated daily during daily stand-up meetings. As at the end of each iteration the sprint review meeting is planned, it provides an opportunity to review the progress made in the sprint. If the team failed to fulfill the commitment due to loss of focus, the team can reflect on those and adapt necessarily (Lacey, 2015, p.8).

As described in the scrum process, it puts a great emphasis on not making changes once the sprint has started. The scrum master has a greater responsibility here to make sure that the team does not get distractions. This role in the team is focused on removing impediments and roadblocks that prevent the team from delivering the product increment (Viscardi, 2013, p.198). For developers, focus means ensuring that their daily work aligns with the sprint goal. It also involves avoiding distractions and other non-essential tasks that divert the team's attention away from the sprint goals

(Schwaber, 2004, p.18). Additionally, to develop a higher degree of focus in the team, the product owner shares the product vision (McGreal & Jocham, 2018, p.38).

2.2.3. Openness

The scrum value of openness is closely associated with transparency which gives birth to the other two pillars of scrum as defined at the beginning of this section. Additionally, Openness is a critical value for building trust and collaboration in a scrum team (Lacey, 2015, p.8; Schwaber & Sutherland, 2020, p.4; Tyagi S. et. al., 2022). As a benefit of this, teams can identify roadblocks in making progress at an early stage and can address them (Viscardi, 2013, p.193-195).

Again similar to other values mentioned above, the scrum framework provides several tools and practices to help teams express Openness. For example, the sprint retrospective meeting encourages team members to be open and honest about sharing what went well in the sprint, and what could be improved. As a result, such meetings help in continuous improvement. Sutherland (2014, p.41) mentioned that teams can achieve incredible outcomes by openly sharing feedback during this event. Further, daily standup meetings also give a chance to the team members to openly share their progress and any challenges they are facing. Here also openness helps to identify potential roadblocks early on so that they can make adjustments as needed. Additionally, the sprint review meeting also encourages open and honest feedback from stakeholders and team members. By doing so it can help in identifying areas for improvement and prioritizing work for the upcoming sprint.

For product owners, being open means having a transparent product backlog with all stakeholders which reflects the priority of features. By doing so it helps developers to understand customer's needs better and prioritize work based on that. Additionally, they should also be open to receiving feedback. This practice potentially improves the value of the product (McGreal & Jocham, 2018, p.140).

Interestingly, the concept of being open is not limited to being transparent about the progress and giving honest feedback but it goes beyond that to even being open to new ideas and trying different approaches for solving any particular problem, Lacey put it nicely as,

“Openness enables teams to be receptive to new ideas.” (Lacey, 2015, p.8)

Additionally, Viscardi (2013, p.192) interprets being open as being more open to sharing their knowledge and expertise. This also supports the principle of continuous learning and improvement (Sutherland, 2014). Interestingly, by doing knowledge sharing

also supports the other value, a commitment which describes that team members are committed to supporting each other.

While looking at the importance of this value, it's also important to acknowledge that to cultivate it, it needs a safe space for the team where they can express their opinions openly (Viscardi, 2013, p.193). Scrum masters are appointed as a facilitator to provide this environment to the team.

2.2.4. Respect

Respect, as described in the scrum guide, includes recognizing and valuing the opinions, judgments, and knowledge of others (Lacey, 2015, p.8; Schwaber & Sutherland, 2020, p.4). As a benefit of cultivating a culture of respect, team members feel more comfortable in sharing ideas, seeking feedback, and asking questions without fear of being judged.(Schwaber & Beedle, 2002, p.147).

As scrum master acts as a facilitator, it falls under their responsibilities to establish a safe work environment for better collaboration among team members. They model respectful behavior and encourage others to do the same (Viscardi, 2013, p.201). Building respect is something that is gradually earned and not something which is granted while adopting scrum. Lacey describes it as

“As the saying goes, respect is earned, not granted. In Scrum, this is especially true.” (Lacey, 2015, p.8)

In the context of respecting each other means, Product owners should respect the developer's expertise and trust them to deliver a high-quality product (Kenneth, 2012). Additionally, they should also respect the team's time and capacity by avoiding micromanagement and not overloading the team with excessive work (McGreal & Jocham, 2018, p.159).

2.2.5. Courage

The scrum value of courage refers to the scrum team's willingness to take chances and face challenging difficulties without concern about negative consequences. For scrum practitioners, it means having confidence to speak up, raise concerns, and take ownership of problems (Lacey, 2015, p.8; Schwaber & Sutherland, 2020, p.4).

Given the industry's rapid growth, innovation is essential for IT businesses to remain competitive. Inspiring scrum team members to do the right thing encourages an innovative culture. They are more inclined to try overcoming barriers in more innovative ways rather than playing it safe and sticking to what they know. As a result, this leads to faster problem resolution and brings sustainable advantages for growth through their solutions.

Lacey looks at it from a different angle and highlights that with a lack of courage, the team might suffer from a bad decision. The author expressed the thoughts as,

“Courage is the ability to face difficulty in spite of your fears. [...] when teams lack the courage to do what they feel is right, the right thing will likely not be done.”
(Lacey, 2015, p.8)

During various scrum meetings, the team members need to show courage. For example, during sprint planning, developers demonstrate courage to commit to what they believe is achievable. At the daily standup meeting, they require courage to be transparent about their progress and any challenges they face. In sprint review meetings, the team must show courage to present their work and receive feedback, whether it is positive or negative. And at last during the sprint retrospective also the team members need to be courageous in providing honest feedback on what went well and what could have been improved (Viscardi, 2013, p.181).

Outside of these events, the team members have to show courage in performing daily work as well. For example, product owners need to make tough decisions while prioritizing the product backlog. Not only this they also need to show courage in communicating those decisions to stakeholders as the value of openness requires it (McGreal & Jocham, 2018). If the product never says no to the stakeholder requirements then the backlog would grow up to the extent that it would become unmanageable. Hence, they need to show courage and say no to stakeholders when necessary.

Alongside the benefit of tackling problems with different innovative approaches. The team members also show courage and speak up in case they are facing any obstacles in making further progress. For example, if a developer encounters a technical issue that becomes a blocker for them progressing further, they must have courage to raise the issue during daily stand-up meetings. As it would help them to address problems promptly (Sutherland, 2014). As the introduction of agile methodologies happened after the waterfall method, the adoption of the scrum framework also has been a challenge for many organizations. In such cases to facilitate its adoption, scrum masters need to have the courage to challenge the status quo, even

if it requires going against established practices and organizational norms (Viscardi, 2013). They must be willing to have difficult conversations with team members, stakeholders, and management and drive continuous improvement using the scrum framework.

In conclusion, the scrum values are crucial in guiding the behavior and interaction of team members, including product owners, scrum masters, and developers, through the use of various scrum events such as sprint planning, daily scrums, sprint reviews, and sprint retrospectives, ultimately promoting a positive working environment and successful implementation of the scrum framework.

2.3. Scrum Team

The scrum team is a group of individuals who work collaboratively to deliver the most valuable product increment (Schwaber & Sutherland, 2020, p.5). Scrum teams are typically made of 5 to 9 individuals, whereas larger teams also are possible for more complicated projects. The scrum team serves as the backbone of the operation in the scrum framework.

Scrum teams are typically co-located, which means that all team members work in the same physical place. This serves as an advantage for good communication and collaboration. However, on the other hand, virtual teams are also possible, where team members work from different locations.

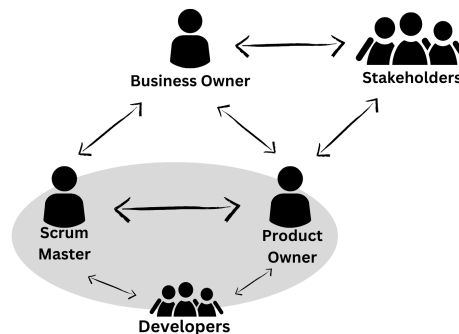


Figure 2.3: Scrum team
Source: Own creation

Figure 2.3 illustrates scrum team structure from a functional point of view. The arrows represent how different roles in the team interact with each other and with stakeholder(s) and business owner(s). The scrum team itself has three roles: the product owner, the scrum master, and the developers. Each role has different responsibilities which makes the team cross-functional and self-organized. (Schwaber & Sutherland, 2020, p.5). The scrum guide explains these roles as,

- The product owner prioritizes the work to ensure that most valuable features are being worked on by developers.
- The scrum master acts as a facilitator and removes obstacles if any present.
- The developers are responsible for developing, testing and releasing the product increment.

At the end of every iteration, the team presents their work to the stakeholders to ensure that the product increment meets their needs. The product owner, as illustrated in the diagram, is responsible for engaging with stakeholders and ensuring that their requirements are integrated into the product backlog. Scrum recommends having regular communication with stakeholders. By doing this the team can gather

important insights, comments, and support. In exchange, it contributes to the product's quality, usability, and value. Customers, users, business owners, regulators, suppliers, partners, industry experts, and other interested parties are examples of stakeholders.

The product owner and scrum master work in close collaboration with the Business Owner. He is responsible for securing budget for the project, managing stakeholders, and ensuring that the product aligns with the organization's business goals. Furthermore, internal stakeholders like board members, architects, consultants, sales, and marketing experts assist the team in developing product vision, strategy to achieve the vision, and product roadmap to put the strategy into action (Pichler, 2022).

Co-location is among other factors like team size, cross-functional, and self-organizing which have a direct influence on the team's effectiveness. They mention that smaller scrum teams are more effective than bigger teams in their study. Further, the cross-functional character of the team is also beneficial for them, as research indicates that teams with this trait are more effective than teams made of individuals with similar skill sets. And regarding the factor relevant to this topic, the research discovered that co-located teams were more effective than virtual teams.

Characteristics of a Scrum Team

The scrum team is known for being cross-functional in nature. The cross-functional team has all of the essential skills within the team to deliver a product (Leinwand et al., 2015). As described earlier in this section, the scrum team has different roles. As each role has distinct expertise like the product owner prioritizes the backlog, developers implement the features and the scrum master facilitates the process.

In addition to the cross-functional nature of the team, scrum teams also are also self-organizing. This means that the team takes ownership of its work and makes its own decision. For example, the team is responsible for prioritizing and implementing work with minimum supervision. This trait is very different from the traditional project management approaches which relied largely on a top-down decision-making approach (Jorge et al., 2011).

2.4. Stages of Scrum Team Development

Bruce Tuckman proposed the model of group development in 1965. This model explains how the team transitions through different stages to reach the performing stage. The model mentions that a team goes through distinct stages of forming, storming, norming, and performing in order to grow, address challenges, and deliver results. Tuckman believed that these stages are necessary and inevitable for any team to reach high performance.

The stage is not permanent. A team typically cycles through these stages several times. Also, not every team advances through these stages in a linear manner. To reach the performing stage the first step is to understand these different stages and figure out where they stand. This would help in finding out what initiatives they can take to enhance their performance.

The forming, storming, norming, and performing paradigm also applies to scrum teams. Each step of the model corresponds to specific activities and milestones in the scrum process as described in following sections.

Forming

Forming stage refers to the first stage of team formation. As a first step, here the team is being formed by bringing different members together (Tuckman, 1965). It is often guided by the human resources department or some team-building experts. As part of this stage, the team is introduced to the project deliverables and they establish ways of working. In the context of scrum the team defines various artifacts such as the format of user stories, definition of ready, definition of done (Schwaber, 2007, p.76).

Storming

The storming stage usually follows the formation stage. Team members are still getting to know one another at this point and building a collaborative working approach. When the team begins to work together, team members may have different viewpoints on how to approach a task. Moreover, they have a difficult time grasping each other's perspectives. As a consequence, it can cause tension and resistance which makes it difficult to progress forward as a team. Hence, it is critical for team members to show courage to communicate openly as well as accept other points of view. Although disagreements are sometimes unavoidable, good conflict resolution is critical for the team's success (Bonebright, 2021).

Scrum process helps the team in various ways in overcoming disputes and progress further. For example, daily standup meetings give an opportunity to discuss their progress and problems if there are any. In addition, sprint retrospectives are planned where members can express themselves openly about how they feel working in the team. In order to successfully navigate through the storming stage, It is critical for team members to adhere to scrum values. This helps them in working through conflicts and disagreements so that the team can advance to the next stage of development and begin to operate more successfully together. (Schwaber, 2007, p.76).

Norming

The norming step is crucial in establishing a shared understanding of team members' roles, responsibilities, and expectations. When a team reaches this stage, the members start to recognize each other's strengths and weaknesses better. As a result, they start establishing a growing sense of mutual respect towards each other (Tuckman, 1965). The scrum framework defines three distinct roles in the team as developer, scrum master, and product owner. As the framework also defines the responsibilities of these roles, it helps the team in understanding each other's strengths. As a result, teams can make progress faster towards the performing stage.

Performing

At this stage the team has a high level of trust, commitment, and motivation among the members. As a result, they work cohesively and leverage each other's strengths. As an advantage of reaching this stage, each team member understands the goals and is motivated to achieve them. Also by now, the team would have developed clear channels of communication, and conflicts are resolved constructively (Tuckman, 1965). However, as said performing stage is not permanent, so as the team meets new challenges, they might return back to the storming stage, where they must restore operational and communication norms in order to go forward (Tuckman, 1965).

The performing stage of the scrum team is critical for the success of a sprint and the project. At this stage, the team successfully works together to achieve project goals and incrementally provide value to the customers. The team members exhibit courage, openness, respect, commitment, and focus. At this stage, the team is also being self-directed and taking the initiative to continually enhance the process (Schwaber, 2007, p.77).

Adjourning

Tuckman later added a fifth stage to the team development model as the last stage. This stage refers to the process of dissolving the team when a project is complete. The author describes that at this stage, members reflect on the project's successes or failures. Team members acknowledge their accomplishments and contributions to the team's success and move on to new projects (Tuckman, 2001).

To achieve more focused results, this research will delve into the specific challenges faced by scrum teams during the Storming stage, where conflicts and disagreements are prevalent which can impact the efficiency of the team.

2.5. Virtual Team

Virtual teams are made up of people from all over the world who work together on tasks and projects (Lipnack & Stamps, 2000). The fundamental distinction between virtual team and traditional colocated team is their geographical separation. This trait results in limited in-person collaboration. To successfully collaborate despite physical distance limitations, these teams rely significantly on communication technology such as email, instant messaging, video and audio calls (Gibson & Cohen, 2003). According to Gibson (2020), virtual teams have grown in prominence over the last two decades, especially during the COVID-19 pandemic in 2020. Powell et al. (2004) define virtual team as follows:

"A virtual team is a group of geographically, organizationally and/or time dispersed workers brought together by information and telecommunication technologies to accomplish one or more organizational tasks." - (Powell, Piccoli, and Ives, 2004, p.5)

To have a thorough understanding of virtual teams, the following sections will focus on their unique characteristics and challenges associated with them.

Characteristics of Virtual Teams

Geographic dispersion is the very first characteristic of virtual teams, as noted in the definition. This means, members of these teams could be located anywhere in the world, whether in separate states within the same country or on different continents (Hertel, Geister, & Konradt, 2005). This also brings the advantage of having access to a vast talent pool (Gibson & Gibbs, 2006).

Virtual teams cannot be discussed without mentioning their dependency on technological platforms for collaboration. For communication they heavily use emails, instant messaging, video conferencing, and other similar tools. (Hertel et al., 2005). Another significant characteristic of virtual teams is their diversity. The members from different cultural backgrounds bring a diverse mix of viewpoints in the team. However, it is worth mentioning that navigating through cultural differences can be difficult. It can cause issues in communication and conflict resolution processes (Gibson & Gibbs, 2006). To be successful, a virtual team must turn cultural differences into their strength and leverage them to achieve their goals.

Finally, virtual teams also show a great degree of autonomy compared to traditional teams. Virtual team members are usually characterized as self-disciplined and have strong time management skills. This helps in being accountable for their own

schedules and tasks (Hertel et al., 2005). However, this autonomy can also lead to misalignment.

Challenges of Virtual Teams

Virtual teams typically face communication issues due to their geographical separation. They rely heavily on technology; nevertheless, technological limitations such as intermittent internet connections can make it difficult to have effective communication (Hertel et al., 2005). Additionally, As the team lacks physical interactions, as a result, the team faces challenges in building camaraderie. This can occasionally lead to feelings of isolation for team members (Powell, Piccoli, & Ives, 2004).

Furthermore, virtual teams lack nonverbal cues. In absence of them it can lead to misunderstandings. Events like this usually further leads to loss of trust among members (Powell et al., 2004). Additionally, as mentioned in the characteristics, virtual teams are spread across the globe, hence, they also face cultural differences (Hertel et al., 2005). It can harm a team in many ways like it can lead to loss of respect. Important to mention that as part of this study, aspects of multiculturalism are not included. Furthermore, virtual teams can lead to a situation where its members are not completely aligned with respect to project goals and priorities (Powell et al., 2004).

In conclusion, literature shows that virtual teams have to navigate through an array of challenges related to communication, social interaction, and misalignment.

2.6. Virtual Scrum Team

As stated in previous section, we live in an increasingly digital world where geographical barriers are no longer an impediment to form a team. And remote work has become more popular in recent years. Further, the COVID-19 pandemic also has a bigger role in this shift (Valgeirsdóttir, H. et.al., 2022). Virtual scrum teams have similar roles as traditional scrum teams including product owner, scrum master, and developers but the members work from different locations (Cohen, Costa, & Fontana, 2020).

As the scrum team is also characterized as a self-managed team, the members need to collaborate frequently for daily tasks. For instance, product owners work closely with developers to explain the requirements (Pichler, 2010, p.7; McGreal & Jocham, 2018, p.147). Scrum masters also work closely with other team members to facilitate the scrum process (Pichler, 2010, p.9; Viscardi, 2013, p.83; McGreal & Jocham, 2018, p.151). Furthermore, the team also needs to collaborate with stakeholders for understanding their needs and getting their feedback (Schwaber, 2004, p.54). In virtual environment, scrum teams collaborate utilizing emails, audio and video conference calls. For e.g. the team conducts its key meetings like daily standup meeting virtually.

As virtual teams rely heavily on technology for communication and collaboration. Here, technical issues are seen as a challenge (Ramesh, Cao, Mohan, & Xu, 2006; OBDRŽÁLKOVÁ, E. & MORAVCOVÁ, M., 2022). Further, virtual teams face many challenges due to lack of in person interaction (Moe, Aurum, & Dyb, 2020; Rebeka D., 2022; Ågren, P. et. al. 2022). Time zone differences are seen as a benefit to providing support around the clock, but very often it also becomes challenging in aligning schedules (Hoda & Murugesan, 2020).

To date, a variety of studies has explored the implementation of Scrum values within traditional, co-located teams. They have found that co-located scrum teams that adhere to the scrum's core values of commitment, focus, courage, openness, and respect produce efficient results (Viscardi, 2013; Lacey, 2015). However, the topic how scrum values are adopted within virtual environments is not explored much. This is particularly important in light of the growing reliance on remote work, with more organizations transitioning their scrum teams to virtual environments. By considering the significance of scrum values in transforming mindsets to become agile, scrum teams must address any challenges that may hinder the complete adherence of scrum values in this new working environment. The first objective is to explore the specific challenges that scrum practitioners face in adhering to scrum values in a virtual environment.

Further, as a subsequent step to finding the challenges, the second objective is to explore practical strategies scrum teams use to address the challenges discovered.

The majority of existing research focuses on recommending strategies to optimize the efficiency of scrum teams in the co-located environment. However, few studies have specifically examined this issue for virtual teams, and even fewer have examined it in the context of the storming stage, the critical stage when team members begin to confront each other's work styles. As virtual environments are becoming more common, this study will provide a fresh insights on how to effectively navigate this stage by adhering to scrum values in a virtual context.

The following research question has been developed by examining the key concepts and the objective of the research:

Main research question:

What challenges does the scrum team encounter in adhering to the scrum values within a virtual setting?

Sub questions:

- **What obstacles does the scrum team face in adhering to the values of commitment, focus, respect, courage and openness in a virtual environment?**
- **What steps can be implemented to ensure the effective adoption of scrum values for enhancing the efficiency of scrum teams in the Storming stage within a virtual setting?**

The following section explains the methodology used for answering the above-mentioned research question regarding exploring the challenges and possible workarounds for achieving higher adherence to the scrum value.

3. Methodology

This section will describe the research methods used to discover the challenges that scrum teams face in adhering to scrum values in a virtual environment during the storming stage of team development and present strategies to effectively address these challenges. It explains the choices made for research design, data collection and analysis approaches to answer research questions.

3.1. Research Philosophy and Approach

Research philosophy encompasses the guiding principles that form the basis of the research procedure. The philosophy is divided into two primary frameworks: positivism and interpretivism. Positivism believes that society shapes the individual, whereas interpretivism believes that individuals shape society (Saunders et al., 2016).

The scrum team has complex interactions on a daily basis. As these interactions are among human beings, there can be multiple interpretations of them. Therefore, as Interpretivism focuses on comprehending human experiences, this philosophy is used for addressing research questions. It allowed for an in-depth exploration of the subjective experiences of team members.

Under research approach, inductive reasoning starts with a collection of data to examine a phenomenon before formulating a theory, whereas deductive reasoning begins with a theory that is subsequently tested by research (Saunders et al., 2016). The inductive reasoning is well suited to exploratory studies like this one, as it helps to identify patterns and themes in the collected data. The inductive approach also led to the development of practical recommendations for overcoming the challenges discovered by interviewees.

3.2. Research Design

There are multiple ways to approach the research, it includes qualitative, quantitative, or a hybrid approach. The difference is that in quantitative research numerical data is collected for analysis with the help of statistical methods; whereas qualitative research focuses on collecting non-numeric data, such as the experiences of scrum practitioners using interviews (Saunders et al., 2016).

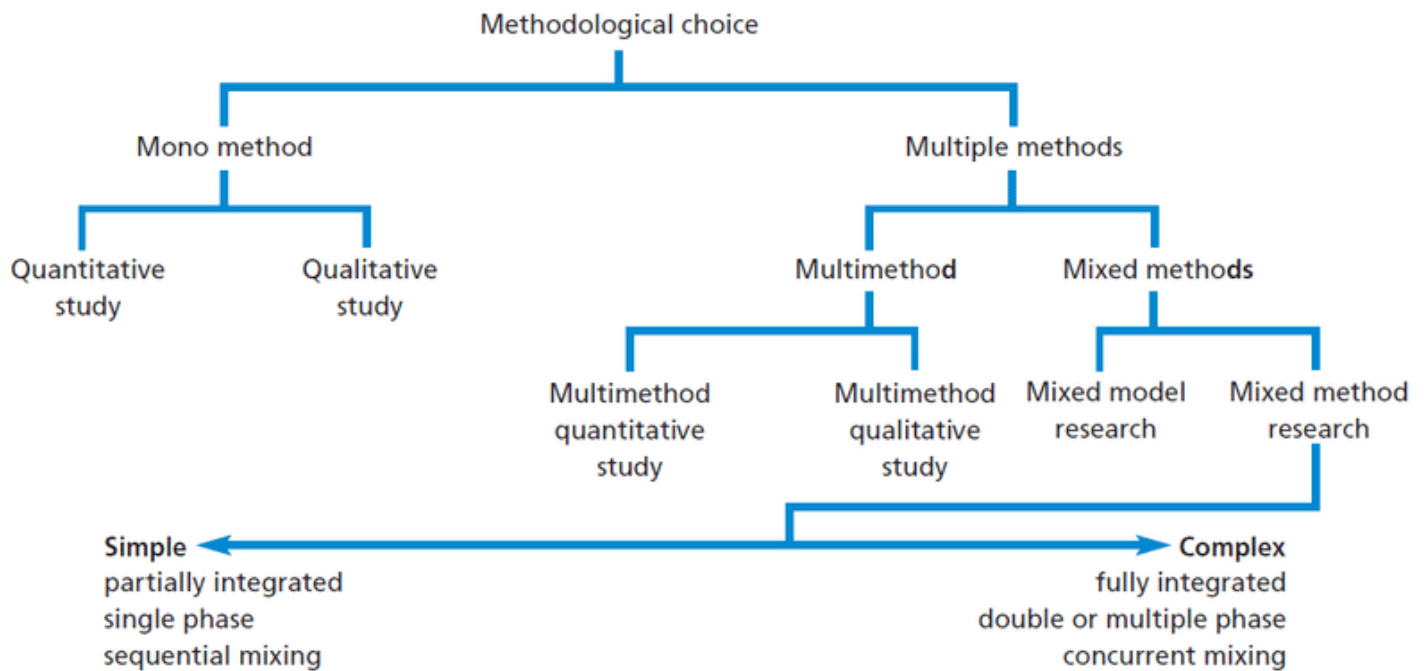


Figure 3.2: The Methodological choice
Source: (Saunders et al., 2019)

A qualitative approach was chosen to address the research question, this is because it aims to understand subjective experiences of scrum teams regarding challenges they face. Additionally, it also helped in exploration of strategies to overcome the challenges they experience.

Further, there are four approaches: exploratory, descriptive, explanatory, and evaluative to choose from. Exploratory is most suitable for establishing greater understanding of the topic as it uncovers the underlying what and how of a topic. As this study explores the challenges and strategies, an exploratory research approach was adopted.

3.3. Data Collection

The core of this master thesis is based on a combination of primary and secondary data. To begin, a comprehensive literature review was carried out to gather secondary data. This gave the foundation for the discussion around scrum framework and its values and the nature of virtual and scrum teams along with their challenges, which were all explored in previous chapters. Further, as this study has exploratory nature, semi-structured interviews were used for data collection to gain in-depth insights.

3.3.1. Selection of interview participants

The following procedures were taken into consideration to make sure that the participants are representative of the target group and offer insightful information:

Target population: The target population is individuals who are part of scrum teams and work in a virtual environment.

Sample size: For this research, a sample of 6 participants, including two product owners, two scrum masters, and two developers with different skill sets were selected.

Sampling method: Purposive sampling was used as the sampling method. Individuals who had specific traits like having experience of working in scrum teams both in virtual and physical environments were selected. Further, interviewees from the South Holland region were chosen for the interviews.

Identify potential participants: Diverse group of participants provide a well-rounded data set. For the interviews, individuals with different responsibilities such as scrum masters, product owners, and developers approached through personal and professional networks using LinkedIn to request their participation in the research.

Screen participants: Once potential participants were identified, a screening process was conducted to verify that they meet the necessary criteria and are suitable for the research. For instance, questions related to their experience of working in virtual scrum teams were asked.

Select the final participants: After completing the screening process, the final participants for the study were selected based on the results. This enabled a thorough understanding of the challenges faced by scrum teams in maintaining scrum values in a virtual environment.

3.3.2. Interview Participants

This research incorporates the insights and experiences of six individuals, all of them are scrum practitioners working in virtual teams. They represent different roles within the scrum framework and offer diverse perspectives on the challenges and potential strategies associated with adherence to scrum values in a virtual setting.

Scrum Practitioner A: "Lucas"

The name Lucas is used as a representation for scrum practitioner A. Lucas is a senior developer and people manager of the other team members. He has been working in a virtual team for over three years. His main responsibilities include providing technical guidance to his teammates. Lucas's team also has a higher level of dependency on other teams within the company who are also working remotely.

Scrum Practitioner B: "Johan"

The name Johan is used as a representation for scrum practitioner B. Johan works as a product owner within his scrum team. He has been working in a virtual scrum team for over three years. Out of which he fully worked remotely for two years and since last year he meets a few of his team members once a sprint. Johan's primary responsibility includes engaging with stakeholders and understanding their needs. He works with developers to facilitate the requirements of features on which the developer works.

Scrum Practitioner C: "Jane"

The name Jane is used as a representation for scrum practitioner C. Jane takes on the role of scrum master in her team, in addition to this she also works as project manager. She works closely with other team members to ensure that the team is making progress in the right direction and as a facilitator to remove any roadblocks team members are facing.

Scrum Practitioner D: "Leah"

The name Leah is used as a representation for scrum practitioner D. Leah also occupies the role of a product owner in her scrum team. Similar to Johan, her primary duties involve prioritizing the stakeholder requirements. She has worked with three different teams in a virtual environment.

Scrum Practitioner E: "Adrian"

The name Adrian is used as a representation for scrum practitioner E. Adrian is a quality assurance developer and he has also been doing the responsibilities of scrum

master for the last six months. He has been working with his virtual scrum team for over three years. He works closely with product owners to understand the requirements, and with developers to improve software quality.

Scrum Practitioner F: "Ethan"

The name Ethan is used as a representation for scrum practitioner F. Ethan, a scrum master with five years of remote work experience. Ethan works as a facilitator in the team and helps the team in following the scrum process.

3.3.3. Interview guidelines

This section presents the predefined interview guidelines for semi-structured interviews. The development of the guidelines was influenced by the findings made during the literature review. To avoid any potential influence on the course and results of the interview, the guideline wasn't shared in advance. The aim of interview questions was to maintain the focus and direction of the interview, while still enabling follow-up questions that facilitate flexibility and encourage a natural flow of conversation.

The interviews started with an introduction to the research topic and goals for the session. This will primarily involve inquiring about the interviewee's experience in upholding scrum values in a virtual environment, with a focus on posing the questions outlined.

- What has been your experience working in a Virtual scrum team?
- Have you noticed any differences in how you apply scrum values in virtual teams compared to teams working in co-located teams?

Subsequently, the interview explored the challenges faced by scrum practitioners in upholding each scrum value in a virtual environment and strategies to overcome them. The questions were designed to cover the following areas:

- Identify challenges scrum teams face in adhering to the value of commitment, focus, openness, respect and courage.
- If there are challenges mentioned by the interviewees then how did they affect the team's efficiency.
- Explore strategies they have found effective in overcoming the challenges.

As a closing note question, the interviewees were said goodbye with a thank you note.

3.4. Data Analysis

As this master's thesis employs interviews as a method of data gathering, by using the qualitative content analysis approach, it is possible to categorize the data and reduce the interview content to just what is necessary (Mayring, 2014, p. 39). This method was used for analyzing interview data for in-depth analysis of drivers and barriers. Mayring has developed below mentioned flow chart for inductive category assignment:

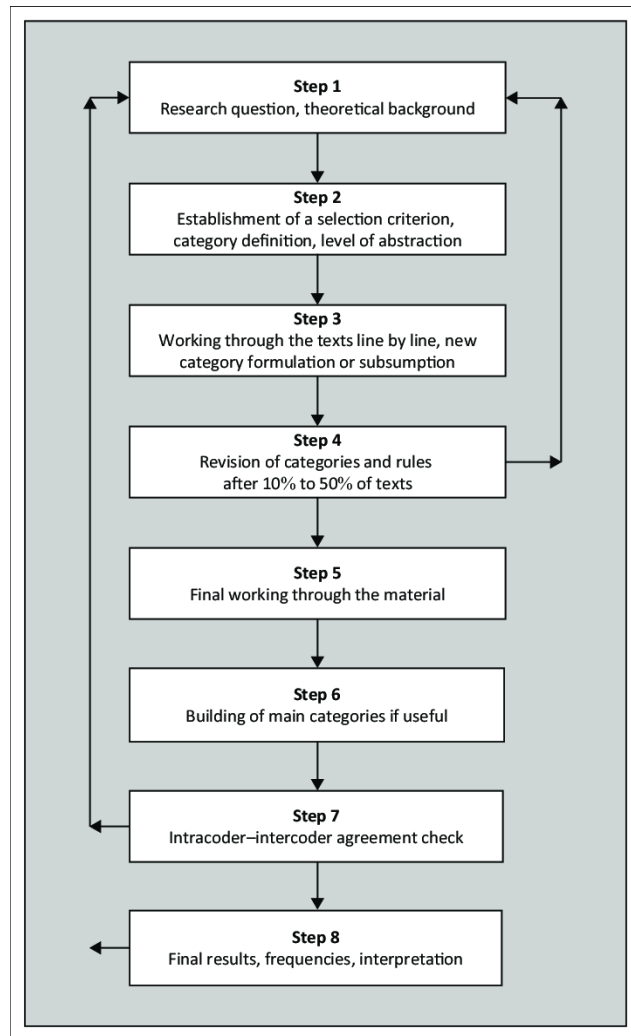


Figure 3.4: Inductive category assignment steps
Source: (Mayring, 2014, p. 80)

An inductive category construction is used in this study since it is exploratory in nature. As a tool maxqda was used to create categories by evaluating different text fragments taken from the interviews for this study. The semi-structured interviews' content is then carefully reviewed, and if a text segment doesn't fit an existing category, new ones are developed. Throughout the analysis process, these categories were continuously evaluated and revised, replicating a methodological approach detailed by Mayring in 2014 (pp. 80–81).

4. Research findings

To find answers to the following two sub-research questions:

- What obstacles does the scrum team face in adhering to the values of commitment, focus, respect, courage, and openness in a virtual environment?
- What steps can be implemented to ensure the effective adoption of scrum values for enhancing the efficiency of scrum teams in the Storming stage within a virtual setting?

Six semi-structured interviews were conducted. From the analysis of the interviews two themes emerged, first the challenges scrum team is facing in adhering to scrum values and second is practical strategies they use to overcome the challenges. This section of the thesis describes different categories under these two themes.

4.1. Challenges

Using the inductive category formation approach below-mentioned categories evolved during qualitative content analysis:

- ❖ **Communication**
- ❖ **Collaboration**
- ❖ **Interpersonal Dynamics**
- ❖ **Virtual work environment**
- ❖ **Personal workspace**
- ❖ **Technical issues and limitations**

The following table provides further details on the codes associated with the aforementioned categories and their influence on adherence to scrum values.

Challenges	Commitment	Focus	Openness	Respect	Courage
Communication:					
Difficulty in articulating complex topics	✓	✓	✓		
Difficulty in showing and reading emotions, and gauging reactions	✓		✓	✓	✓
Inadequate and delayed feedback	✓		✓		✓
Different preferences for communication channels				✓	
Collaboration:					
Difficulties in pair programming, knowledge sharing, troubleshooting	✓	✓			✓
Limited spontaneous knowledge exchange	✓		✓		
Misalignment with respect to project goals	✓	✓			
Missing over-the-shoulder review	✓		✓		
Interpersonal Dynamics:					
Lack of trust	✓		✓		✓
Lack of camaraderie			✓	✓	
Fear of vulnerability			✓		✓
Disengagement or feeling isolated	✓				✓
Virtual Work Environment:					
Overload of communication channels and constant influx of notifications		✓	✓		
Less effective virtual meetings		✓			
Invisibility of effort	✓			✓	✓
Unintentional exclusion	✓			✓	
Personal Workspace:					
Distractions from the personal environment	✓	✓			
Blurred boundary between work - personal life		✓			
Technical Issues and Limitations					
Slow internet	✓	✓	✓		
Lack of Software or Hardware	✓		✓		✓

Table 4.1: Categories of challenges and their influence on adherence to scrum values

4.1.1. Communication

The difficulty in articulating complex topics such as requirements, architectural design, and defects is one of the main communication challenges highlighted by scrum practitioners. They highlighted that they are missing physical gestures which are usually helpful in explaining complex topics. As an example, senior developer Lucas stated that explaining architectural design via video call does not produce the same level of understanding as an in-person discussion.

“when I think of an example knowledge sharing comes to my mind. We face difficulties in communicating complex architectural designs to others. Back then working from office it was so easy the walk to the desk of another developer and clarify things. I used to do this alot like for asking why they have implemented any particular functionality in some particular way or design a solution on the whiteboard with them.” (Lucas)

Adrian also shared the same thought that as a quality assurance developer he is facing issues in understanding the complex requirements and also in explaining the complex defects to developers. In his words,

“I have faced challenges related to understanding complex requirements. I would say sometimes communicating complex defects to developers is also equally difficult.” (Adrian)

The difficulty is not only in explaining the complex topics, it also goes the same for explaining complex decisions. Johan shared that as a product owner for him it is challenging to effectively communicate decisions about stopping a project or changing priorities. As transparency is the first pillar of scrum this becomes very crucial. In his words,

“In my experience, I would say being a PO means I have to make tough decisions no matter where I work from. For me the hardest part is communicating those decisions to the stakeholders and the team. [...] You know transparency is very important in scrum. I feel no matter what communication channel we use bu they are not effective as working from officie. These channels are not enough in explaining the reasoning behind the decisions we make about starting or stopping a new project or adding or removing features in the upcoming release.” (Johan)

Further, scrum practitioners also talked about lack of non-verbal cues. As these cues help in conveying emotions better their absence can lead to miscommunication. As a consequence, it can lead to conflicts and poor decision-making. Adrian and Jane shared:

“I used to actively observe body language in meetings. But since we are working in a remote environment, now it is challenging to pick up on these cues. You see now It is

more difficult to understand how team members are feeling about work pressure etc.”
(Jane)

“[...] in the project where I joined the new team we were talking about, we had delays in the testing process, which was affecting our ability to meet the deadlines. There I proposed building test automation to speed up the testing, but other members were hesitant. You see what I am trying to say, it was difficult to convince the team. Looking at this I miss the time when we were more willing to take on new challenges.” (Adrian)

4.1.2. Collaboration

Scrum practitioners talked about various collaboration challenges for knowledge sharing. As described in literature review commitment is one of the scrum values which says scrum team members are dedicated to supporting each other and knowledge sharing is one way to do that. Team members pointed out that virtual environments have limited opportunities for spontaneous knowledge exchange while they were very common in co-located teams. Beside knowledge sharing, they also pointed out that pair programming also poses significant challenges because it typically relies on real-time interaction and they have been struggling in replicating that over digital platforms.

As an example of these events Lucas said that they are lacking opportunities which they used to get earlier like coffee breaks discussions. This is not a good sign for scrum teams as these meetings often led to innovative ideas. In his words,

“[...] another thing which we are missing is spontaneous knowledge sharing, you know now a days it has become more formal like even to discuss small details we need to plan meetings otherwise we end up in an email loop.” (Lucas)

Adrian extended the same thought. He shared concerns regarding missing over-the-shoulder reviews. These events are usually used for taking a quick glance over a colleague's work. In contrast now they face delays in receiving task updates. This can cause delay in finishing the user stories and as an effect sprint velocity can go down.

“We are having some issues. Mostly we are facing delays in task updates. Like I usually hear that something is ready for testing in daily stand up of next day even if a developer has already reviewed the tasks in the first half of today. You see because of these delays I get less time for testing. It really wrecked best for me when we used to work by sitting next to each other, back then we had so many opportunities for sharing status updates throughout the day.” (Adrian)

Scrum master Ethan additionally shared that developers in his team also have difficulty while troubleshooting and pair programming. In his team, because of

communication delay and a lack of real-time collaboration sometimes the team loses focus. In his words,

“I keep hearing from developers that troubleshooting and pair programming as one of the biggest challenge. They often complains that it is time-consuming and this situation sometime jeopardize our commitments..” (Ethan)

Furthermore, product owner Leah said her team also frequently battles with misalignments. She shared,

“We’ve had some issues around maintaining focus on our sprint goal. When we used to work from office, we used to meet each other several time like at a coffee corner or stopping by someone’s desk for a quick chat about our progress or just to discuss something. I feel these interactions brought focus. However, since we are working remotely, we also connect via quick call but I mean to say that these interactions are limited. We often only see each other during the morning standup meetings and say see you tomorrow if we don’t have any other meeting planned together.” (Leah)

4.1.3. Interpersonal Dynamics

As described in literature, trust forms the foundation of effective scrum teams. However, scrum practitioners shared that building trust is challenging while working remotely and there are very limited social interaction. A lack of trust in the team can cause hesitations in sharing ideas openly. Adrian shared,

“I am hesitant to give direct feedback to colleagues. Specially towards the colleagues who joined us after covid. I guess it’s because I used to work with others in office and I know them better.” (Adrian)

Leah also had the same experience while working with stakeholders. He said,

“In my experience collaborating with stakeholders is as difficult as with team. As now we have very limited face-to-face interaction, it is hard to share difficult decisions with them.” (Leah)

The team members also mentioned that they are missing casual social interactions in a remote setting. As the literature states building respect takes time and it grows gradually. The lack of these interactions can affect the development of mutual respect among team members. Adrian and Lucas shared,

“we had a new scrum master in our team I guess she was with us for about six months. This one time I felt weird about the feedback she gave. [...] I think the virtual environment is the culprit here because I remember when we used to work from the same office

space, we had stronger team bonds and were very transparent with each other while sharing feedback.” (Lucas)

“I feel building respect is something which comes with time. Since we are talking about working in virtual team compared to old time. I would say it was easy to make personal connection back then because we were meeting every day and having lunch together. I remember we used to have a lot of conversations outside of work as well which really helped us in truly knowing each other. Since we don’t have that luxury now, if I don’t say difficult then at least it’s slow.” (Adrian)

Johan extends the same thought, He said it is difficult to know team members on a personal level in a virtual setting. The social training at his company mentioned that it is very much needed to know how to communicate with them. Not knowing it can lead to misinterpretations. As a consequence, it can impact in adhering to the value of respect and openness. He shared,

“At my company our HR department organized a social behavior training. It really helped me understand others personalities and communication styles. But I see usually it is difficult to know others communication styles when as we don’t interact much with each other since we are working from home. I feel somewhere this is because we are mostly focused on work and less on team-building.” (Johan)

Furthermore, interviews revealed the fact that due to limited social interactions team members feel more cautious while sharing their thoughts. Such hesitations very often affect open communication. Scrum practitioners shared,

“In my team, we’re six developers out of which four of us used to work from the office earlier and during the last two years, we hired two more developers in the team. From my experience, I would say onboarding a new developer to the team is difficult. Usually, it takes longer time for new developers before they feel comfortable in sharing their thoughts.” (Lucas)

“As I am there in all the meetings with the team, I see that the old members of the team are more open. Usually have the talking stick with them in the meeting. However, there are also colleagues who would not speak until asked explicitly or would have their cameras off, [...] you know it makes it difficult to engage with everybody.” (Jane)

“From what I have observed when new members join the team. I see the new members are more hesitant to take risks in trying a new approach or asking for help.” (Ethan)

Interestingly, interviews also discovered that the remote work environment can also lead to feelings of disengagement or isolation. The absence of personal interaction sometimes results in team members feeling detached. This can also have a negative effect on team members' confidence and desire to take on difficult problems. Adrian shared,

“I joined a new team and worked on that project for around nine months. Can you imagine we did not even meet all of team members, at least it was the first time experience for me. There I like isolated, I felt that I was not motivated. [...] in the project where I joined the new team I mentioned earlier, we were encountering significant delays in the testing process, which was affecting our ability to meet the deadlines. In my team, I suggested that we try using an automated testing tool to speed up the testing process, but as far as I remember our team was very hesitant.” (Adrian)

4.1.4. Virtual Work Environment

Virtual workspace itself also serves as a challenge to the team. Interviewees shared that it is more common to get distracted in virtual meetings. Scrum master Jane mentioned that as a facilitator in her role, ensuring active participation from all team members is very difficult. She shared,

“On a daily basis, I have mostly faced challenges in maintaining everyone’s engagement and attention during virtual meetings. We see often some members are distracted due to multitasking and these scenarios are happening more often. Now if we compare it to in-person meetings, there everyone was physically present. The example which comes to my mind is, yes, we have a company alignment meeting where developers usually say that I will listen to it passively while fixing a defect.” (Jane)

Virtual meetings are not as effective as in person meetings. These ineffective meetings can lead to burnout and less time to focus on actual work. Product owner Johan said this in this regard,

“sometimes the meetings get dragged on forever, like our daily scrum meeting used to be of 10 minutes but now they stretch out to 30 minutes or sometime even more. For me at least its problematic to be engaged in longer meetings. [...] As I said usually these long meetings leave us with less time to focus on actual work, like writing down requirements so that the developers can work on them. Sometimes, developers end up working on user stories that aren’t really ready for development. You know when the requirements aren’t clear in the user stories, developers make a different interpretation of it and we end up developing functionalities in a wrong way.” (Johan)

Interviewees also mention that they need to rely on a variety of digital tools. As each tool usually has its own set of notifications. It was interesting to discover that the constant stream of notifications makes it difficult for scrum practitioners to maintain focus. Lucas said this regarding implementing requirements,

“For example, to implement any functionality we typically follows three steps, implement, review, and test. Suppose I am reviewing someone’s work then I need to provide comments in the shared code repository. The other developer usually see them when

they check their email, then revert a comment and I get another email with clarification, sometimes we have to do follow-up comments, and this loop of email threads goes on. From my experience, I believe this is not as efficient as it used to be earlier when we could have simply just walked to the developer and discussed it. Apart from this, these constant messages or emails distract us from focusing on the topic we were working on. Due to this, very often we end up in context switching throughout the day. Eventually, you know it takes longer to finish the work and sometimes it becomes difficult to finish within the sprint.” (Lucas)

Also due to virtuality the visibility of individual team members' efforts is considerably low. Such scenarios can lead to misunderstandings about their accomplishments where team members feel they are not appropriately recognized. This can be a challenge in adhering to the value of respect. Regarding this Jane shared,

“Recently we got certification for one of our products where a senior developer in my team really worked hard to make this happen. But his efforts were not well recognized by the management due to working remotely. I saw a lack of motivation in him for further project deliveries.” (Jane)

Leah extended the same thought that in a virtual workspace unintentional exclusion can occur more frequently. Unintentional exclusion can lead to lower job satisfaction, and can impact team cohesion negatively. From her experience as scrum master Leah shared that some team members might feel left out from important discussions. In her words,

“[...] we have many tools available today for better collaboration like google meet, MS Teams. You see these tools give us both ways to communicate with audio and video. However, if people do not switch on their camera or unmute themselves until asked to, then we are helpless. [...] I have worked with three different scrum teams virtually. In all the teams I see one thing common that 30-40% of the team members have their camera switched off. Very often I find myself talking with only a few developers and miss out on the other 40%. It's weird that now when I think about this, the other members might even feel excluded from decision-making processes.” (Leah)

4.1.5. Personal Workspace

As people are mostly working from home in virtual teams, their personal workspace also emerged as a challenge. Interview participants shared that working from home has blurred the line between personal and work life. Lucas said while working from home, the physical separation between these two domains disappears for him. Usually, the overlap between work and personal life leads to an imbalance where personal responsibilities encroach upon work time or vice versa which can affect work

life balance. This imbalance can negatively impact a team member's engagement during work hours which can be a challenge in adhering to focus.

“For me while working from home I have difficult time switching between work and personal life. Like I start my work for few hours then have coffee or lunch with my partner then I again go back to work. For me balancing between these two is difficult. Sometime I still think about work in back of my head while having havif lunch with my partner and also the other way around.” (Lucas)

As I said vice versa above, the blurred boundary can result in overworking as team members might find it hard to 'switch off' from work mode. The perception that one is always 'at work' could lead to extended work hours. Jane shared,

“[...] when we used to go to office in person, coming back from office was end of it. Now now since we are working from home, I feel that the office hours never ends for me. I installed slack and outlook in my phone when we moved to home office setting. At that time I did not think about it but now I find myself checking messages or emails at odd hours. It feels that office hours never ends and my cell phone has now transformed into another office gadget.” (Jane)

Additionally, interviews discovered that it is difficult to maintain a dedicated workspace where team members can concentrate without interruptions. Interview participants shared that these interruptions have a quite big range from family obligations to noise or interruptions from other members of the home. These distractions serve as a blocker in adhering to the value of focus. According to Leah and Adrian,

“Sometimes, we get distracted by other projects or our surroundings, which leads to a loss of focus on our sprint goal.” (Leah)

“I faced challenges with respect to my personal environment at the beginning of the lockdown. Due to my living situation, it was challenging to participate in meeting effectively. Background noises from my family especially children often disrupted the meetings. As I didn't have a separate, quiet space to work from, I frequently struggled to find an environment where I can focus on complex tasks and important discussions. I often found myself muting my microphone and turning off the camera, but this severely limited my ability to engage fully in the meetings.” (Adrian)

4.1.6. Technical Issues and Limitations

Technical limitations were also discovered as another popular topic under challenges. Technical limitations such as unstable Internet, lack of hardware disturb the

flow of work. This leads to missing or delayed information and hinder real-time collaboration which team members need very often. Ethan shared,

“Sometimes team members have technical difficulties or do not have a stable internet connection. These events disturb the flow of communication. From my team, we have one colleague from Cape Town who has to miss daily stand-up meetings sometimes due to ongoing power cuts in South Africa.” (Ethan)

Lucas extended the same thought, he said during pair programming, code reviews, or problem-solving discussions, unstable internet makes these sessions unproductive. In his words,

“During pair programming sessions, we sometimes experience issues especially when screen-sharing sessions frequently lag or disconnect entirely due to his unstable internet connection. When we discuss something important and this happens then it becomes very frustrating. Many times it happens that someone has to rejoin the meeting because audio or video is not working fine.” (Lucas)

Apart from unstable internet, lack of appropriate hardware like high-performance computers, multiple monitors, or specific devices for testing were also mentioned as obstacles while working from home. These factors also serve as an obstacle for the team. Adrian shared,

“While working from the office, I used to have access to lab with a high-performance hardware equipment. This was really important for me as I could test on multiple devices simultaneously and identify issues quickly. However, on the other hand, now, I have to simulate the test environment instead of working with real hardware devices which also ends up taking more time. The lack of necessary hardware for sure impacts my work efficiency and the quality of the testing. Overall it made it harder to finish testing on time.” (Adrian)

Furthermore, some team members also lack the technical skills to use certain software. This can cause delays and inefficiencies because the absence of immediate, in-person technical support team members struggle to resolve technical problems on their own. Scrum master Jane shared,

“To be honest with you I struggle with some of the complex features of Jira like creating custom workflows. I often end up spending extra time to figure out how they work, or worst one time I do it incorrectly where team had to suffer. These issues were easier to figure out when we used to work from office. I feel now providing immediate hands-on support to colleagues is not there.” (Jane)

4.2. Strategies

Through qualitative content analysis, several key strategies emerged to address the mentioned challenges. These categories were inductively formed from the data and have been organized into six main categories as presented below:

- ❖ **Enhanced Meeting Management:**
 - Involve product owner in daily standups for better alignment
 - Allocate post-standup time for discussion or issue resolution
 - Ensure clear agendas for virtual meetings and promote engagement
 - Promote cross-functional inclusion in sprint review meetings
- ❖ **Effective Communication Strategies:**
 - Use visual aids or collaborative documents for complex topics
 - Clearly communicate project goals
 - Establish a well-defined information flow
 - Encourage responsiveness but also calendar respect
- ❖ **Optimizing Tools & Technology:**
 - Encourage video usage during meetings and regular huddles for enhanced connectivity
 - Employ screen-sharing tools for effective communication
 - Record meetings with critical discussions for future reference
 - Equip team members with necessary technology and support
 - Schedule time blocks for focused work
- ❖ **Leveraging In-Person Engagements:**
 - Prioritize physical presence for sprint and project planning
 - Promote in person meetings with stakeholder by product owners
- ❖ **Promote Team Building Activities:**
 - Engage in team-building activities for enhanced team cohesion
- ❖ **Nurturing positive work culture:**
 - Schedule causal connective meetings for improved team dynamics
 - Cultivate an inclusive work environment
 - Promote individual accountability in remote settings
 - Implement a buddy/mentor program

4.2.1. Enhanced Meeting Management

This category includes ideas mentioned regarding how scrum meetings such as sprint planning meetings can be improved while working in a virtual environment. As an example scrum practitioners suggested ideas like inviting the product owner to daily

standup meetings, reserving time after the standup, cross-functional involvement in sprint review meetings. It also recommends having a clear and concise agenda for the meetings.

Scrum encourages its practitioners to be transparent about obstacles they face. It can not be left at this point, as a second step it is important that issues raised during standup meetings are addressed. Some interviewees shared that they allocate a specific time frame following daily standups meetings. As an advantage, a team can engage in deeper discussions and resolve issues faster. This can result in greater efficiency as issues are addressed promptly and members are not blocked. As this results in collaborative problem solving, it is considered as a scrum team's commitment. Lucas shared,

"In my team, we block extra 30 minutes after the daily stand-up meeting so that we are available to help out each other if there are any obstacles mentioned by anyone during the standup meeting." (Lucas)

Furthermore, Johan, as a product owner, stated that his presence in daily standups improves alignment. This can help in resolving if there is any confusion regarding requirements. As a result it significantly speeds up the development process. In words of Johan,

"One thing that really worked for me is that I started having regular check-ins with the developers during our daily stand-ups. You know the scrum process doesn't ask me as a PO to join daily standup meetings but I find it really useful to clarify if there are any doubts about the requirements." (Johan)

Further, Johan and Jane both stressed on having a clear and well-structured agenda for meetings. A clear agenda encourages active participation from all team members because they know what is expected from them and can plan their inputs in advance. Furthermore, it keeps discussions focused and ensures that time is used efficiently. They said,

"I have worked to establish clear communication channels and guidelines for virtual meetings. For example we now set time limits for each agenda item and encourage team members to stay on topic.." (Johan)

"we have established clear guidelines and communication channels for sharing particular news or updates. We have set time limits for meetings. If we don't reach a conclusion then we reconvene at later time instead of prolonging the meeting. Our scrum mater also help us in keeping the discussion focused." (Jane)

Sprint review meetings allow teams to review product increments and adjust the backlog as necessary. Leah discussed that having people with different roles, such as the sales and marketing teams, in these meetings can help to improve the product. She

states from her own experience that this provides greater input to improve the product. In her words,

“I would say, we need to extend scrum beyond the team level and adapt it to the enterprise level. In my company, we have onboarded other non-IT teams like sales, marketing, and customer support with the project vision. Since then we feel much more aligned.” (Leah)

4.2.2. Effective Communication Strategies

Although, literature already revealed that effective communication is challenging in a virtual team but still this category includes some strategies for improving it. Scrum practitioners pointed out that use of visual aids or collaborative documents has been very helpful for them in explaining complex topics. Collaborative documents provide a shared environment for team members to add, modify, and interpret ideas together. Regarding this Johan said,

“[...] Another thing that's helped us is that we are now using collaborative documentation tool and visual aids for describing complex things, including user stories and acceptance criteria. Long story short it has really helped us in minimizing misunderstandings and I feel that we're all on the same page than ever before.” (Johan)

Certain best practices also emerged from the interviews such as setting up time blocks in the calendar to focus on one task and prevent distractions. Simultaneously they also suggest team members to be respectful of others calendars. It is also necessary to respect others' calendar schedules before calling them, as this could serve as a distraction for them. Further respecting team members' working hours, time zones and personal times can help minimize burnout and create a healthy workplace. They also recommend responding in a timely manner because as discussed in the challenges section that delay in responding leads to project delays or lower morale in the team. Ethan shared this from his personal experience,

“I worked with the team during one of our sprint retrospective meetings to establish a set of best practices for communication. We made some best practices like blocking focus time in calendar, checking other's calendars before scheduling a video call, and defined channel for internal information flow.” (Ethan)

Another interesting finding from the interviews was the significance of onboarding everyone with the project vision. Leah mentioned that as an advantage of this, the team became more aligned. Team members also feel motivated as they see how their work relates to the project's success. Scrum practitioners shared,

“My approach begins by ensuring that the vision is effectively communicated to the team because it really helps in communicating a clear understanding of the bigger picture we’re working towards. I believe in it and I feel by working this way, we ensure that our efforts are directed toward the right direction.” (Leah)

4.2.3. Optimizing Tools & Technology

Another overarching category under strategies is about the optimized use of technological resources. Scrum practitioners emphasized on the use of collaboration tools in lack of in person meetings. Regarding this Leah and Ethan shared,

“In my opinion today the technology has advanced very much. You see the entire world went to working remotely even classes for my six year old was online and we all made it through. To be honest we have many tools available today for better collaboration like google meet, MS Teams” (Leah)

“[...] physical meetings are not always possible. Like members of our sister team are located in different continents and they need visa and seven hours of flight to be here. But anyway I don’t see it as much of a challenge because on the other hand we have way many collaboration tools. I would say we should make most out of them.” (Ethan)

They shared that tools like screen sharing, video calls and slack helps them in keeping in touch. Further they also recommended recording virtual meetings where complex topics are discussed so it can be revisited in the future if needed. Interestingly, as a benefit such things can help in onboarding of new team members as they can go through videos. So indeed the virtual environment brings challenges with it but also there are advantages to it. Leah and Jane shared these strategies from their experiences,

“[...] we use various communication channels, such as google meet and huddles, as well as collaboration tools like mural boards for planning and Jira boards for tracking progress. We have found it helpful to onboard all team members with the product vision and maintain focus on achieving the committed objectives.” (Leah)

“we also record the important meetings so if someone can not join due to a conflicting meeting then they can still go through the recording. For example, all of our Sprint Demos are recorded, our company alignment meetings are recorded.” (Jane)

In the previous section during the analysis of challenges a challenge of missing over the shoulder review was highlighted. To deal with such challenges, interviews discovered that the use of screen-sharing tools significantly helps in explaining complex architectures or procedures. Regarding this Adrian said,

“[...] the technological advancements that we have available today, such as screen sharing and many other collaboration tools are invaluable in helping us in articulating complex ideas. These tools allow us to share our screens, demonstrate features, and provide detailed explanations to team members. I believe all teams should make more use of it.” (Adrian)

4.2.4.Leveraging In-Person Engagements

This category recommends utilization of face to face interaction for important meetings. Interviewees mentioned that if it is possible to meet each other everyday then team members should try to have physical presence at least once a sprint for events such as sprint planning. Ethan shared his thoughts as such,

“In my experience, adopting a hybrid working model can be beneficial in certain situations. I believe you would agree with me that we all know physical interactions are more effective in building relationships building trust among team members. As an example, last year we brought developers from abroad to our office for one week during a project planning session. The retrospective showed that this was a positive experience and resulted in a greater sense of support and bonding among the team members.” (Ethan)

As the sprint planning or project planning meetings involve complicated decision-making, having a physical presence for these meetings can bring better results. Furthermore, presence in person during these can build a strong team bond. As an added bonus, this can generate an environment for open communication. As Johan and Ethan shared this in this regard,

“For project planning, we ask everyone to come to the office. Our project planning goes on for two days and during this we go over the requirements of prioritized requirements, estimate them, and commit to the work for next six months. Our sister teams also meet every quarter on the same day for planning upcoming sprints. This really helps us align better, and get a clear understanding of the project deliverables.” (Johan)

“As scrum masters in my company we are organizing the in-person meeting with the team members at least once in a sprint for events like Sprint retrospectives. We also try to organize sprint review and planning for the next sprint on the same day as well when team members are in office.” (Ethan)

For virtual scrum teams, very often meeting in person every sprint is not possible for them. Interviewees recommend bringing everyone to one place at least once or twice a year for project planning. Adrian shared,

“[...] what we discussed and the team also did later after I left is inviting the members from remote locations to our office and work from a common space for a week. During

this week they discussed requirements and the architectural design. Now we all say that we should have done it at the beginning.” (Adrian)

The relationship between product owners and stakeholders is fundamental to the project’s success. During the interview product owners mentioned that in person meetings with stakeholders allow for better negotiation of priorities and a better understanding of requirements. Leah mentioned,

“I feel there is no substitute for in-person interactions when it comes to strengthening relationships. We follow it in our team and I see as a result we are being open about the priorities and tough decisions like saying no to the requests which do not align with the product vision.” (Leah)

In conclusion, although virtual communications channels are invaluable for maintaining frequent contact, in-person meetings can significantly enhance the quality of stakeholder relationships and team cohesion. By adopting this strategy, the team can also benefit from effective decision-making.

4.2.5.Promote Team Building Activities

As explained in the literature review, trust fosters a feeling of community within a team. Trust is especially crucial in the case of a scrum team because it serves as the framework's foundation. Interviewees described that team building exercises play a vital role in establishing trust. With the help of these activities teams can also significantly improve motivation of the team. scrum team members stated:

“Some companies organize team building exercises even for virtual teams, I have found them very helpful also for creating mutual respect in the team.” (Lucas)

“I've found team building workshops really helpful. We had one couple of months back. It helped us in creating an inclusive environment. Now we see the few team members who usually stayed quiet and now participating more in discussions.” (Leah)

“At our company we have regular team-building activities or dinners together. For example, after every major release of the product, we order food and have a virtual dinner together, here we also take out time to acknowledge each other's contribution.” (Jane)

“At my company, the HR department organized a social behavior training that really helped me understand my team members' personalities and communication styles. Here the trainer said a very interesting thing about treating others the way they want to be treated, rather than how we want to be treated ourselves. I think that kind of approach can really build respectful environment.” (Johan)

These findings illustrate that virtual scrum teams need to make more effort than just following the process. Events like team building exercises are essential for success in a virtual environment. Because by prioritizing team building exercises the team can build a greater cohesion and navigate through the challenges of remote work by continuously improving.

4.2.6. Nurturing positive work culture

The strategy of nurturing a positive work culture is another category which can be used as a strategy during the analysis of the interviews. This strategy recommends creating an inclusive workplace by having some casual gatherings as they used to have in a co-located team. Interviewees mentioned virtual coffee breaks as an alternative to spontaneous meetings they used to have in office. They find these coffee meetings helpful in developing a sense of camaraderie. These informal encounters provide a break from work as well as a chance for team members to bond on a more personal level. Lucas and Leah mentioned,

“I guess we all have found our ways with time. In our team we have made lunch breaks longer and we also block this time in our calendar so that someone doesn’t end up scheduling meeting during this hour. Also, in the afternoon we have one extra meeting sync meeting, we call it tea/coffee meeting. We started this meeting to talk about our other interests before stopping work. This evening meeting has also helped us in knowing our colleagues better.” (Lucas)

“I feel scrum meetings are time-bound and limited in scope. This is why we need to bring back informal discussions like coffee corner chats. In my team we call them virtual tea-coffee breaks. I have experienced that these informal conversations are very helpful.” (Leah)

The importance of having an inclusive work environment was also mentioned as a strategy for building respect in the team. Scrum practitioners mentioned,

“At our company we ensure that everyone on the team has an equal voice and is encouraged to participate actively in meetings and discussions.” (Jane)

“It is important that we develop a psychologically safe environment proactively. So that new members also feel comfortable discussing any roadblocks they encounter while working.” (Lucas)

As remote work frequently includes a greater degree of autonomy, it was no surprise that interviewees mentioned encouraging individual accountability as a strategy

they use for efficiency. Regarding building accountability, Ethan shared the suggestion of his colleague,

"[...] She advised us to assign separate persons as subject matter expert experts for the different products because we typically work alone while working from home. We did it and this approach has been working fine for us so far in resolving bugs fast." (Ethan)

Interestingly Jane mentioned a buddy and mentor program as a strategy for building a culture of learning. It can help new team members in adapting to the team culture. Jane mentioned,

"[...] we have tried multiple ways, like we have brought the concept of buddy and mentor into the company. Employees can choose a buddy to know each other and the organization better. The buddy is someone outside of their own team. They usually have weekly meetings for half an hour for syncing and being in touch. Similarly the HR introduced the mentorship program to help employees with personal and professional development." (Jane)

As a result, nurturing a positive work culture in a virtual setting means building a sense of community, promoting inclusivity, and establishing clear expectations for individual accountability. By implementing these strategies, organizations can create a remote work environment where everyone feels valued and motivated to contribute their best.

5. Discussion and Interpretation

The objectives of this research were to analyze the challenges scrum teams face in adhering to scrum values in a virtual setting, and to identify strategies they can employ to overcome the discovered challenges. This is for the purpose of enhancing the efficiency of scrum teams during the Storming stage of team development. The findings of the semi-structured interviews provide insights into the challenges. Communication, collaboration, interpersonal dynamics, the virtual work environment, and personal workspace difficulties were identified as categories by analyzing the interviews. These challenges affect adherence to different scrum values in multiple ways.

While discovering the challenges related to the value of commitment. Various communication challenges were highlighted such as difficulty in showing emotions, and gauging reactions. As the scrum teams are committed to supporting each other and knowledge sharing is one way to do it. Limited spontaneous knowledge exchange also came up as a collaboration challenge to the commitment. Further challenges like team members feeling disengaged in the remote work environment also serve as a challenge to commitment under the interpersonal dynamics category. Such feelings can lead to lower commitment toward a project. Under the technical issues and limitations category, issues like slow internet and lack of hardware also present challenges to commitment.

Focus-related challenges also reside in different categories. Like misalignment about the priorities in such scenarios, team members can get distracted and work on low-priority tasks. The communication challenge that falls under focus is difficulty in articulating complex requirements as similar to misalignment the wrong requirements also can lead to the implementation of wrong functionality. Further, from the virtual work environment category, overload of communication channels and constant influx of notifications, and less effective virtual meetings present challenges in adhering to focus. The distractions from the personal environment can not be overlooked as the lack of clear boundaries between work and personal life presents challenges in adhering to focus.

The challenges in adhering to openness mainly came from the category of interpersonal dynamics. These challenges include a lack of camaraderie and fear of vulnerability due to limited social interaction. Technical issues like slow internet emerged as challenges in adhering to openness because it makes it difficult to communicate in such cases. Communication challenges such as delayed feedback also serve as a challenge in adhering to openness. It also impacts courage as in lack of sufficient support or feedback, team members are less inclined to take risks.

Regarding adhering to respect, challenges like lack of camaraderie were mentioned in the interpersonal dynamics category. Interestingly the virtual environment

presents challenges such as invisibility of effort and unintentional exclusion which serve as roadblocks in adhering to the value of respect.

Similar to respect, adherence to courage also presents challenges from the interpersonal dynamics category. Lack of trust and fear of vulnerability serves as a blocker for team members to show courage in taking risks. This challenge mainly arises due to limited social interaction. Additionally from the communication category, challenges such as difficulty in gauging reactions and inadequate feedback can lead to loss of respect.

Previous research on communication and collaboration issues (Gilson et al., 2015; Hinds & Mortensen, 2005) complement the findings on challenges in this category. The challenges from categories of interpersonal interactions and the virtual work environment highlight the difficulties in establishing a strong team culture while working remotely (Valgeirsdóttir, H. et.al., 2022). Lack of trust and feelings of isolation were important concerns which also complement the previous findings (Rebeka D., 2022). The challenges described in the personal workspace category illustrate how the boundaries between work and personal life become blurred while working from home. Distractions and work-life balance concerns are consistent with studies (Kossek & Thompson, 2016; Ågren, P. et. al., 2022).

In response to these challenges, based on the practical strategies proposed by the interview participants offer a roadmap for scrum teams to navigate through challenges in virtual environments. Enhanced meeting management, effective communication strategies, and optimized use of tools and technology can serve as antidotes to the identified communication and collaboration challenges. Further leveraging in-person engagements, promoting team-building activities, and nurturing a positive work culture can help alleviate interpersonal challenges and build trust by adhering to scrum values. This research also discovered some interesting strategies for establishing cohesive work culture such as scheduling casual tea/coffee breaks with team members and implementing a buddy/mentor program to prevent feelings of isolation.

Although the suggested strategies are drawn from the real-life experiences of scrum practitioners, they provide practical insights for teams struggling with similar issues. However, additional quantitative studies are recommended to determine their efficacy in different circumstances. Regardless, this study provides a complete picture of the challenges that scrum teams experience in virtual environments and recommends practical solutions to address them, contributing significantly to the current body of knowledge on virtual scrum teams.

Additionally, To narrow the scope for better results, the study focused on the IT industry, so the results may not apply to other industries. Further research

Due to time constraints, this study did not include the factor of multiculturalism. I have worked in three different cultures using the scrum framework but all together it felt like a different experience. I observed that the culture influences how scrum practitioners adhere to scrum values. Hence further research is recommended to investigate how multiculturalism impacts adherence to scrum values in a virtual environment.

6. Recommendations for Scrum Practitioners

These recommendations are interpreted from the research findings and suggested per different roles in the scrum team.

For Product Owners

- Meet in person with stakeholders whenever possible to build stronger relationships and gain a deeper understanding of their needs.
- Proactively participate in daily stand-ups for quick clarifications.
- Clearly communicate the product vision to all team members for enhanced focus.
- Have a well-defined information flow.
- Utilize visual aids and collaborative documents when conveying complex requirements.

For Developers

- Make use of screen-sharing tools during knowledge sharing, pair programming or problem-solving sessions to enhance understanding.
- Actively participate in all meetings using video where possible.
- Embrace a culture of individual accountability.
- Engage in team-building activities to foster a sense of camaraderie.
- Leverage recorded meetings for reference, especially when dealing with complex problems or critical decisions.

For Scrum Masters

- Facilitate meetings with clear agendas and encourage active participation from all team members.
- Ensure the provision of necessary technology and support to team members, promoting the optimal use of collaboration tools.
- Organize casual non-work-related meetings to help team members connect on a personal level and enhance team dynamics.
- Promote a culture of responsiveness while also respecting individuals' calendars and personal time.
- Consider implementing a buddy or mentor program to support individual growth and team cohesion.
- Advocate for in-person engagement during critical meetings such as sprint or project planning when possible.

7. Conclusion

Today, the successful adoption of scrum values in a virtual environment is a critical topic in a rapidly growing digital workplace. This study aimed to look into the challenges that scrum teams face in virtual environments in particular adhering to scrum values. The findings provide insight into the various challenges, including communication, collaboration, interpersonal dynamics, virtual work environment, and personal workspace issues. Further, the research discovered practical strategies that scrum practitioners found useful, including improving meeting management, leveraging in-person engagements, optimizing tools and technology, encouraging team-building exercises, and cultivating a positive work culture. The identified challenges underline the areas that need attention and the strategies provide a roadmap for navigating these challenges. In simpler terms, these strategies align well with the identified problem, proving they are appropriate and likely to work well. They could help in establishing an environment that encourages the adoption of scrum values.

In conclusion, as agile organizations continue to navigate the paradigm shift toward the virtual environment, these findings can play an important role in guiding the virtual scrum teams toward successful team dynamics and enhanced efficiency.

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Appendix A: Interview Transcript Scrum Practitioner A

The name "Lucas" is used as a representation for scrum Practitioner A.

Praveen: Hi, good morning. Thank you for making time for the interview. I am a master student at FH Vorarlberg. I am currently working on my thesis. For that I am conducting a study where I need your inputs. It is for scrum practitioners who are working in a virtual environment. Today we will focus on the challenges you face in adhering to scrum values and how you overcome them.

Lucas: Hi Praveen, good morning, thanks for inviting me, the agenda sounds good to me.

Praveen: Can you please describe your role in the virtual scrum team?

Lucas: Sure, I am working as a senior developer and I am also people manager of other members of the team. I work closely with them to develop the products we have. We don't have real customers outside the company but rather our products are used by other teams within our company so we have a lot of dependency with other teams.

Praveen: Thanks for sharing this, as you are also a people manager have you faced any challenges in supporting your team members due to virtuality?

Lucas: Now, when I think of an example knowledge sharing comes to my mind. We face difficulties in communicating complex architectural designs to others. Back then working from office it was so easy the walk to the desk of another developer and clarify things. I used to do this alot like for asking why they have implemented any particular functionality in some particular way or design a solution on the whiteboard with them. Another thing which we are missing is spontaneous knowledge sharing, you know now a days it has become more formal like even to discuss small details we need to plan meetings otherwise we end up in an email loop.

Praveen: what do you mean by email loop?

Lucas: Yes, For example, to implement any functionality we typically follows three steps, implement, review, and test. Suppose I am reviewing someone's work then I need to provide comments in the shared code repository. The other developer usually see them when they check their email, then revert a comment and I get another email with clarification, sometimes we have to do follow-up comments, and this loop of email threads goes on. From my experience, I believe this is not as efficient as it used to be earlier when we could have simply just walked to the developer and discussed it. Apart from this, these constant messages or emails distract us from focusing on the topic we were working on. Due to this, very often we end up in context switching throughout the day. Eventually, you know it takes longer to finish the work and sometimes it becomes difficult to finish within the sprint.

Praveen: Given the challenges you mentioned, how do you work collaboratively with the team to efficiently achieve the committed sprint goals?

Lucas: We use collaboration tools like Slack and Google Meet to stay connected. In my team, we block extra 30 minutes after the daily stand-up meeting so that we are available to help out each other if there are any challenges mentioned by anyone during the standup meeting.

Praveen: Can you please tell me how effective is having collaboration over virtual meetings, do you face any challenges there?

Lucas: I think overall its working fine but during pair programming sessions, we sometimes experience issues especially when screen-sharing sessions frequently lag or disconnect entirely due to his unstable internet connection. When we discuss something important and this happens then it becomes very frustrating. Many times it happens that someone has to rejoin the meeting because audio or video is not working fine.

Praveen: You mentioned about discussing challenges during daily stand-ups. How is the value of openness adopted by you or your team members?

Lucas: I guess it's there but not 100%. In my team, we're six developers out of which four of us used to work from the office earlier and during the last two years, we hired two more developers in the team. From my experience, I would say onboarding a new developer to the team is difficult. Usually, it takes longer time for new developers before they feel comfortable in sharing their thoughts.

Praveen: What approaches have you found effective in openly communicating your progress in a virtual scrum team environment?

Lucas: I have experienced that simply asking team members to be open and transparent is not enough. It is important that we develop a psychologically safe environment proactively. So that new members also feel comfortable discussing any roadblocks they encounter while working. Some companies organize team building exercises even for virtual teams, I have found them very helpful also for creating mutual respect in the team.

Praveen: Thanks for sharing it, do you feel any challenge associated with that due to virtuality?

Lucas: To be honest, I cannot think of a specific example, but during our last sprint retrospective, we had a new scrum master in our team I guess she was with us for about six months. This one time I felt weird about the feedback she gave. However, once she clarified what she meant, the misunderstanding was gone. But I think the virtual environment is the culprit here because I remember when we used to work from the same office space, we had stronger team bonds and were very transparent with each other while sharing feedback.

Praveen: Have you faced any challenges in focusing of project goals?

Lucas: For me while working from home I have difficult time switching between work and personal life. Like I start my work for few hours then have coffee or lunch with my partner then I again go back to work. For me balancing between these two is difficult. Sometime I still think about work in back of my head while having havif lunch with my partner and also the other way around.

Praveen: What strategies did you use then for staying focused?

Lucas: I guess we all have found our ways with time. In our team we have made lunch breaks longer and we also block this time in our calendar so that someone doesn't end up scheduling meeting during this hour. Also, in the afternoon we have one extra meeting sync meeting, we call it tea/coffee meeting. We started this meeting to talk about our other interests before stopping work. This evening meeting has also helped us in knowing our colleagues better.

Praveen: Has remote work affected your team's ability to demonstrate scrum's value of courage?

Lucas: Although we have faced many challenges like using new communication and collaboration tools, adjusting to different time zones when we hired new developers from Eastern Europe. But we have shown a great deal of courage in adapting to them and improving every single time.

Praveen: Thank you for sharing your valuable insights.

Appendix B: Interview Transcript Scrum Practitioner B

The name "Johan" is used as a representation for scrum Practitioner B.

Praveen: Thank you for joining today. I'll briefly introduce myself and the agenda of interview. I am pursuing my master's degree in International Management and Leadership at FHV. I am currently working on my thesis. For that I am conducting a study on scrum practitioners who are working in remote environment just like you are. In this meeting we will focus on exploring challenges faced by you in adhering to scrum values. In case of challenges, We would also explore what strategies have you used in overcoming the challenges.

Johan: Thanks for the invitation.

Praveen: Sure, as a starting point could you please tell about your role and responsibilities?

Johan: Sure, I am working as a product owner in my team. My team is working in remote environment for the past three years. Well, it was fully virtual when the COVID started and now we try to meet once in a sprint. I look after the product backlog and write user stories for developers. And yeah, apart from working with team as you might know I also collaborate with stakeholders just like any other PO.

Praveen: Thanks for the intro. How do you see working remotely as compared to working from office? Do you have any challenges?

Johan: You know, we don't have real life interactions much so sometime it's very tricky to ensure that everyone knows about deadlines and take them seriously.

Praveen: Can you tell more about it like what strategies you used for overcoming such challenges?

Johan: One thing that really worked for me is that I started having regular check-ins with the developers during our daily stand-ups. You know the scrum process doesn't ask me as a PO to join daily standup meetings but I find it really useful to clarify if there are any doubts about the requirements. Also another thing that's helped us is that we are now using collaborative documentation tool and visual aids for describing complex things, including user stories and acceptance criteria. Long story short it has really helped us in minimizing misunderstandings and I feel that we're all on the same page than ever before. And yes, we have also kept an extra meeting in the middle of the sprint where we resolve any doubts developers have about the requirements and make sure that we are making progress in the same direction.

Praveen: Speaking about everyone making progress in the same direction, have you encountered any other challenges in adhering to the scrum value of focus due to virtuality?

Johan: Luckily, you know we have a lot of great tools available today for organizing our work. I find it really useful. For us at least it has been really helpful in improving collaboration. But sometimes the meetings get dragged on forever, like our daily scrum meeting used to be of 10

minutes but now they stretch out to 30 minutes or sometime even more. For me at least its problematic to be engaged in longer meetings.

Praveen: How has it impacted the efficiency of your scrum team?

Johan: As I said usually these long meetings leave us with less time to focus on actual work, like writing down requirements so that the developers can work on them. Sometimes, developers end up working on user stories that aren't really ready for development. You know when the requirements aren't clear in the user stories, developers make a different interpretation of it and we end up developing functionalities in a wrong way.

Praveen: Could you share some strategies that you have found useful?

Johan: Yes, few which I can share are, that we have established clear guidelines and communication channels for sharing particular news or updates. We have set time limits for meetings. If we don't reach a conclusion then we reconvene at later time instead of prolonging the meeting. Our scrum mater also help us in keeping the discussion focused.

Praveen: Thanks for sharing, indeed these advices looks really useful. can you tell how do you create an environment of respect in your team?

Johan: Our HR manager once said something that really stuck with me: 'Talk to each other instead of talking about each other.' And I totally agree - you see building respect in any environment requires open and direct communication. At my company our HR department organized a social behavior training. It really helped me understand others personalities and communication styles. But I see usually it is difficult to know others communication styles when as we don't interact much with each other since we are working from home. I feel somewhere this is because we are mostly focused on work and less on team-building.

Praveen: Can you describe any challenges you have faced in showing courage in making difficult decisions due to virtuality?

Johan: In my experience, I would say being a PO means I have to make tough decisions no matter where I work from. For me the hardest part is communicating those decisions to the stakeholders and the team.

Praveen: I see it's related to openness. Could you describe how transparency is affected by virtuality for you?

Johan: Yes, I am coming to that. You know transparency is very important in scrum. I feel no matter what communication channel we use bu they are not effective as working from officie. These channels are not enough in explaining the reasoning behind the decisions we make about starting or stopping a new project or adding or removing features in the upcoming release.

Praveen: What approaches have you found useful in ensuring transparency of the product backlog?

Johan: To overcome these challenges, we have implemented several strategies to improve communication and transparency. Like now we have detailed documentation around the product vision and priorities, including user stories and acceptance criteria. Additionally, I have worked to establish clear communication channels and guidelines for virtual meetings. For example we now set time limits for each agenda item and encourage team members to stay on topic.

Praveen: Thanks, do you have any final advice for the scrum teams who are struggling while working virtually?

Johan: I would recommend doing one thing which I have found very helpful. For project planning, we ask everyone to come to the office. Our project planning goes on for two days and during this we go over the requirements of prioritized requirements, estimate them, and commit to the work for next six months. Our sister teams also meet every quarter on the same day for planning upcoming sprints. This really helps us align better, and get a clear understanding of the project deliverables.

Praveen: Thank you for your inputs I think we are complete.

Johan: You're welcome.

Appendix C: Interview Transcript Scrum Practitioner C

The name "Jane" is used as a representation for scrum Practitioner C.

Praveen: Thanks for giving the interview. I will start the interview by introducing myself then we can do your introduction. Well, I am a student at FHV. I am working on my thesis which is about virtual scrum teams and I need your inputs in it. The agenda for today is to explore the areas where you face challenge in adhering to scrum values.

Jane: Hello Praveen, I am happy to be part of your research. But before we move ahead I want to mention that I would have to leave a bit early due to some personal situation, really sorry for that.

Praveen: Thanks for sharing that, I guess we can make it work, and thanks anyway for making time. Can you please tell me more about your role in the team.

Jane: I am primarily responsible for scrum master duties but in addition I am also working as project manager. On a day to day basis I work with the product owner and developers and help in hiring new members etc.

Praveen: I suppose you also work remotely. Have you faced any challenges in that regard?

Jane: Ohh yes! That's right. on a daily basis, I have mostly faced challenges in maintaining everyone's engagement and attention during virtual meetings. We see often some members are distracted due to multitasking and these scenarios are happening more often. Now if we compare it to in-person meetings, there everyone was physically present. The example which comes to my mind is, yes, we have a company alignment meeting where developers usually say that I will listen to it passively while fixing a defect.

Praveen: What approaches have you found useful in addressing these challenges?

Jane: To be honest, we are struggling with these situations. A few steps we take include sending emails of the key important decisions as well, so if someone missed something during the meeting or could not make it to the meeting, they get a second chance to get the information. Additionally, we also record the important meetings so if someone can not join due to a conflicting meeting then they can still go through the recording. For example, all of our Sprint Demos are recorded, our company alignment meetings are recorded.

Praveen: Nice to hear that a sense of transparency is there. Have your team faced any challenges in adhering to the scrum value of openness due to virtuality?

Jane: I used to actively observe body language in meetings. But since we are working in a remote environment, now it is challenging to pick up on these cues. You see now it is more difficult to understand how team members are feeling about work pressure etc.

Praveen: What strategies have you found useful as an alternative to address these missing elements in the meeting?

Jane: As I am there in all the meetings with the team, I see that the old members of the team are more open. Usually have the talking stick with them in the meeting. However, there are also colleagues who would not speak until asked explicitly or would have their cameras off, not sure maybe they have internet bandwidth issues. But you know it makes it difficult to engage with everybody. As a company, we give working from home allowance to support the employees and help in procuring accessories like cameras if needed.

Praveen: I see maintaining work-life balance is also very important. Can you please tell any challenges that you face regarding this?

Jane: Yes I also wanted to talk about this, You see when we used to go to office in person, coming back from office was end of it. Now now since we are working from home, I feel that the office hours never ends for me. I installed slack and outlook in my phone when we moved to home office setting. At that time I did not think about it but now I find myself checking messages or emails at odd hours. It feels that office hours never ends and my cell phone has now transformed into another office gadget.

Praveen: Can you describe any challenges you have faced in promoting a culture of respect in the scrum team due to virtuality?

Jane: Yes, recently we got certification for one of our products where a senior developer in my team really worked hard to make this happen. But his efforts were not well recognized by the management due to working remotely. I saw a lack of motivation in him for further project deliveries. Another point, it is also challenging to create an environment where team members feel comfortable sharing their ideas and concerns openly. For example, I also work with another scrum team, there the new team members seemed to be holding back their opinions and ideas. In situation like this for me as a scrum master it is difficult to identify and address issues.

Praveen: What strategies have you found effective in building a culture of respect in the scrum team?

Jane: At our company we have regular team-building activities or dinners together. For example, after every major release of the product, we order food and have a virtual dinner together, here we also take out time to acknowledge each other's contribution. This has really helped us in having a stronger sense of team.

Praveen: Do you have any other challenge to share that you have faced while working in remote environment?

Jane: To be honest with you I struggle with some of the complex features of Jira like creating custom workflows. I often end up spending extra time to figure out how they work, or worst one time I do it incorrectly where team had to suffer. These issues were easier to figure out when we used to work from office. I feel now providing immediate hands-on support to colleagues is not there.

Praveen: Now as a last question before you go, can you describe how you support your scrum team in adhering to all the scrum values as a whole?

Jane: We have tried multiple ways, like we have brought the concept of buddy and mentor into the company. Employees can choose a buddy to know each other and the organization better. The buddy is someone outside of their own team. They usually have weekly meetings for half an hour for syncing and being in touch. Similarly the HR introduced the mentorship program to help employees with personal and professional development.

Praveen: I think we can conclude now if you don't have anything else to mention and thank you once again for sharing your valuable insights.

Appendix D: Interview Transcript Scrum Practitioner D

The name "Leah" is used as a representation for scrum Practitioner C.

Praveen: Thank you for giving the interview. I am studying master in International Management at FHV. This semester I'm writing my thesis. It focuses on virtual scrum teams. Now I am at the stage where I am interviewing the scrum practitioners who work in virtual environment. Some words about the agenda of the meeting, well there is no fixed plan as I am using semi-structured interviews but I have a skeleton which I would use. We will focus on exploring if there are any challenges in upholding scrum values when you work remotely. Now, can you please share your experience of working in the virtual team?

Leah: Good morning, Praveen. Thank you for inviting me. As you're doing this research I guess you might already know my responsibilities from my title. I work as product owner so in a gist I am responsible for deciding the priorities of the features. I also work closely with stakeholders for gathering their requirements and feedback.

Praveen: What has been your experience working in working from home? Do you face any challenges?

Leah: We've had some issues around maintaining focus on our sprint goal. When we used to work from office, we used to meet each other several time like at a coffee corner or stopping by someone's desk for a quick chat about our progress or just to discuss something. I feel these interactions brought focus. However, since we are working remotely, we also connect via quick call but I mean to say that these interactions are limited. We often only see each other during the morning standup meetings and say see you tomorrow if we don't have any other meeting planned together. Additionally, sometimes, we get distracted by other projects or our surroundings, which leads to a loss of focus on our sprint goal.

Praveen: Can you give an example of such an event, where your team lost focus from the sprint goal?

Leah: Well, we had a senior developer in our team who was distracted by a feature request that came directly to him from the sales executive. To be honest we faced similar things before as well while working from office, but now they seem to happen more frequently.

Praveen: How did you overcome this challenge?

Leah: Well, I think this about alignment. We can't leave the factor out that sales executives need to prioritize customer requests to ensure customer satisfaction. But, it's not ideal for them to ask a developer to work on a customer request directly without involving the product owner. Although, situations like these do happen occasionally. We discussed it during sprint retrospective, and to our surprise it was due to a very small misunderstanding as the developer assumed that the priority of it had been discussed with product owner.

Praveen: What would you recommend to other virtual scrum teams to avoid such distractions and stay focused on the Project goal?

Leah: From my experience of working in virtual environments, I would say, we need to extend scrum beyond the team level and adapt it to the enterprise level. In my company, we have onboarded other non-IT teams like sales, marketing, and customer support with the project vision. Since then we feel much more aligned.

Praveen: Thank you for sharing the challenge of maintaining alignment. Can you please also share how you keep your scrum team focused on the project goals and minimize distractions?

Leah: Sure. My approach begins by ensuring that the vision is effectively communicated to the team because it really helps in communicating a clear understanding of the bigger picture we're working towards. I believe in it and I feel by working this way, we ensure that our efforts are directed toward the right direction.

Praveen: I appreciate your insight on the importance of onboarding team members with the product vision. What approach do you use in onboarding team members with vision while working remotely?

Leah: In my team, we use various communication channels, such as google meet and huddles, as well as collaboration tools like mural boards for planning and Jira boards for tracking progress. We have found it helpful to onboard all team members with the product vision and maintain focus on achieving the committed objectives.

Praveen: Can you elaborate on their effectiveness as well?

Leah: In my opinion today the technology has advanced very much. You see the entire world went to working remotely even classes for my six year old was online and we all made it through. To be honest we have many tools available today for better collaboration like google meet, MS Teams. You see these tools give us both ways to communicate with audio and video. However, if people do not switch on their camera or unmute themselves until asked to, then we are helpless. You see in a co-located workplace, when someone was in a meeting, they were committed to being present in that meeting with minimal distractions but you can not guarantee the same in a virtual environment. I have worked with three different scrum teams virtually. In all the teams I see one thing common that 30-40% of the team members have their camera switched off. Very often I find myself talking with only a few developers and miss out on the other 40%. It's weird that now when I think about this, the other members might even feel excluded from decision-making processes.

Praveen: How do you build trust in the new team while working remotely?

Leah: I would say building trust is really really challenging especially when someone joins a new team. I feel scrum meetings are time-bound and limited in scope. This is why we need to bring back informal discussions like coffee corner chats. In my team we call them virtual tea-coffee breaks. I have experienced that these informal conversations are very helpful.

Praveen: One of the other values of scrum is respect, from your experience how virtuality affects it?

Leah: I've found team building workshops really helpful. We had one couple of months back. It helped us in creating an inclusive environment. Now we see the few team members who usually stayed quiet and now participating more in discussions.

Praveen: Have you faced any challenges in maintaining openness with stakeholders?

Leah: Yes it is the same story as working with team. Now since we don't get chance to meet stakeholders on a regular basis, it is hard to share difficult decisions like saying no to their customization requests. However, I try to meet them face-to-face occasionally for the purpose of requirement elicitation, after product release, or for planning the new cycle of the project.

Praveen: Do you recommend meeting in person occasionally even if you're majorly working from home?

Leah: Yes, I would recommend meeting face-to-face occasionally with your stakeholders and team members if possible. I feel there is no substitute for in-person interactions when it comes to strengthening relationships. We follow it in our team and I see as a result we are being open about the priorities and tough decisions like saying no to the requests which do not align with the product vision.

Praveen: Thanks.

Appendix E: Interview Transcript Scrum Practitioner E

The name "Adrian" is used as a representation for scrum Practitioner E.

Praveen: Hello Adrian, thanks for joining me today. I am a masters student at FH Vorarlberg . This semester I am writing my thesis and my research is centered around virtual scrum teams. I am particularly interested in exploring the challenges that professionals face while upholding scrum values in remote setting. In this interview we'll talk about your perspective on this subject. I will also focus on discovering strategies that you have used to tackle down the challenges.

Adrian: Good morning, I am happy to be here.

Praveen: You're welcome. Can you describe your experience working in virtual scrum team?

Adrian: Sure, I work as quality assurance developer in my team. Additionally, in my team our scrum master left around six months ago since then I am also facilitating scrum process for our team. I work closely with the product owner to understand the requirements and create test plans to ensure the quality of product increments. I think it's important to mention since your research focus on virtual teams, at my company we also have been working remotely for more than three years now.

Praveen: How does this differ compared to everyone working from one office, what is your experience?

Adrian: A project that began last year comes to my mind. There I joined a new team and worked on that project for around nine months. Can you imagine we did not even meet all of team members, at least it was the first time experience for me. There I like isolated, I felt that I was not motivated.

Praveen: Can you tell how did you overcome this feeling?

Adrian: In my case, I rejoined my old team after having discussions with my manager as it was getting difficult to stay motivated. But what we discussed and the team also did later after I left is inviting the members from remote locations to our office and work from a common space for a week. During this week they discussed requirements and the architectural design. Now we all say that we should have done it at the beginning.

Praveen: What other kind of challenges have you faced while working from home?

Adrian: Yes, I faced challenges with respect to my personal environment at the beginning of the lockdown. Due to my living situation, it was challenging to participate in meeting effectively. Background noises from my family especially children often disrupted the meetings. As I didn't have a separate, quiet space to work from, I frequently struggled to find an environment where I can focus on complex tasks and important discussions. I often found myself muting my microphone and turning off the camera, but this severely limited my ability to engage fully in the meetings. I am still working remotely but I moved to the suburbs to a bigger apartment now here I have a personal workspace so it's all working good now.

Praveen: Have you faced any challenges in achieving committed sprint goals efficiently while working virtually?

Adrian: We are having some issues. Mostly we are facing delays in task updates. Like I usually hear that something is ready for testing in daily stand up of next day even if a developer has already reviewed the tasks in the first half of today. You see because of these delays I get less time for testing. It really wrecked best for me when we used to work by sitting next to each other, back then we had so many opportunities for sharing status updates throughout the day.

Praveen: What else changed that impacted your productivity as compared to working from the office?

Adrian: While working from the office, I used to have access to lab with a high-performance hardware equipment. This was really important for me as I could test on multiple devices simultaneously and identify issues quickly. However, on the other hand, now, I have to simulate the test environment instead of working with real hardware devices which also ends up taking more time. The lack of necessary hardware for sure impacts my work efficiency and the quality of the testing. Overall it made it harder to finish testing on time.

Praveen: You mentioned that your job is also to assure the quality of the product. Have you faced any challenges in focusing on delivering a high-quality product increment while working virtually?

Adrian: I believe that commitment of my company to deliver high-quality products sets us apart from others in the industry. Talking about my part, I am responsible for quality of the products. I don't face many issues in performing the job as it is software at the end. But I have faced challenges related to understanding complex requirements. I would say sometimes communicating complex defects to developers is also equally difficult.

Praveen: What strategies have you found effective in addressing these challenges?

Adrian: In my opinion, the technological advancements that we have available today, such as screen sharing and many other collaboration tools are invaluable in helping us in articulating complex ideas. These tools allow us to share our screens, demonstrate features, and provide detailed explanations to team members. I believe all teams should make more use of it.

Praveen: Can you describe any challenges you have faced in openly communicating your progress due to virtuality?

Adrian: I guess I don't face much issues. Maybe it's because I am working for a long time at my company. But, I am hesitant to give direct feedback to colleagues. Specially towards the colleagues who joined us after covid. I guess it's because I used to work with others in office and I know them better.

Praveen: Lets move to another scrum value. Lets talk about courage. Have you or your team faced challenges in taking risks to implement new ideas for problem-solving?

Adrian: Yes, in the project where I joined the new team we were talking about, we had delays in the testing process, which was affecting our ability to meet the deadlines. There I proposed building test automation to speed up the testing, but other members were hesitant. You see what I am trying to say, it was difficult to convince the team. Looking at this I miss the time when we were more willing to take on new challenges.

Praveen: Moving ahead, have you faced any challenges in building mutual respect in the team?

Adrian: I feel building respect is something which comes with time. Since we are talking about working in virtual team compared to old time. I would say it was easy to make personal connection back then because we were meeting every day and having lunch together. I remember we used to have a lot of conversations outside of work as well which really helped us in truly knowing each other. Since we don't have that luxury now, if I don't say difficult then at least it's slow.

Praveen: Thank you so much for your time and inputs.

Appendix F: Interview Transcript Scrum Practitioner F

The name "Ethan" is used as a representation for scrum Practitioner F.

Praveen: Hi, Thank you for joining. The agenda is, we will introduce ourselves and later I'll ask you few questions about your experience of working virtual scrum team. I have designed these question mostly to explore the challenges you face in adhering to scrum values. I am a student at FH Vorarlberg. I am pursuing masters and currently working on my thesis where I need your inputs, hence this interview. can you please introduce yourself?

Ethan: Thanks for the introduction. I am Ethan. I am working remotely since the covid started. I am a scrum master in my current role. On a daily basis, I am responsible for facilitating the scrum process. I also have engineering background so I try to help out team in testing during release phase.

Praveen: Have you faced any challenges due to virtuality in facilitating the scrum process?

Ethan: Sometimes team members have technical difficulties or do not have a stable internet connection. These events disturb the flow of communication. From my team, we have one colleague from Cape Town who has to miss daily stand-up meetings sometimes due to ongoing power cuts in South Africa. Also, there is a timezone difference in winter which complicates common meeting hours.

Praveen: What strategies have you found effective in overcoming these challenges?

Ethan: For these type of tasks that have a tight deadline, I create a jira ticket on the board so it can be tracked and even if someone misses something, we get another chance on second day to cross-check where we stand on the task. And in terms of scheduling meetings, we try to be mindful of time zone differences and schedule meetings at times that work for all team members.

Praveen: Have you faced any challenges due to virtuality where the team lost the focus from the sprint goals?

Ethan: I guess despite our efforts to stay focused, there are things which keep on popping up and to be honest sometimes they are difficult to avoid. Even though we had our sprint planning, developers committed to the work and so on but due to situation like a high priority bug from the customer makes it challenging.

Praveen: How did these challenges affect the efficiency of the scrum teams?

Ethan: I have never been a programmer by myself but I keep hearing from developers that troubleshooting and pair programming as one of the biggest challenge. They often complains that it is time-consuming and this situation sometime jeopardize our commitments.

Praveen: What strategies have you found effective in overcoming these challenges?

Ethan: A new developer on our team suggested an approach based on her previous experience. She advised us to assign separate persons as subject matter expert experts for the different products because we typically work alone while working from home. We did it and this approach has been working fine for us so far in resolving bugs fast.

Praveen: How do you ensure effective communication in virtual team?

Ethan: To address communication challenge, I worked with the team during one of our sprint retrospective meetings to establish a set of best practices for communication. We made some best practices like blocking focus time in calendar, checking other's calendars before scheduling a video call, and defined channel for internal information flow.

Praveen: What strategies have you found effective in creating a culture of Respect in the scrum team?

Ethan: As scrum masters in my company we are organizing the in-person meeting with the team members at least once in a sprint for events like Sprint retrospectives. We also try to organize sprint review and planning for the next sprint on the same day as well. But the problem is, physical meetings are not always possible. Like members of our sister team are located in different continents and they need visa and seven hours of flight to be here. But anyway I don't see it as much of a challenge because on the other hand we have way many collaboration tools. I would say we should make most out of them.

Praveen: Can you describe any challenges you have faced in adhering to the scrum value of courage due to virtuality?

Ethan: From what I have observed when new members join the team. I see the new members are more hesitant to take risks in trying a new approach or asking for help. Wait, you see how closely these values are connected to each other.

Praveen: What is your experience, would it be better for the scrum team to adopt a hybrid working environment where they meet once or twice a sprint or at least for important meetings like review, retrospective, or planning?

Ethan: In my experience, adopting a hybrid working model can be beneficial in certain situations. I believe you would agree with me that we all know physical interactions are more effective in building relationships building trust among team members. As an example, last year we brought developers from abroad to our office for one week during a project planning session. The retrospective showed that this was a positive experience and resulted in a greater sense of support and bonding among the team members. Although the team has requested similar in-person sessions during project planning, we are still waiting for another opportunity due to logistical constraints.

Praveen: Thanks again for taking the time and sharing insights with me.

