# Work in Progress: Investigating the Future of Work

Cumulative Dissertation

For the attainment of the degree Doktor rerum politicarum

(Dr. rer. pol.)

submitted by

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Date of examination: 16.07.2024

**Acknowledgments**

First and foremost, I want to express my deep gratitude to Professor Ringlstetter, my primary supervisor, for the unwavering support, guidance, and encouragement throughout the entire research process. His expertise, constructive discourses, and mentorship have been instrumental in the successful completion of this dissertation. I am deeply appreciative of his exceptional collaboration in both research and teaching endeavors. Furthermore, I am grateful to Professor Setzer, my second supervisor, for the intellectual debates, which contributed to this dissertation.

Many thanks go to my wonderful and supportive co-authors Björn, Paul, Marjaana, Sascha, and Dimitri for their collaborative spirit, tremendous support, and dedication to our shared goals, which were essential to the successful completion of this work.

I am grateful to the LSR community and my colleagues Christina, Henrik, Kolja, Vinzenz, Adrian, Franziska, Dana, and Chris for enriching my time at the WFI and for creating an inspiring, fun, and encouraging work environment. I thank the LSR secretaries Walburga and Franziska for their kind-hearted spirit, their willingness to listen to my concerns as well as to offer advice and support throughout my academic journey.

A big thank you to the Department of Management at the University of Central Florida, Orlando, United States of America, for making me feel so welcome during my research visits in 2022, 2023, and 2024 as well as for providing an exceptional research environment. The department's supportive atmosphere and collaboration with Becky and Carol helped me a lot to develop myself professionally and personally.

Finally, I would like to express my deepest gratitude to my family, boyfriend, and friends for their unconditional love, encouragement, and support throughout my doctoral journey. Their belief in me has been a constant source of strength, which was essential to the successful completion of my dissertation.

I would like to express my sincere appreciation to all who have been part of my academic journey. You have been instrumental in bringing this dissertation to fruition and making a dream come true. Thank you.

Luisa Koloch

Ingolstadt, July 2024

## Overview

This cumulative dissertation contributes to the research stream *Future of Work* and focuses on alternative workplace arrangements, especially when employees rely on information and communication technologies to communicate virtual feedback.

More specifically, this dissertation addresses (1) the various conceptualizations and terminologies which researchers use for analyzing alternative work arrangements since the 1970s, (2) the multidimensional nature of virtual feedback, its effects on an individual and team level as well as the underlying cognitive processes when receiving virtual feedback, and (3) the effect of feedback on performance improvement when teams receive in-person or virtual feedback. This results in the following three manuscripts:

**Manuscript 1:** Schäfer, B., Koloch, L., Storai, D., Gunkel, M., & Kraus, S. (2023). Alternative workplace arrangements: Tearing down the walls of a conceptual labyrinth. *Journal of Innovation & Knowledge*, Vol. 8, 100352.

**Manuscript 2:** Koloch, L., Goldmann, P., Schäfer, B., & Ringlstetter, M. (2023). Feedbacking research on virtual feedback: A literature review.

**Manuscript 3:** Koloch, L. (2023). Is virtual feedback less effective than in-person feedback for improving team performance? An experimental study.

Despite the uprising scholarly interest in the *Future of Work*, its academic debate is characterized by conceptual complexity regarding different workplace arrangements and the research stream on virtual feedback lacks a comprehensive understanding. In response to that, the three manuscripts contribute to the literature in the following ways:

The first manuscript provides an analysis of twelve research streams utilized in the examination of alternative workplace arrangements. By establishing the unique characteristics of each research stream, demonstrating the interconnections between them in a map, and identifying future research guidelines for specific research streams and the overall field, the literature review enhances conceptual clarity, establishes a more substantive picture of the complex research field and assists researchers and practitioners in progressing straightforwardly among alternative workplace arrangements. The first manuscript was published in the *Journal of Innovation & Knowledge* (2023), Vol. 8, 100352.

The second manuscript draws on the feedback process model (Ilgen et al., 1979) to analyze the literature on virtual feedback and reveals the aspects that influence a recipient's response and the underlying cognitive processes. The literature review provides a comprehensive picture of literature on virtual feedback, identifies remaining research gaps, and demonstrates a roadmap for further research endeavors to enhance our understanding of virtual feedback. Further, the implications support practitioners minimizing misunderstandings, promoting the acceptance of feedback, and achieving the feedback recipient's desired response when communicating virtual feedback.

The third manuscript responds to calls of previous researchers and advances our understanding of virtual feedback with an experimental study. The experiment demonstrates that performance improvement in teams that received in-person feedback or virtual feedback (via videoconferencing) did not differ significantly. The study contributes to educational research by providing empirical support for blended-learning approaches that combine, both, virtual feedback (via videoconferencing) and in-person feedback to improve performance in student teams. This work supports the ongoing digital transformation of organizations and the use of alternative workplace arrangements, e.g., hybrid work, for collaborating with team members and communicating feedback virtually and in-person to improve team performance.

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## 1. Introduction

Driven by the ongoing advances in digital transformation and globalization, organizations are increasingly adopting alternative workplace arrangements (Bartsch et al., 2021; Vita et al., 2019). Especially the COVID-19 pandemic has accelerated the shift in organizations towards the use of different working arrangements, because a large portion of employees was restricted to work from home (Malhotra, 2021). Over the past decades, researchers addressed multiple alternative work arrangements, e.g., telework (Biron et al., 2023), remote work (Leonardi, 2021), telecommute (Venkatesh & Johnson, 2002), and mobile work (Chatterjee et al., 2009). Beside this variety of work arrangements, alternative workplace arrangements have the following aspects in common: Technological advancements in information and communication technologies (ICTs) have enabled a growing number of organizations to embrace alternative workplace arrangements (Abendroth et al., 2022). They differ from a traditional work environment in terms of geographic and temporal aspects, as well as interpersonal collaboration, technological surveillance, and contractual agreements (Abendroth et al., 2022; Pianese et al., 2022; Vayre & Pignault, 2014).

There is an ongoing organizational adoption of alternative work arrangements because they provide advantages to employees' work-life balance (Felstead & Henseke, 2017), enhance job autonomy (Ollo-Lopez et al., 2010), reduce real estate costs (Raghuram et al., 2001), and serve as a form of competitive advantage in attracting and keeping highly talented employees (Gajendran & Harrison, 2007).

A crucial factor for achieving an organization's competitive advantage is performance (Crook et al., 2008). Recent research stresses the relevance of feedback to be a valuable instrument for individual and team advancement, driving towards enhanced learning, development, and task performance (Eckert et al., 2010; Gabelica et al., 2014). Virtual feedback, also known as computer-mediated or digital feedback, is a fundamental instrument in fostering collaboration

for geographically dispersed individuals and teams, who are working in alternative work arrangements and strongly rely on ICTs (Karl et al., 2022; Mulki et al., 2009). Virtual feedback is communicated with ICTs and refers to evaluative or corrective information about an individual's or team's behavior, processes or performance to control future actions (Geister et al., 2006; Konradt et al., 2015).

In recent years, virtual feedback has attracted considerable research interest regarding its effect on individual and team behavior (Ouverson et al., 2021). Further, multiple studies indicate the limitations of virtual feedback compared to in-person feedback, because of the reduced availability of nonverbal cues in electronic communication, known as distortions (Parker & Grote, 2022; Sardeshmukh et al., 2012). According to these distortions, nonverbal cues, including gestures, posture, facial expressions, eye contact, and tone of voice are constrained in electronic communication (Weisband & Atwater, 1999; DeSanctis & Monge, 1999). Consequently, distortions in virtual communication influence how individuals perceive the received feedback, which might reduce message understanding and hinder to achieve desired effects of virtual feedback (DeSanctis & Monge, 1999).

This dissertation addresses the research stream *Future of Work* with three interrelated manuscripts. Firstly, the dissertation is focusing on the various conceptualizations and terminologies researchers use for analyzing alternative workplace arrangements since the 1970s. When working in alternative workplace arrangements, employees rely on ICTs to communicate virtual feedback and, thus, the dissertation secondly addresses the multidimensional nature of virtual feedback, its effects on an individual and team level as well as the underlying cognitive processes when receiving virtual feedback. Thirdly, the dissertation investigates the effect of feedback on performance improvement in teams when teams receive

virtual or in-person feedback. More specifically, the relevance of each manuscript and their contributions will be demonstrated in the following.

While alternative workplace arrangements have continuously attracted the attention of researchers over the decades (Felstead & Henseke, 2017; Nilles, 1976), a comprehensive definition of different work arrangements remains missing in the literature, leading to ambiguity in identifying relevant research streams (Nakrošienė et al., 2019). As researchers stress, that "the absence of shared understanding of work performed outside of the conventional working place creates difficulties to studying this phenomenon" (Nakrošienė et al., 2019, p. 89), the first manuscript responds to calls of researchers and provides a more comprehensive overview by identifying the conceptualizations and terminologies utilized in examining alternative workplace arrangements. By establishing the unique characteristics of each research stream, demonstrating the interconnections between them, and setting guidelines for future research for single streams and the overall field, this literature review provides a comprehensive overview of the different forms of work arrangements and assists researchers and practitioners in progressing straightforwardly among alternative work arrangements.

Virtual feedback has been extensively studied by researchers since the 1980s (Siegel et al., 1986) regarding topics addressed (e.g., see Wong et al., 2021), theories used (e.g., see Wang et al., 2014), and methodologies applied (e.g., see Vinagre & Corral Esteban, 2018). Despite the growing amount of research on virtual feedback, a holistic understanding of the existing studies and their diverse findings remains elusive. Further, the academic discourse on virtual feedback becomes more complex because of partially contradicting results (e.g., see Johnson & Connelly, 2014; Tavoletti et al., 2019). Thus, the second manuscript delves into research on virtual feedback by applying the feedback process model, which was developed by Ilgen et al. (1979)

to the virtual context. In this way, the authors are able to analyze the multifaceted nature of virtual feedback regarding a) the recipient's perception, b) the way it is accepted, c) the recipient's willingness to respond, as well as ultimately, d) the response. By synthesizing prior research, the literature review unveils a comprehensive and unique picture of an individual's diverse behavioral responses to virtual feedback in alternative work arrangements while uncovering an individual's underlying cognitive mechanisms explaining the responses. Further, the literature review provides a complete portrayal of remaining research gaps and a roadmap for further research endeavors. The implications guide practitioners communicating virtual feedback to both, individuals and teams to minimize misunderstandings, enhance feedback acceptance, and ultimately, achieve desired outcomes of virtual feedback.

As organizations adopt hybrid work that enables employees working in alternative workplace arrangements and combining in-person and virtual interactions (Lal et al., 2023; Spitzmuller et al., 2023), supervisors are confronted with the decision of whether to provide feedback virtually or in-person. Due to Raghuram et al. (2019) "Technology dependence is mostly compared unfavorably with face-to-face interaction and is shown to have negative implications for […] giving and interpreting feedback" (p.13). Consequently, virtual feedback communicated via ICTs in alternative workplace arrangements might have different effects on team performance than in-person feedback due to reduced nonverbal behavior in virtual communication, e.g., limited facial expressions, gestures, and tone of voice (Daft & Lengel, 1986; Driskell et al., 2003). Thus, the author employed an experimental research study with a between subject-design to investigate the effect of virtual and in-person outcome feedback on performance improvement in student teams. The findings demonstrate that performance improvement of teams that receive virtual feedback (via videoconferencing) or in-person feedback does not differ significantly. Therefore, the experiment contributes to recent research in the educational

and management context by providing empirical support for blended-learning approaches as well as hybrid workplaces to communicate both, virtual feedback (via videoconferencing) and in-person feedback to improve team performance.

## 2. Scope of the dissertation

Burgeoning scholarly interest in the research stream *Future of Work* is addressing the changing nature of work and its implications on organizations because of technological, social, political, and economic shifts (Abendroth et al., 2022; Santana & Cobo, 2020). Within the scope of this dissertation, the *Future of Work* demonstrates a working world, which is *in progress* due to continuous changes, e.g., technological advancements (see Bartsch et al., 2021).

From a technological perspective, ongoing advances in digitalization and notably events like the COVID-19 pandemic were driving increased adoption and utilization of a range of technologies, e.g., audio and video communication technologies, digital networks with enhanced bandwidth and latency (5G), internet of things, cloud computing, and artificial intelligence (Amankwah-Amoah et al., 2021; Bartsch et al., 2021; Malhotra, 2021). Academic debates on the *Future of Work* regarding social impacts caused by technological changes comprise, e.g., employees' work-live balance, talent attraction and retention, and corporate social responsibility (Khanna & New, 2008; Santana & Cobo, 2020). From a political perspective, researchers argue that the changing nature of work requires the adoption of HR policies regarding emerging work concepts like flexible work arrangements in form of, e.g., telework (Khanna & New, 2008; Santana & Cobo, 2020). Further, researchers mention the necessity for creating supportive programs to include workers in the labour market (e.g., individuals from disadvantaged backgrounds) (Gruen, 2017; Santana & Cobo, 2020). Considering the economic perspective in the academic discourse on the *Future of Work*, researchers address topics like, e.g., wage inequalities and implications of technological advancements considering both, job creation and loss (Spencer, 2018; Santana & Cobo, 2020). Regarding the multifaceted perspectives on the *Future of Work*, technological developments and their impact on organizations have gained a prominent role in the literature (Kudyba et al., 2020). In this context, researchers mention that collaboration of employees in alternative

workplace arrangements is characterized by virtuality (Breuer et al., 2020). Whereas in face-to-face interactions employees are co-located, communicate visually and verbally, and share information simultaneously (Driskell et al., 2003), there is an ongoing academic debate about defining aspects of team virtuality regarding, e.g., spatial distribution of employees, information richness, and media synchronicity (Hoch & Kozlowski, 2014). In general, team virtuality exists when collaboration of employees relies on geographical dispersion and technology-mediated communication rather than in-person interaction (Gibson & Cohen, 2003).

The work of Mesmer-Magnus et al. (2011) demonstrates a distinction regarding the degree of virtuality in teams into low virtuality teams and high virtuality teams. In more detail, teams that employ virtual tools with high information richness and media synchronicity, such as videoconferencing, teleconferencing, and instant messaging, are categorized as low virtuality teams due to their similarity to face-to-face interactions (Mesmer-Magnus et al., 2011). In contrast, high virtuality teams use virtual tools with low information richness and media synchronicity, e.g., email and informational databases, which reduce the overall volume of information sharing compared to low virtuality teams and face-to-face interactions (Mesmer-Magnus et al., 2011). Because of limited information richness and media synchronicity when using virtual tools, researchers argue that individuals are likely to work in a hybrid workplace to interact with colleagues due to an individual's needs of face-to-face and virtual interactions (Mesmer-Magnus et al., 2011).

Whether those organizational teams can be categorized as virtual or hybrid teams when working in alternative workplace arrangements (Mesmer-Magnus et al., 2011), Katzenbach & Smith (2015) define a team as "a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable." (p.41). Thus, team members see themselves as a unified

social entity in a social system and they jointly shoulder responsibility for outcomes which are achieved through team processes (Gibson & Cohen, 2003; Marks et al., 2001). Marks et al. (2001) created a classification system for team processes, which includes process dimensions, such as transition processes, interpersonal processes, and action processes.

Besides transition processes (e.g., specifying goals and formulating a strategy) and interpersonal processes (e.g., managing conflicts and motivating team members), action processes comprise activities such as, e.g., monitoring the progress of the team towards the goals and giving feedback (Marks et al., 2001). Providing feedback to employees regarding their progress in achieving their goals enables employees to assess their advancement and their likelihood of success within a specified timeframe (Marks et al., 2001).

Researchers found that virtual feedback has an effect on, e.g., increasing employee motivation and engagement (Nurmi & Hinds, 2016), enhancing wellbeing of employees (Mishima-Santos et al., 2021), improving learning at work (Gerards et al., 2021), and building trust in teams (Jaakson et al., 2019). Surprisingly, empirical investigations on virtual feedback lead to different and partially contradicting results. For instance, virtual feedback via email resulted in performance improvements of team members (Johnson & Connelly, 2014), whereas virtual feedback communicated by a peer evaluation system did not improve the performance of team members (Tavoletti et al., 2019).

From a theoretical perspective, Wang et al. (2014) emphasize that the feedback process model (Ilgen et al., 1979) provides a theoretical basis for researchers' ongoing empirical examination of feedback. This model unravels the factors, which explain an individual's behavior stimulated by feedback (Ilgen et al., 1979). By integrating diverse elements involved in feedback delivery, encompassing the feedback source, the message itself, individual characteristics of the recipient, and the recipient's internal cognitive processing, the model explains an individual's behavioral response to feedback (Ilgen et al., 1979; Wang et al., 2014).

As the feedback process model explains an individual's reaction solely stimulated by feedback (Ilgen et al., 1979), the stimulus-organism-response model is a theory rooted in environmental psychology and has been extensively applied by researchers to explain individuals' diverse intentions and actions (Kordzadeh & Ghasemaghaei, 2021; Mehrabian & Russell, 1974). The stimulus-organism-response model is a three-stage theory and demonstrates that environmental cues (*stimuli*) influence the psychological state of an individual, because they initiate an individual's internal evaluation process (*organism*) (Mehrabian & Russell, 1974; Pandita et al., 2021). The *organism* represents the individual's internal cognitive processes, e.g., perceptual and thinking activities that intervene between external stimuli and an individual's behavioral action (*response*) (Chang et al., 2011; Pandita et al., 2021).

In the scope of this dissertation, the stimulus-organism-response model (Mehrabian & Russell, 1974) was adapted to demonstrate the interrelation of the three manuscripts on the *Future of Work* in Figure 1. In the adapted stimulus-organism-response model (Mehrabian & Russell, 1974), alternative work arrangements serve as the *stimulus* according to their characteristics, because they provide employees with, e.g., spatial and temporal flexibility (Thulin & Vilhelmson, 2022), and interactions with colleagues across geographic boundaries with ITCs (Pianese et al., 2022). Working in alternative work arrangements might have an effect on the processes for ensuring collaboration among employees, e.g., feedback (see Marks et al., 2001) due to the contextual factor virtuality. When receiving virtual feedback, an individual's internal cognitive processes (*organism*) are activated which affects an individual's response to the virtual feedback. In contrast to face-to-face interactions, the nature of online environments influences the communication, interpretation and use of virtual feedback when communicated with ICTs (Cramton, 2001). Recent research demonstrates various effects of virtual feedback on individuals and teams (*response*), e.g., increase in motivation (Hertel et al., 2008), well-being (Mishima-Santos et al., 2021), and performance (Johnson & Connelly, 2014). Due to the

environmental cues, the communication of virtual feedback via ICTs is affected by distortions in terms of limited nonverbal communication, e.g., gestures, facial expressions, and tone of voice (Weisband & Atwater, 1999).

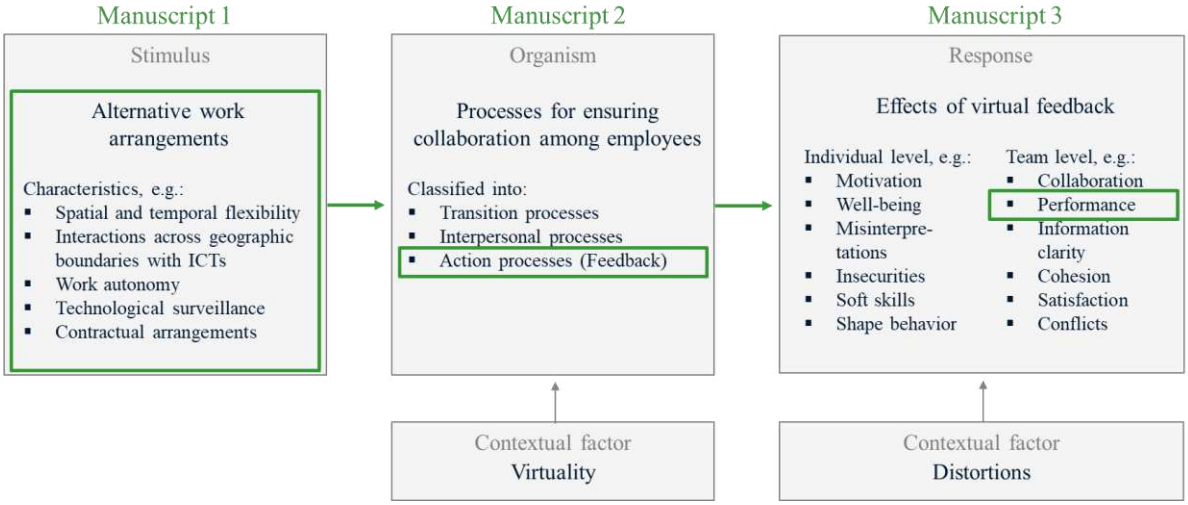



Figure 1: Adapted stimulus-organism-response model (Mehrabian & Russell, 1974) to demonstrate the interrelation of the three manuscripts on the research stream *Future of Work*

The first manuscript is a literature review on different work arrangements, which clarifies the unique characteristics of each research stream, shows the interconnections between them in a map, and demonstrates guidelines for future research directions.

The second manuscript is a literature review on virtual feedback, which demonstrates a context-specific application of the feedback process model (Ilgen et al., 1979). This enables the authors to analyze virtual feedback regarding its multifaceted nature as well as its various effects and underlying cognitive processes of the feedback recipient, to portray remaining research gaps and to create a roadmap for further research endeavors.

The third manuscript examines whether the effect of feedback on improving team performance is equivalent when communicating feedback virtually or in-person. The experimental study provides implications for scholars and practitioners, for communicating, both, virtual feedback (via videoconferencing) and in-person feedback.

## 3. Summary of the single studies

Within this chapter, the three individual manuscripts will be briefly described, their contribution to the academic discussion on the *Future of Work* will be highlighted, and academic interest on these studies from fellow researchers will be depicted.

### Manuscript 1: Schäfer, B., Koloch, L., Storai, D., Gunkel, M., & Kraus, S. (2023). Alternative workplace arrangements: Tearing down the walls of a conceptual labyrinth.

With its five-decade history, researchers examined alternative work arrangements with a variety of topics, methodological approaches, and terminologies (Abendroth et al., 2022; van Zoonen & Sivunen, 2022). The tremendous amount of academic works might indicate that the extensive research efforts have resulted in a comprehensive and nuanced understanding of alternative work arrangements (Schäfer et al., 2023). Nevertheless, the conceptualizations and terminologies used to address different work arrangements like, e.g., telework (Nakrošienė et al., 2019), remote work (McDonald et al., 2022), working from home (Bellmann & Hübler, 2021), mobile work (Cohen, 2010), and distributed work (Rockmann & Pratt, 2015) are blurred and overlapping (Schäfer et al., 2023). Further, researchers continuously adapted existing explanations of alternative work arrangements or generated completely new definitions over the decades (Abendroth et al., 2022). As Pianese et al. (2022) mention that "More research should be devoted also to define a shared terminology on new work arrangements […] and reconcile the perspective of organizations and employees on flexibility" (p.13), this literature review's core contribution is its proposal to enhance concept clarity.

The RAMESES scheme serves as the foundation for the authors' methodological approach (Wong et al., 2013) to examine multiple research streams with varying historical backgrounds and research paradigms (Snyder, 2019). Through an iterative process, the authors identified twelve research streams (categories) related to alternative work arrangements, namely

“telework”, “remote work”, “telecommute”, “future of work”, “new work”, “working from home”, “home office”, “distributed work”, “mobile work”, “smart work”, “virtual work”, and “new ways of work”. The analysis of 344 academic articles as well as the qualitative content analysis of each publication allows the authors to examine the conceptualizations of often-overlapping research streams referring to the generic term future of work. In more detail, the authors presented the metrics in each of the included categories, e.g., regarding the number of conceptual, qualitative and quantitative articles as well as their methodological development over time. Following this analysis, the authors then identified the core elements of the definitions and provided a description of each research stream, its focus and theoretical development over time.

In doing so, the authors identified unique approaches of the research streams as well as delimiting characteristics between the research streams to create concept clarity. Further, the authors demonstrated commonalities of the research streams to determine common paths. Due to the analysis, the authors suggest potential developments of each research stream and show how the entire field could advance to enhance contribution through clarity.

This literature review contributes to the discussion on the research field *Future of Work* and related literature by providing a more substantive picture of the research streams on alternative work arrangements. Therefore, the authors develop an overview of existing research streams in terms of a map, identify their focus of specific topics, and show where co-existing and isolated research can be expected.

The authors provide a higher concept clarity of the research streams on alternative workplace arrangements by merging parallel research streams (e.g., home office and working from home), clearly assigning research streams to specific topics (e.g., virtual work to research on the metaverse or augmented reality), and reducing the use of generic concepts such as, e.g., new work. Importantly, this literature review does not devalue existing research but presents the

academic works of researchers in a more clearly defined context and enables scholars and practitioners to access researchers' works on alternative work arrangements more efficiently.

**Manuscript 2: Koloch, L., Goldmann, P., Schäfer, B., & Ringlstetter, M. (2023). Feedbacking research on virtual feedback: A literature review.**

Virtual feedback is an indispensable means for personnel development as well as individual and team success (Karl et al., 2022). Researchers have investigated virtual feedback from a multitude of theoretical perspectives, e.g., the multifaceted impacts of virtual feedback on both, individual and team-level outcomes (e.g., see Glikson et al., 2019; Walton & Gilbert, 2022; Wong et al., 2021) and the cognitive processes which are activated by individuals when receiving virtual feedback (Wang et al., 2014). Nevertheless, recent research highlights that the absence of nonverbal cues in electronic communication (known as distortions) when communicating virtual feedback might pose limitations to obtain desired effects of virtual feedback compared to in-person feedback (Sardeshmukh et al., 2012). This is supported by Johnson & Connelly (2014) because they mention that virtual feedback might not lead to the same outcomes as in-person feedback. As electronic communication, eliminates cues such as body language and tone of voice (Lee, 1994), virtual feedback might be perceived and accepted differently by the receiver than in-person feedback, and consequently, affect an individual's response (Driskell et al., 2003).

Despite the emerging amount of research on virtual feedback, the outcomes of virtual feedback as well as their underlying reasons are not yet properly understood because virtual feedback also lead to various, and partially conflicting results (see Johnson & Connelly, 2014; Tavoletti et al., 2019). For instance, Johnson & Connelly (2014) revealed performance improvements of team members receiving virtual feedback via email, while Tavoletti et al. (2019) did not find

performance improvements of team members when communicating virtual feedback by a peer evaluation system.

Due to the above mentioned aspects, a thorough and comprehensive review of the literature on virtual feedback, identifying areas where knowledge on virtual feedback remains limited, and a roadmap for future research efforts are required to advance our understanding of virtual feedback.

To comprehensively capture the rich body of research on virtual feedback, the authors identified 110 peer-reviewed academic articles published between 1986 and 2023 in journals on Management, Business, and Psychology. The authors conducted a semi-systematic review on the research field virtual feedback that has been investigated by multiple researchers within diverse disciplines to synthesize previous findings (Snyder, 2019; Wong et al., 2013). The authors used relevant search terms, like “feedback”, “appraisal”, “peer evaluat*”, “virtual”, “digital”, “online”, “remote”, “telework”, “virtual collaboration”, “distributed”, “distance”, “work* at home”, “work* from home”, and “home office” as well as Boolean operators to locate the journal articles. Afterwards, the authors analyzed 110 peer-reviewed academic articles thoroughly encompassing their theory, employed methodology, and the feedback process model’s elements (Ilgen et al., 1979), which were all included in this literature review. Drawing upon the feedback process model (Ilgen et al., 1979), the authors rigorously analyzed the multifaceted dimensions of virtual feedback and comprehensively investigated its influence on individual behavior. This procedure goes beyond assessing the outcome of virtual feedback because it enables the authors to demonstrate the underlying factors involved in the feedback recipient’s cognitive processes, e.g., how an individual perceives and accepts the virtual feedback. By comprehensively analyzing an individual’s cognitive processes, the authors provide deep insights into the mechanisms of virtual feedback to a) explain an individual’s outcomes and how to b) drive an individual’s desired behavior.

This literature review enriches the academic discourse on virtual feedback in at least three ways. First, the authors demonstrate the elements of virtual feedback that influence a) the recipient's perception, b) the way virtual feedback is accepted, c) the recipient's willingness to respond, and ultimately, d) the response. By applying the model to the specific context of virtual feedback, the authors provide a comprehensive understanding of an individual's reaction to virtual feedback. Second, the authors demonstrate the models' elements examined in previous literature and simultaneously highlight areas lacking empirical investigation. In doing so, the authors pave the way for further investigation and suggest directions for future research. Third, the literature review contributes to the academic discourse on virtual feedback by offering implications to support scholars and practitioners in communicating virtual feedback to minimize misinterpretations, foster acceptance, and drive intended outcomes of virtual feedback.

**Manuscript 3: Koloch, L. (2023). Is virtual feedback less effective than in-person feedback for improving team performance? An experimental study.**

A growing body of research indicates the continuing adoption of alternative work arrangements, such as hybrid work, even beyond the COVID-19 pandemic (Lal et al., 2023; Spitzmuller et al., 2023). In the academic discourse, researchers are raising concerns that "Technology dependence is mostly compared unfavorably with face-to-face interaction and is shown to have negative implications for […] giving and interpreting feedback" (Raghuram et al., 2019, p.13). The inherent limitations of electronic communication due to restricted nonverbal cues like, e.g., gestures and facial expressions could lead to different outcomes of in-person feedback and virtual feedback on team performance (Driskell et al., 2003; Weisband & Atwater, 1999).

Despite researchers' growing interest in virtual feedback, the effect of virtual vs. in-person feedback on performance improvement in teams remains unexplored and is poorly understood

which requires thorough scholarly attention. In this context, Brown et al. (2019) mention that "Scholars could look at reactions related to the provision of PM[Performance Management] feedback online or through email versus physical face-to-face formats." (p.67). Thus, researchers highlight the need to investigate "the extent to which current findings from traditional work environments hold true in these new work contexts" (Brown et al. 2019, p.67). As the ongoing adoption of alternative work arrangements combines virtual collaboration and in-person interactions with colleagues (Spitzmuller et al., 2023), supervisors face the decision to deliver feedback virtually or in-person, which leads to the research question: Whether and to what extent is the effect of feedback on improving team performance equivalent when feedback is communicated virtually or in-person?

As the feedback process model, which was developed by Ilgen et al. (1979), lays the cornerstone for examining virtual feedback (Wang et al., 2014), the author adapted this model to examine whether and to what extent virtual feedback is less effective than in-person feedback for improving team performance. For doing so, the author adapted the model (Ilgen et al., 1979) for examining the effect of in-person feedback and virtual feedback (via videoconferencing) (*stimulus*) on performance improvement of teams (*response*).

The author conducted an experimental research study with a between-subjects design and recruited 117 students from the Catholic University of Eichstätt-Ingolstadt, Germany, to participate in the experiment. As the experimental study was conducted on a team-level, the sample size for this experiment composed 32 team-level observations with three to four members per team. Further, the study received approval from the Ethics Committee of the Catholic University of Eichstätt-Ingolstadt and, thus, the experiment was conducted in four courses for graduate students at the Catholic University of Eichstätt-Ingolstadt, Germany, from October 2021 to February 2023.

The results of the experimental study reveal that performance improvement of teams that received in-person feedback or virtual feedback does not differ significantly.

This work contributes to the educational and management context and enriches the academic discourse in a threefold way. First, despite prior researchers' suggestions that feedback communicated in-person and virtually might function differently (Johnson & Connelly, 2014), surprisingly, this study found no significant difference in performance improvement of teams that received in-person feedback or virtual feedback (via videoconferencing). Thus, this experiment responds to calls of researchers, especially Brown et al. (2019) to compare the effect of feedback on team performance when using different communication modalities. Second, this study contributes to educational research by supporting blended-learning approaches for delivering, both, in-person feedback and virtual feedback (via videoconferencing) to improve students' team performance. Third, as organizations continuously adapt their management practices to the new work conditions, this experimental study is of great interest for practitioners in the management context by supporting in-person interactions and virtual collaboration among employees because no significant difference in performance improvement of teams exists when communicating in-person feedback or virtual feedback via videoconferencing.

## 4. Conclusion

Although ongoing digitalization and its impact on organizations is often a matter of academic debate (Lal *et al*., 2023; Malhotra, 2021), this dissertation enriches the academic discussion on the *Future of Work* and focuses on alternative work arrangements, especially when employees rely on information and communication technologies to communicate virtual feedback. In three manuscripts, consisting of two literature reviews and one experiment, this dissertation establishes a comprehensive understanding of the growing body of academic works on alternative work arrangements and virtual feedback. Further, it helps to extend recent research

regarding the effect of feedback on performance improvements of teams when using different communication modalities. It thereby responds to calls from fellow researchers (e.g., Pianese et al., 2022; Nakrošienė et al., 2019).

While this dissertation contributes to the research field *Future of Work*, the three manuscripts are not without limitations. For instance, given the growing body of literature on different work arrangements, entirely new streams of research that emerged during the process of analyzing the twelve research streams on alternative work arrangements may have been overlooked and not further analyzed. In line with this limitation, future studies should explore any new research streams on alternative work arrangements to continuously keeping an overview on emerging work arrangements as well as their connections. Further, the experimental study has been conducted with student teams at the Catholic University of Eichstätt-Ingolstadt and solely examined the effect of outcome feedback on performance improvements of teams. As various types of feedback exist, such as developmental and process feedback (Geister et al., 2006), the experiment should be replicated to examine the effects of different types of feedback on performance improvement of teams and its implications.

The dissertation contributes to the academic discussion on the *Future of Work* in the following ways. The first manuscript provides insights into the complex corpus of alternative work arrangements regarding their different conceptualizations as well as elements of overlapping and differentiation of the research streams while tracing the connections between them. Thus, it enables practitioners and policymakers in having access to researchers' works and efficiently selecting research streams on alternative work arrangements.

The second manuscript focusses on employees collaborating in these alternative work arrangements and communicating virtual feedback by using ICTs. It adds to our understanding of the multidimensional nature of virtual feedback, its effects on an individual and team level

as well as the underlying cognitive processes when receiving virtual feedback. This supports practitioners to select suitable ICTs regarding one's communication needs, to consider the timing, frequency, and content for providing virtual feedback, and to be aware of a culturally diverse organizational setting when communicating virtual feedback.

The third manuscript contributes to the academic debate on the *Future of Work* by investigating the effect of feedback on performance improvement in teams when communicating in-person or virtual feedback. As individuals are likely to work in a hybrid workplace consisting of in-person conversations and virtual interactions (Gibson et al., 2023), the experiment provides valuable insights. The findings of this experimental study support organizations' ongoing adoption of alternative workplace arrangements as well as employees' preferences to work in a hybrid workplace because performance improvement of teams that received in-person feedback or virtual feedback (via videoconferencing) did not differ significantly.

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## 6. Three manuscripts on the research stream Future of Work

Manuscript 1

# Alternative workplace arrangements: Tearing down the walls of a conceptual labyrinth.

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Published 2023 in *Journal of Innovation & Knowledge, Vol. 8, 100352*.

DOI: https://doi.org/10.1016/j.jik.2023.100352

## Abstract

With its five-decade history, the literature on alternative workplaces, working time arrangements, and related issues now represents a relevant quantitative and qualitative articulate corpus regarding topics addressed, approaches applied, analytical tools implemented, and terminology used. Due to its complexity, this corpus appears as an indubitable labyrinth. However, it is unnecessary to be perplexed by this maze. It can be exited and the contributions hidden within it can be of value. This paper presents a literature review of three different and related objectives: (a) to investigate the different conceptualizations and terminologies used for analyzing workplace arrangements (research streams), (b) to analyze the results of the individual streams to identify elements of overlapping and differentiation while tracing the connections between them, and (c) to identify future research guidelines for single streams and the entire field. We analyzed 344 academic publications. Our qualitative content analysis of the articles allows us to investigate the peculiarities of each research stream and grasp the

relationships between them. We supplemented our analysis using Leximancer, a conceptual mapping tool. This article contributes heightened clarity in the complex research field of workplace arrangements. We provide a map of research streams assisting researchers to move across the labyrinth and introduces redesigned research avenues for the purpose of sharing insights and progressing straightforwardly. Increasing clarity within the field allows fellow researchers' contributions to be more accessible to practitioners, reducing their effort in finding relevant work and researchers.

**Keywords:** Alternative workplace arrangements; Future of work; Telework; Telecommute; Remote work; New work

## Introduction: A terminology maze of research streams

The COVID-19 pandemic dramatically increased the use of alternative workplaces and working time arrangements, and changed work situations for nearly everyone employed (Wendt et al., 2021). Working on companies' premises was not often allowed by law, therefore, a large portion of the workforce worked from home. With the increased possibility to work elsewhere other than in the office, numerous employees used this opportunity to spend time at remote locations or even in different countries by working online.

Besides spatial and temporal flexibility, work arrangements changed regarding information and communication technologies (ICTs), collaboration with co-workers and supervisors across relational boundaries, contractual arrangements, family-friendly working conditions, and technological surveillance (Abendroth et al., 2022; Thulin & Vilhelmson, 2022; Vayre & Pignault, 2014; Vlaar, van Fenema, & Tiwari, 2008). However, evolving work arrangements are not new and have been a topic of interest since the 1970s (e.g., Nilles, 1976). Many studies have already examined different work arrangements (e.g., Chung & van der Horst, 2018; Dutcher, 2012; van Zoonen & Sivunen, 2021). The sheer volume of studies might suggest that research in these fields has reached a mature stage of theoretical development, but this is not the case. There has been no attempt to define the different work arrangements comprehensively, and it remains unclear which research stream to consult when dealing with different work arrangements.

To date, the terminology used to describe different work arrangements is blurred and overlapping. For instance, Vayre and Pignault (2014) state that "there is no consensus on how to define and understand teleworking" (p.177). Thus, neither researchers nor practitioners have arrived at a common definition of *telework* or related concepts such as *telecommuting*, *working at home*, *remote working*, *smart working*, *home office*, or *virtual work*. Furthermore, researchers

mention that "the absence of shared understanding of work performed outside of the conventional working place creates difficulties to studying this phenomenon" (Nakrošienė et al., 2019, p. 89).

Referring to these aforementioned works, the necessity to clarify and unify the terminology used becomes obvious. However, the limitation imposed by the status quo impairs further theoretical development of the research streams on forms of work arrangements and makes it challenging to offer sensible guidance to scholars and practitioners.

Pianese et al. (2022) state that "More research should be devoted also to define a shared terminology on new work arrangements […] and reconcile the perspective of organizations and employees on flexibility" (p.13). Accordingly, the objective for this paper is to provide a more substantive picture, by clarifying the content domains of, and theoretical connections between numerous research streams focused on different work arrangements.

Other researchers before us probed into some isolated and even overlapping areas of this topic's complexity, e.g., Felstead and Henseke (2017) on *remote work* or Raghuram et al. (2019) on *virtual work*. However, we opted for a broader approach, choosing no less than twelve different introductory points in the labyrinth of *future of work*-related literature (see Table 1). We probed deeply into each corridor for concepts, found pathways between definitions, and shifted barriers of constructs. This review supports researchers and practitioners by facilitating them in their choice of which research stream to pursue, and providing guidance when addressing topics related to the future of work.

The first objective of our review article lay in assisting researchers find their way through this maze without getting lost. To achieve this, we mapped the trajectory of theoretical and methodological development in *future of work*-related literature. We extended existing research by conducting a review that captures the breadth of the field and the related streams, creating a

shared understanding for engaged scholars and practitioners. The second integrated goal was to destroy superficial barriers between adjoining, sometimes interchangeable, concepts to establish concept clarity. Hence, we synthesized and extended theory by establishing a comprehensive picture of connecting and differentiating characteristics between the literature streams on work arrangements. Finally, our third aim lay in providing an outlook on where those extensive paths would take research once we combined forces. Ultimately, "killing the minotaur" by focusing on investigating and shaping the *future of work* is challenging enough without considering a labyrinth of our own making. Basically, we built greater coherence within a tremendous amount of research to contribute to the identification of possible future research guidelines.

Thus, the following questions led our review: (1) Which relevant research streams related to the future of work exist? What is their focus, and how did they develop theoretically and methodologically? (2) Which characteristics connect these research streams, and how can we distinguish between them? (3) Finally, we asked what future research guidelines will be promising and where complicity should occur.

With our review, we contributed to the discourse on the future of work and related literature by establishing an overview of existing research streams and their foci. Foremost, we stated concrete suggestions on how the broader field would profit from focusing streams on specific topics (e.g., *virtual work* on topics related to augmented reality or the metaverse) and from discontinuing to publish research under catch-all phrases and buzzwords such as *new work* or *future of work*.

This conceptual clarity will also benefit practitioners and policymakers alike, as finding streams, articles, and scholars of interest will be much easier for non-scholars.

## Scope of the review: Outside walls and entry points

Advances in ICTs have allowed an increasing number of organizations to adopt new work arrangements differing from traditional work in temporal, spatial, and other aspects (Pianese et al., 2022). Many firms have announced their interest in or have already adopted these ways of working in the aftermath of the COVID-19 pandemic. In the near future, investments in alternative work programs are among the priorities of their digital agenda (Pianese et al., 2022). Over the last five decades, researchers have developed conceptualizations and terminologies for work arrangements differing from traditional settings. Among others, these include *future of work* (Santana & Cobo, 2020), *new work* (Aroles, et al., 2021), *telework* (Taskin & Bridoux, 2010), *telecommute* (Sia, et al., 2004), *remote work* (Pianese et al., 2022), *distributed work* (Bélanger & Collins, 1998), or *virtual work* (Raghuram et al., 2019). Individual theoretical and even methodological developments characterize each research stream. Furthermore, academics and practitioners adapted prevailing explanations on alternative work arrangements or created entirely new definitions (Abendroth et al., 2022), which increased ambiguity. Consequently, this study reviewed several literature streams bordering or potentially subsumable under the topic *future of work*. We aim to support researchers and practitioners in selecting the proper research stream to pursue and provide guidance when dealing with different aspects of future work arrangements.

## Methodology: Preparing to enter the maze

We designed our research to investigate several often-overlapping concepts related to the general term *future of work*. This analysis identified delimiting characteristics between the fields to establish concept clarity, highlighted commonalities to determine common paths, and proposed how the overall field could move forward to increase contribution through clarity.

*Literature Review*

We based the description of our methodological approach on the RAMESES scheme, which addresses semi-structured *meta-narrative reviews*, "a relatively new method of systematic review, designed for topics that have been differently conceptualized and studied by different groups of researchers." (Wong et al., 2013, p. 2). This form of review has gains increasing interest in management research due to its meta-narrative approach, which aims to integrate several research streams with different historical backgrounds and paradigms (Snyder, 2019).

We defined nine starting concepts from the existing literature to initiate our literature search on Scopus and Web of Science (WoS) and later expanded the focus by adding three concepts to the review based on their emergence in the already screened articles and their influence on the overall field. This resulted in the final twelve concepts and the search terms used, as depict in Table 1.

**Table 1:** Search terms used in Scopus & Web of Science (incl. quotation marks)

| | | |
|---|---|---|
| “smart work*” | “new work*” | “future of work*” |
| “telework*” | “work* from home” | “telecommut*” |
| “remote work*” | “home office” | “new ways of work*” |
| “distributed work” | “mobile work*” | “virtual work*” |

We started with 5,632 hits on WoS and 5,935 hits on Scopus by searching for appearance in title only. Then, we limited our search to the fields of Business and Management (WoS) and Business, Management, and Accounting (Scopus), leading to 777 and 1,245 results, respectively. Next, we focused on *articles* only and correcting for inter-category and inter-database doublets with and between databases, we were led to 915 articles.

In the following step, we applied a *quality threshold* (see, e.g., Kraus et al., 2020) by excluding all articles published in journals not listed in the British *Academic Journal Guide* ranking (303 articles) or rated below '1' (143 articles), which left us with 469 papers to analyze.

In the next step, we screened titles and abstracts of ten articles, applying pre-defined inclusion and exclusion criteria to each. We excluded literature reviews not marked as such, articles with search terms only of contextual and not focal relevance, or part of a formulation with different meaning. Afterwards, we screened all abstracts applying these criteria, resulting in 393 papers. Of these articles, we excluded another 49 at a later stage: 16 due to a total change in the meaning of the search term, language, or missing relevance becoming obvious only at in-depth analysis; 13 articles revealed to be previous literature reviews and were thus used to triangulate our insights, but not included in our review, and another 20 articles which were inaccessible via two universities as well as through directly contacting the authors. These steps led to a final sample of 344 articles. We have depicted the identification process in Figure 1.

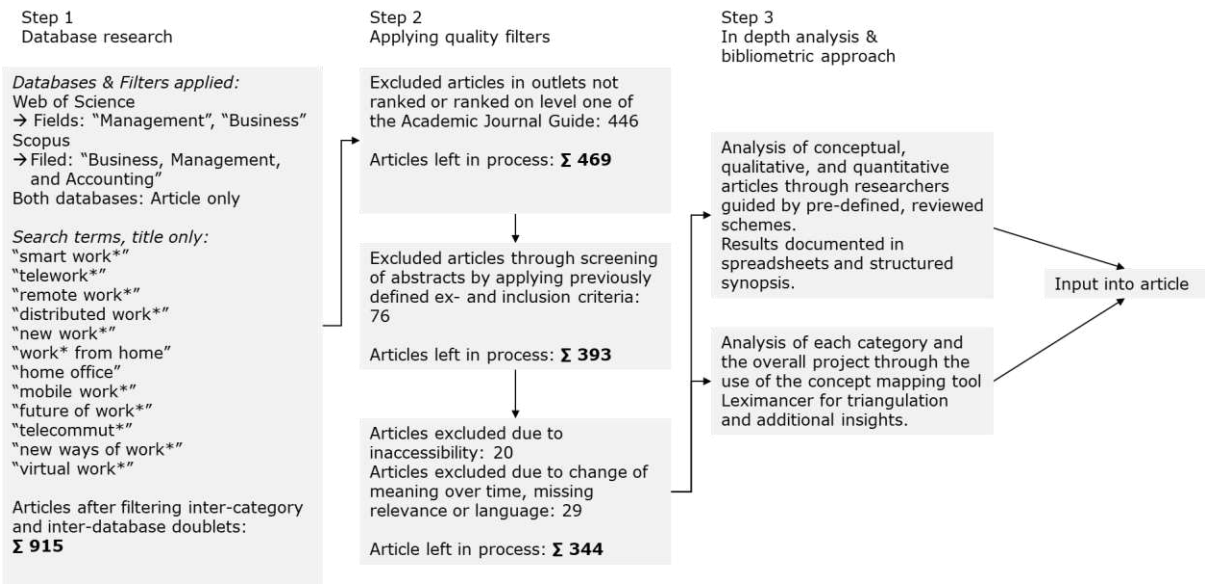



**Figure 1:** Literature review process

*Exploring the maze in a traditional way*

Three researchers developed a standardized analysis scheme for conceptual and qualitative articles and a separate one for quantitative articles. Another author reviewed this scheme, her suggestions were discussed, and the scheme was adapted accordingly (similarly to, e.g., Aguinis et al., 2022).

We then divided the categories for analysis between the authors. After the first step, the analysis began with categories of the fewest articles to discuss and adopt to the process. We continued the procedure after minor changes to the documentation, and screened qualitative and conceptual papers for (a) methodology, (b) definitions and conceptualization of the topic in focus, (c) central topic, and (d) results where applicable.

We screened quantitative approaches for (a) methodology, (b) definitions and conceptualization of the topic in focus, (c) up to three focus topics, and (d) up to three key results.

We documented the analysis results for each article in spreadsheets. Then we authored a synopsis of each category, outlining its central topics, its development over time, commonalities with other concepts, where evident, and future research guidelines or suggestions to combine the stream with others. In the last step, we merged the reports and spreadsheets into the two subsequent sections, generating concept clarity, forming an integrative perspective of the concepts surrounding the literature on *future of work*, and providing an outlook on the field's possible developments.

*Implementing technology for mapping the maze*

Supplementing our rigorously conducted 'traditional' review approach to the field, we applied a bibliographical analysis process described by Donthu et al. (2021). We drew upon

*Leximancer*, a text-mining software for concept and theme analysis, to provide an integrative overview of the field. This software identifies concepts (keywords) through semantic and relational extraction. Based on a Bayesian co-occurrence metric with bootstrapping, Leximancer provides a simulated concept map, visualizing the identified concepts as networks on a map through an iterative process. Overarching themes represent the connectedness between the concepts (size of themes), the relevance of the themes (color-coded), and their distinctiveness from each other (distance between themes) (Smith & Humphreys, 2006). With the provided visualization and the opportunity to explore relationships in-depth through accessible information, e.g., co-occurrence of terms, management scholars are increasingly using the software to generate input into large fields of literature (e.g., Wilden et al., 2016; Wilden et al., 2019).

We analyzed the same 344 articles with default settings, each attributed to its field, having Leximancer develop an initial concept seed set of 158 concepts. Next, we excluded 38 irrelevant terms (e.g., "analysis," "data," or "model") and merged 40 terms (e.g., "team" and "teams"), leading to 100 concept seeds for initial analysis. Finally, we kept terms serving as "kill concept" to exclude the bibliography section of the analyzed articles in the next step (i.e., "vol.", "journal," or "press"). In the next step, we analyzed the thesaurus generated by Leximancer and proceeded to define the kill concepts mentioned above to exclude references from the analysis. Finally, we generated concept maps and screened the synopsis for references, identifying additional kill concepts to avoid excluding relevant data. This iterative process also revealed the map's stability, as repeating the process with slide adaptations did not change concepts and topics (Wilden et al., 2019).

Within the concept map, we adapted the theme size from 60% (default setting Leximancer v. 5), revealing four themes (i.e., employees, technology, telework, and telecommuting) to 33% (default setting Leximancer v. 4) to allow for nine concepts to emerge: communication,

employees, employment, mobile, organization, technology, telecommuting, telework, and women.

## Stream-specific results: Climbing the walls - a perspective on the definition and developments of related constructs

As advocated by Kraus et al. (2022; 2020) in their recent work on the methodology of review articles, we followed a two-step approach by combining content analysis with bibliometric results (see, e.g., Vallaster et al. (2019) or Wales et al. (2021) for similar approaches).

For each of the included categories, we first provided a quick overview of the metrics (i.e., development over time, number of conceptual articles, and number of qualitative and quantitative studies included). Afterwards, we turned to common central components of the definitions and closed with a description of the field, its focus, and its development over time. The described process held true for all but two categories: *future of work* and *new work*. Both categories' vagueness and generic nature made it impossible to identify definitions which led to our attempt to conceptualize them.

### *Future of work*

While this category forms the basis for this article, it also proved to be the hardest to grasp. We included 21 articles of this category in our review, published between 1976 and 2022. Of these, four were qualitative, one was quantitative, and 16 were conceptual. A terminological indistinctness of the field became evident when noting that none of the articles included a clear definition, and few offered a precise conceptualization of the term. While researchers recently published reviews on the core topic (e.g., Mitchell et al. 2022; Santana & Cobo, 2020), these ignored related fields, and no definition emerged.

The key question, recurring in the field, focused on how work will change in the next few decades because of the constant changes affecting the economic and social phenomena that form the backdrop to work (Schlogl et al., 2021). The breadth of the topics covered risks giving the term *future of work* an evanescent, unclear, and sometimes contradictory meaning. Nevertheless, certain elements emerged more frequently in our review of the focal literature.

First, technological innovation has been assigned a prominent role among the causes of the ongoing changes impacting work. The impact of technology on work is a classic theme that runs through all economic thought. Therefore, it is not surprising that this theme plays a prominent role in the presence of disruptive innovations (Kudyba et al., 2020).

Additional sources of change, such as demographic dynamics, the related issues for welfare models, public policies, globalization and its impact on business models and strategies adopted by companies, or sustainability issues, add to the dynamics of the research field (Ainsworth & Knox, 2022; Khanna & New, 2008).

The outlined changes impact work differently: Companies pursue greater flexibility in work relationships to maintain or strengthen their competitiveness. They require new skills, develop new organizational forms, and establish new legal arrangements for employment relationships to meet these needs (Lowe, 1998).

In this vein, researchers analyzed the development of jobs carried out outside companies' premises and investigated their impact on leadership style, employer-employee relationship, work-life balance, and workplace re-design (Antonacopoulou & Georgiadou, 2021).

However, the authors noted contradicting results in the literature on *future of work* regarding researchers' approach to explaining this work arrangement. For example, whereas Mitchell et al. (2022) related *future of work* to *telecommuting*, literature has pointed out that Couch et al.

(2021) shifted *future of work* to the research stream of *working from home*, which increases overall ambiguity.

*New work*

Like *future of work*, our analysis of thirteen articles on *new work* included in this review lead us to believe that the category must be understood as generic, bracketing a large, diverse set of study areas and directions. Compared to the following categories, *new work* focuses less on technological-driven change and more on organizational topics. Behind the use of the term stands the idea that, at least for an increasing proportion of workers, the way they carry out their work is changing. The term *new* indicates the presence of several elements featuring today's labor relations. These appear innovative compared to the traditional way of understanding work based on well-defined working hours, rigid procedures to be followed, and little autonomy for the worker. According to Schmitz et al. (2021), *new work* is conversely featured by "flatter hierarchies or network structures […] a new organizational culture of trust, and focuses on participation and collaboration" in addition to "flexibility in working time" and the development and implementation of "new office concepts" (p. 321).

Underlying these changes is a broad spectrum of phenomena that reshape the features of labor relations, the firms' organization, and working activities. These phenomena include legislative innovations concerning the rules governing the employment relationship, the implementation of *new work* practices (e.g., job rotation, teamwork, greater job autonomy, and enhanced upward communication), and the increasingly decisive role of technology (Ramirez et al., 2007).

Empirical papers included in the category investigated whether and to what extent these phenomena impact aspects such as the workers' effort, the employment opportunities for

immigrants, the attractiveness of the firm for potential workers, the effectiveness of carried out activities, the core features of an employment relationship, or the sensemaking of employees facing relevant changes. Furthermore, some papers analyzed factors, such as country-specific features or roles played and actions undertaken by unions, able to impact the adaptation of *new work* practices (Ollo-Lopez et al., 2010).

All 13 papers were published in this century, four in 2021, demonstrating the timeliness of the subject. However, work characteristics are currently and likely to be subject to further relevant changes, which will be essential to study with further analysis.

Over the years, *new work* literature has focused on organizational topics rather than employees. Even if researchers focused on the individual level, they produced mixed approaches in describing employees in the *new work* context. These descriptions ranged from e-worker (Bell, 2002) to nonstandard workers (Ashford, George, & Blatt, 2007) without finding common ground. This presents an exciting opportunity to expand the scope of research on the individual level, e.g., by identifying a terminological basis regarding employees in *new work* while also addressing the role of gender, well-being, or work-family interface in this work arrangement.

*Telework*

"Telework is a broad and complex phenomenon that lacks a commonly accepted definition" (Nakrošienė et al., 2019, p. 98). This statement is of little surprise when considering that the category of *telework* represented more than a third of all articles included in this review, with 22 conceptual, 34 qualitative, and 83 quantitative or mixed studies, 139 articles written from 1984 until 2022 (121 since 2000 and 18 since 2020*).*

As *telework* is a *multi-faceted* phenomenon, Vayre and Pignault (2014) stated that neither researchers nor practitioner organizations have been able to arrive at a standard definition of

*telework* according to its various concepts such as *telecommuting*, *working from home*, *working at a distance*, *remote working*, *home (office) working*, and *virtual work*. We needed to consider several dimensions to establish a common understanding of *telework*. Regarding *transportation*, early conceptualizations of *telework* tend to focus on its potential to avoid commuting (Sullivan, 2003). Due to the *working location*, *telework* is a form of organizing and carrying out professional activities outside the employing organization's worksite (Vayre & Pignault, 2014). Depending on the working location, researchers identified three types of *telework*: home-sed teleworking, remote offices, and mobile working (Vries et al., 2019).

Regarding the *amount of time* working remotely, employees can perform work exclusively at home or in remote offices on a full-time basis. In contrast, alternating *telework* enables employees to split their working time between the employing organization's worksite and the home (Tietze, 2002). *Temporal flexibility*, a further dimension of *telework*, distinguishes between full-time and part-time teleworkers. Whereas full-time teleworkers complete most of their work during regular hours and add evenings and weekends to recoup work, part-time teleworkers work only evenings and weekends (Dimitrova, 2003). As work becomes disconnected from time and space conventions, Chung and van der Horst (2018) described *telework* as flex, enabling employees to control their working times and location. More specifically, flextime entails workers' ability to change the timing of their work regarding the starting and ending times and to fluctuate the number of hours worked per day or week (Chung & van der Horst, 2018). One of the most fundamental elements for defining *telework* is the use of *information and communication technology (ICT)* which ranges in terms of hardware (such as computer, laptop, modem, and smartphone) and software (such as Wi-Fi, videoconferencing, e-mail, 3G, access to employers' computer networks) (Daniels et al., 2001; Sullivan, 2003) for carrying out work from a remote location. In terms of *control*, ICT affords opportunities to integrate technological and bureaucratic control (Thulin & Vilhelmson, 2022). By facilitating

a constant real-time flow of information regarding employees' performance, ICT enables employers to electronically monitor and regulate the work performance of teleworkers at a distance (Bathini & Kandathil, 2019; Thulin & Vilhelmson, 2022). Regarding a teleworker's *affiliation with an employer*, employed teleworkers are still generally involved in occasional commuting to work, and their workflow is supervised externally by their organization (Dimitrova, 2003). In contrast, self-employed teleworkers are responsible for their workflows (Baines, 2002). Table 2 provides an overview of definitions and conceptualization components.

**Table 2:** Key-components of telework definitions & number of appearances

| Component | Number of Appearances | Component | Number of Appearances |
|---|---|---|---|
| Off primary worksite (incl. variations) | 63 | IT based communication (incl. variations) | 48 |
| Proportion of time teleworking | 33 | Flexibility of working time | 26 |
| Telework & Telecommute | 24 | Employment status | 15 |
| Mobile work | 11 | Working from home (incl. variations) | 8 |
| Remote from management | 7 | Measurable and trackable behavior of employees | 7 |

Researchers focused on *telework* by examining how knowledge workers and organizations adopt telework as an alternative work arrangement (Jaakson & Kallaste, 2010). To explore the acknowledged problems of defining *telework* and assess whether the term is still valid today, Wilks and Billsberry (2007) examined criteria used to characterize teleworkers in recent literature. While looking into the household of the self-employed teleworker, Baines (2002) showed how uncomfortably work can fit into the physical and emotional space of the home. Thus, they explored the reasons and identified barriers why working at home on a full-time basis has not been more widely adopted by employees and implemented in organizations (Baines, 2002). Regarding the work and family interface, researchers investigated the

relationship between work and family roles, and gender among home-based teleworkers and their families (Sullivan & Lewis, 2001), as well as changing work-family interdependences (Tietze, 2002). In this vein, Fonner and Stache (2012) examined the strategies home-based teleworkers use to manage the work–home boundary and the cues to facilitate transitions between work and home roles.

Regarding gender-based studies, researchers examined female teleworkers' domestic work experiences during the COVID-19 lockdown (Çoban, 2021). By focusing on ICTs, the main objective of, e.g., Dimitrova (2003) was to explore how the work context shapes control and autonomy in *telework*, how to achieve control, and how control procedures and practices vary across workplaces. Regarding social support and physical isolation, Vayre and Pignault (2014) addressed how teleworkers perceive and organize their relationships with others, e.g., work colleagues, supervisors, family members, and close friends. In addition, Taskin and Bridoux (2010) showed how telework may endanger an organization's knowledge base by threatening knowledge transfer between teleworkers and non-teleworkers.

Even as research on *telework* has grown remarkedly over recent years, it lacks a systematic attempt to comprehensively structure and connect the variety of its disconnected literature. Consequently, it serves as a catchall phrase. Therefore, we advocate systematically analyzing this research stream from a theoretical and methodological perspective in a separate literature review. Nevertheless, we shall propose a future direction for the stream in an integrative perspective on all research fields included. In addition to the organizational adaption of telework and employee-related factors, research on *telework* offers limited insights into developing innovations and related management of information when teleworking. This presents an attractive opportunity to expand the scope of research, which is especially important for managing, e.g., knowledge workers over geographical distances.

*Telecommuting*

With 64 papers, *telecommuting* is the second largest category of the review. About half of them appeared between 1984 and the end of the last century. Since 2000, almost all the papers have presented a quantitative analysis. The twelve conceptual articles indicated the importance of the topic. Eleven qualitative and 41 quantitative articles represented the interest in and the complexity of the topic.

Nilles (1976) coined the term *telecommuting*. The term draws attention to the substitution of travel towards employers' premises through ICTs. In this setting, the workplace is either the employee's house, thus wholly avoiding physical commuting, or a place close to it, reducing commuting.

In the following decades, the meaning of *telecommuting* has broadened. For instance, workplace flexibility has expanded to refer generically to locations other than the employer's premises. Today, the critical elements of the definitions and conceptualizations of *telecommuting* are workplace flexibility and communication technologies. In addition, some authors pointed out that *telecommuting* can cover all or part of the employee's regular working hours (Mayo et al., 2009; Olszewski & Mokhtarian, 1994).

We have provided an overview of the central concepts included in the definitions and conceptualization in Table 3.

**Table 3:** Key-components of telecommuting definitions & number of appearances

| Component | Number of Appearances | Component | Number of Appearances |
|---|---|---|---|
| Space outside the office (incl. variations) | 29 | ICT (incl. variations) | 27 |
| Working from Home (incl. variations) | 25 | Part-Time and Full-Time (incl. variations) | 10 |
| Substitution of commuting through ICT | 9 | Satellite office (incl. variations) | 6 |

The topics of research in *telecommuting* have evolved over time. This change certainly has been influenced by the significant technological evolution that has taken place in almost four decades, separating the first works on the subject from today.

Despite this varied picture, it was possible to outline research streams characterizing this category's contributions. The first stream includes studies that analyze the spread of telecommuting, explores its determinants (e.g., the characteristics of the company, of the worker, and of the employment relationship that make the adaptation of this work setting more or less likely), and investigates possible social implications (Mannering & Mokhtarian, 1995).

The second line of investigation explores the effects of telecommuting implementation on workers. It analyzes, for example, the potential benefits telecommuters might obtain and the drawbacks they could face. In addition, it addresses the potential impact of telecommuting on workers' job satisfaction, their engagement with the company, their turnover intentions, and their perceptions in terms of career and salary growth opportunities, as well as a sense of isolation and justice inside the company (e.g., Golden & Veiga, 2005).

Finally, the third line of inquiry focuses on the impact of telecommuting on an employer, its organization, and its performance. On this last point, in particular, the impact on costs and productivity is analyzed (Dutcher, 2012; Neufeld & Fang, 2005). In this area of investigation, analysis was carried out on the changes that the implementation of telecommuting makes necessary in terms of organizational structure, leadership style, internal communication, compensation systems, and, more generally, human resource management (Dahlstrom, 2013; Lautsch & Kossek, 2011). Studies also analyzed the impact of company choices on the degree of satisfaction of telecommuters, their behavior, and productivity. These studies focused on the technological aspects of telecommuting (Kuruzovich et al., 2021). In addition, in recent years,

several studies have analyzed telecommuting in the context of the COVID-19 pandemic (Jamal et al., 2021).

However, the authors noted there are contradicting perspectives on the spatial flexibility to perform one's tasks outside the company's offices. While Kossek et al. (2006) and Golden and Gajendran (2019) referred to *telecommuting* exclusively when addressing *working from home* by being supported with telecommunications technology, Vanderstukken et al. (2022) described *telecommuting* in a broader context in terms of *telework*, *remote work*, *distributed work*, and flexible work to perform tasks elsewhere than in a central workplace. This limitation impairs further development of the *telecommuting* research stream, and thus, we suggest establishing a shared terminology and a clearly defined research domain. According to extensive research on *telework* over the years, an overview of multiple facets of this work arrangement is necessary for a holistic understanding.

*Remote work*

Felstead and Henseke (2017) stated that defining *remote work* and its operationalization is still a central topic in the field. Based on the 41 articles reviewed throughout the process (ten conceptual, 14 qualitative, and 17 quantitative), we can agree that the definitory meaning of the field is fragmented.

Researchers defined *remote work* as a flexible work arrangement in which employees have control to work at locations beyond the employing organization's worksite (Perry et al., 2018). From a geographical perspective, remote workers can work from home, in satellite offices, in neighborhood work centers, and on the road (van Zoonen et al., 2021). *Remote work* ranges from workers who occasionally work away from the organization's worksite to fully remote workers who may be located anywhere in the world and permanently work away from the

organization's worksite (McDonald et al., 2022). Although different in form, all these work arrangements involve time spent working at a geographic distance from a supervisor and colleagues. This modus operandi reduces in-person supervision and replaces face-to-face interaction with technology-mediated communication (van Zoonen & Sivunen, 2021). Employees use ICTs to interact with others inside and outside their organization (Shirmohammadi et al., 2022). In this context, it seems that researchers described working remotely as a way of conducting one's work rather than a specific work location. Delany (2021) argued that a remote worker refers to a "location-free workforce" (p.5) provided with the technology needed to perform one's professional duties outside of the company's offices. From the perspective of working times, employees can work at any time, outside conventional working hours, if they can access the internet and official systems to complete their allocated assignments (Chatterjee et al., 2022).

We have provided an overview of the most common definitional components in Table 4.

**Table 4:** Key-components of remote work definitions & number of appearances

| Component | Number of Appearances | Component | Number of Appearances |
|---|---|---|---|
| Off primary worksite (incl. variations) | 13 | Working from home (incl. variations) | 15 |
| IT based communication (incl. variations) | 12 | Virtual setting (incl. variations | 9 |
| Remote from management | 6 | Telework & Telecommute* | 4<br>4 |

*Synonym usage addressed by authors

It seems *remote work* has gained increasing empirical interest, closely scrutinized from diverse lenses with quantitative, qualitative, and conceptual approaches, e.g., the consequences of *remote work* on work effort, job-related well-being, and work-life balance (Felstead & Henseke, 2017) as well as emotional stability and autonomy (Perry et al., 2018). Studies have examined the influence of *remote work* on worker performance (Jensen et al., 2020) and

organizational performance (Sherman, 2020). Due to the COVID-19 pandemic, one of the consequences of the widespread switch to *virtual work* is the impact on the relationships and interpersonal networks within organizations. Waight et al. (2022), e.g. studied how working remotely can damage employee social connections and trust. Furthermore, research focused on aspects of sustainable practices and identified challenges facing organizations adopting *remote work* (Delany, 2021; Laat, 2022). Regarding the challenges when working from home, researchers investigated how remote work practices, ICT use, and work stressors relate to psychological strain (van Zoonen et al., 2021; van Zoonen & Sivunen, 2021). Regarding the work-family interface, Shirmohammadi et al. (2022) focused on individual differences in work-family conflict. To mitigate psychological strain, Bouchard and Meunier (2022) identified specific management practices that promote the psychological health of remote workers in the context of COVID-19. Regarding human resources development, researchers examined how employees can enhance their skills and knowledge for career development and progress (Yarberry & Sims, 2021).

We found contradicting results when looking closely at the research stream *remote work*. Whereas Barsness et al. (2005) mentioned that remote workers can work from home, in satellite offices, in neighborhood work centers, and on the road, Zhang et al. (2021) referred to *remote work* as the standard concept of *working from home*. Thus, terminological differences obfuscate comparing results from a single research stream.

Regarding *remote work*, research still lacks an understanding of the effects of new technological tools on organizational control and surveillance in alternative work arrangements. Pianese et al. (2022) emphasized that future efforts should investigate organizational control in flexible work practices and alternative work arrangements (e.g., smart work), an aspect we strongly support.

*Working from home*

With the oldest paper in our study stemming from 1999, and 16 out of 21 articles published after 2020, this field belongs to the most recent included in our study. With one conceptual, five qualitative, and 15 quantitative articles, the field has a strong positivistic influence, even though we perceived its conceptual foundation as weak; while determining common definitional building blocks, the references to other concepts almost outweighed the definitional components.

A variety of researchers like Bellmann and Hübler (2021), Chi et al. (2021), Khan (2021), and van der Lippe and Lippényi (2020) have developed their definitions and explanations to describe *working from home*. In essence, *working from home* refers to working from a non-office location, usually an employee's home, to fulfill the duties of one's job by utilizing information and communication technology during or outside regular work hours (Chi et al., 2021; Khan, 2021). Thus, *working from home* is described as a family-friendly workplace arrangement (Abendroth et al., 2022) in which employees do not commute to their workplace in the company (Bellmann & Hübler, 2021). Nevertheless, studies showed that *working from home* is also called *remote work*, *telecommuting*, *telework*, *homework*, *home office*, *mobile work*, *outwork*, and the *flexible workplace* (Bellmann & Hübler, 2021; Dockery & Bawa, 2018). Table 5 provides some insight.

**Table 5:** Key-components of working from home definitions & number of appearances

| Component | Number of Appearances | Component | Number of Appearances |
|---|---|---|---|
| Working from home as active doing | 7 | Telework | 6 |
| ICT support (incl. variations) | 5 | Telecommute | 5 |
| Remote Work | 4 | | |

Researchers investigated the implementation and administration of *working from home* initiatives in organizations (Venkatraman et al., 1999), as well as various individual and organizational outcomes of *working from home* in terms of employees' job satisfaction, career opportunities, productivity, individual and team performance, and work-family conflict (Dockery & Bawa, 2018; Nakrošienė et al., 2019; van der Lippe & Lippényi, 2020). From a political perspective, Jones et al. (2021) addressed the nature and timing of policy responses to COVID-19 to encourage *working from home*. Furthermore, researchers investigated the extent and nature of changes in the domestic division of labor allocations (Garcia, 2022) and how *working from home* has impacted the experience of interruptions during work time (Leroy et al., 2021). Research also focused on disabled employees' likelihood and experiences of *working from home* relative to non-disabled employees (Hoque & Bacon, 2022).

Studies over the years have produced mixed results on the effects of *working from home*, which seem contradictory (Yeo & Li, 2022). Whereas *working from home* has the potential to increase an individual's work-life balance, employees are frequently confronted with interruptions from home and working longer hours which negatively influence an individual's work-life balance (Nakrošienė et al., 2019).

Research on *working from home* is limited at the organizational level, and a comprehensive overview of factors that impact organizations' resilience regarding the ability to work from home is missing (Fischer et al., 2022). Future avenues for research should go beyond the scope of the employed set of variables in their study. As Bellmann and Hübler (2021) examined the effect of *working from home* on job satisfaction and work-life balance, scholars should consider a broader range of context variables, e.g., job characteristics, commitment, and collegiality effects.

*Virtual work*

We included 13 articles on *virtual work* in our review. Out of the 13, there were three conceptual, four qualitative, and six quantitative articles, all published within this century. Two key points features the definitions and conceptualizations of *virtual work*: (a) the possibility to work from places other than the company premises and (b) the use of ICT allowing this spatial dispersion. Further elements pointed out by some authors are the potential temporal flexibility and the possible involvement of people living in different countries (global *virtual work*) (Nurmi & Hinds, 2016). In 2019 Raghuram et al. (2019) carried out a review aimed at detecting the key research stream referred to as *virtual work,* exploring the potential synergies among them. With its generic setup, *virtual work* now poses as a meta-category or umbrella term, comparable to *telecommuting* or even including such a category.

The studies included in the category cover the topic of the potential pros and cons of *virtual work* and the challenges related to the coexistence between material and virtual work (Robey et al., 2003). Furthermore, they included elements referring to the workers' characteristics, and the organizations' actions were analyzed to understand how the implementation of virtual working can be more effective both in terms of workers' (teleworkers and other workers) well-being and in terms of organizational performance (Raghuram, 2001). Finally, one article focused on global *virtual work* deals with topics at least partially overlapping with those analyzed by literature of multicultural organizations.

Due to the growth in *virtual work* literature and its position as a meta-category, this research stream's theoretical and empirical development is still unclear. Thus, we suggest that future research efforts should discard this research stream. As Raghuram et al. (2019) examined *virtual work* under the lens of different dimensions of virtuality, we believe there is potential for further research in this area. In terms of virtuality and related technologies, it is possible to

elaborate various effects, e.g., augmented reality, holograms, and the metaverse, on an individual and team level. This would contribute to research on different work arrangements and help to develop a theory about antecedents and outcomes.

*Distributed work*

We analyzed 13 distributed work papers: one conceptual, six qualitative, and six quantitative articles. As the term *distributed work* was coined quite some time ago, research in the field draws upon a common ground when defining the generalist phenomenon. All conceptualizations and definitions include spatial dispersion at their core. Such dispersion is often related to single team members or complete teams of an organization. Possible variants exist, including a mix of co-located and remote members. However, such relations can also be inter-organizational (Venkatesh & Vitalari, 1992). How dispersion changes over time (e.g., changing worksites (Pritchard & Symon, 2014) or changing between home and company premises (Sia et al., 2004)) differs between articles.

The second common characteristic is facilitating *distributed work* through ICT. In this context, the conceptualizations also explicitly include the interaction between the entities. More recent studies closely relate to or interchangeably use the term "virtual teams" for distributed teams and distributed work, e.g., Lai and Burchell (2008). Additional aspects mentioned in two or more publications are a possible temporal dispersion, e.g., Vlaar et al. (2008), or remote entities' increased autonomy (Rockmann & Pratt, 2015).

The articles included in our study indicate several developments. While Venkatesh and Vitalari (1992) addressed *distributed work* as a possibility for additional work from home, Burke et al. (1999) indicated a rising relevance of distributed teams. The field addressed a well-established phenomenon from the beginning of the new millennium onwards. While the earlier works dealt

with *distributed work* at a team and organizational level (e.g., Sia et al., 2004), the later contributions more often focused on the individual level effects (e.g., Sarker & Sahay, 2010).

On the one hand, we recommend following up on the research of Rockmann and Pratt (2015) on the effects of distributed work on permanent on-site organizational members and team members visiting the office irregularly. The developments connected to COVID-19 indeed will have affected the perception of isolation at the office. On the other hand, research on the cooperation of onshore, offshore and nearshored teams, thus deepening the insights of Brooks et al. (2020), poses a promising pathway for future research on distributed work.

*Mobile work*

The analysis of the category of *mobile work* included ten articles: one conceptual article, six qualitative, and three quantitative studies, all published between 2007 and 2022.

Definitions of *mobile work* comprise several facets, such as *mobility at work*, *mobility for work*, and *working while mobile* (Cohen, 2010). Cohen (2010) described *mobility as work* as the movement of people, goods, or vehicles between places, common in professions such as cycle couriers, truck drivers, and pilots. Moreover, professions that require mobility to accomplish one's job belong to *mobility for work*, such as district managers, plumbers, and construction workers. In addition, authors use the expressions *working while mobile* (Cohen, 2010) and *mobile work* (Brodt & Verburg, 2007; Karanasios & Allen, 2014; Yuan et al., 2010) to express collaborative and independent work activities that can be carried out while mobile or at multiple sites. Raguseo et al. (2015) adapt Martins et al. (2004) defined and described *mobile work* in terms of temporary activities that are accomplished outside the firm's premises and across locational, temporal, and contextual boundaries when being in physical movement. Therefore,

mobile technologies such as ICTs support mobile work (Brodt & Verburg, 2007; Raguseo et al., 2015).

Researchers started to explore *mobile work* from the perspective of enablers, drivers, and barriers for successfully introducing mobile work initiatives with qualitative approaches (Brodt & Verburg, 2007; Cohen, 2010). For example, Yuan et al. (2010) examined *mobile work* by creating a research model focusing on the fit between task characteristics and mobile work support functions. In addition, this research focused on employees' experiences, willingness to use mobile working, and its implications for home and work domains (Karanasios & Allen, 2014; Porter & van den Hooff, 2020; Raguseo et al., 2015). Additionally, Tranvik and Bråten (2017) investigated *mobile work* from the perspective of internal systems for governance and control regarding employees' data protection and privacy.

As a missing shared terminology characterizes *mobile work*, further research could be helpful in defining the research domain clearly and understanding that research stream better.

*New ways of work*

Articles on *new ways of work* analyzed changes in how work is carried out. According to Aroles et al. (2021), changes can be grouped into three aggregates: firstly, changes related to the introduction of new technologies; secondly, changes impacting the place and the time the activities are carried out, and finally, changes modifying the relation between firms and workers. The category included seven papers, one conceptual article, three qualitative studies, and three quantitative studies. Except for one, which dated to 2013, all the others appeared in the last five years.

Common elements of *new ways of work* conceptualizations are the role of new technologies and the flexibility in the time and space of carrying out work. Some contributions also pointed

out that *new ways of work* allow workers more control over the tools and content of their work, including a greater degree of freedom in organizing and prioritizing their activities. Workers' access to firm knowledge and spaces was also analyzed (Gerards et al., 2018).

Empirical papers included in the category first analyzed the potential impact of *new ways of work*, considered in their multiple facets, on employees' informal learning, work engagement, and entrepreneurial behavior (Gerards et al., 2021). Two case studies analyzed the effects of *new ways of work* implementation; in particular, one investigated changes in managerial behavior aiming to define and reaffirm managers' role in the new work setting (Leclercq-Vandelannoitte, 2021).

*Smart work*

*Smart work* included only three papers published between 2016 and 2021. We excluded other works on the topic due to pre-defined filters. Key points of *smart work* definitions are the space and time flexibility together with the use of ICT. They did not diverge significantly from the ones highlighted for other categories analyzed in this paper. Under this perspective, the expression *smart work* seems mainly to be a language variant of other terms more broadly used in professional environments and academic works.

Nevertheless, Malik et al. (2016) conceptualized *smart work* as a "means of achieving better stakeholder outcomes through new ICT, collaborative, creative and iterative processes of exploration and exploitation of existing and new knowledge" (Malik et al., 2016, pp. 1043–1044), emphasizing the role of new knowledge creation and exploitation processes in improving stakeholder satisfaction.

First among the topics analyzed by the papers included in the category was the employees' evaluation of their smart working experience (Cellini et al., 2021). Secondly, the articles

analyzed individual and organizational factors impacting employees' attitudes toward smart working, including task performance and job satisfaction (Ko et al., 2021). Finally, researchers investigated the elements influencing attitudes toward smart work hubs and the intensity of their use (Malik et al., 2016).

Regarding future research efforts, scholars should consider a more comprehensive range of context variables. Extending the analysis to a broader range of national contexts to capture the impact of country-specific peculiarities such as culture, technology diffusion, and legislation would improve understanding of the investigated phenomena.

*Home office*

*Home office* refers to their homes being the employees' primary work venue to complete their assigned tasks. Researchers describe *home office* as an intense form of home-based *telecommuting* in which employees remain in their home and use a virtual connection to the employer in terms of a personal computer and a modem's connection to a telephone line and the employer's computing facility (Hill et al., 2003).

As we see, the interconnectedness of the streams of *home office* and *telecommuting* is also supported by Tunyaplin et al. (1998) "workplace of the future […] enabled through the concept of telecommuting and the personal computer" (p.178). However, in recognition of this complex definition, it holds the potential to cause additional obscureness.

Hill et al. (2003) investigated the effect of *home office* on aspects of work such as job performance, job motivation, job retention, and the effect of *home office* on personal and family life. Along with COVID-19, Primecz (2022) explored *home office* by discovering the impact of restrictions connected to the pandemic on the work and life of international professional women with children. The emergence of these topics is not unique to the stream on *home office*. Indeed,

one can find their relevance in almost all the fields we probed, stressing the need for an overarching perspective even more.

## Integrative results: Looking at the maze from above – commonalities, differences, and dead ends

Researchers associate *telework* with geographical and temporal flexibility, enabling employees to use home-based teleworking, remote offices, and mobile working anytime (Chung & van der Horst, 2018). Further, the role of employment relations between employees and their employer is well recognized in shaping *telework*, and thus, researchers differentiate between employed teleworkers, self-employed teleworkers, full-time teleworkers, and part-time teleworkers (Baines, 2002). In addition, we noted the role of gender and work-family interdependencies as characteristics of *telework* (Gálvez et al., 2020).

Research on *future of work* also addresses the employees' geographical and temporal flexibility to conduct their work; the key is providing employees the choice to work when and where they are most effective. Thus, *future of work* literature focuses more on technology enabling effective working than *telework* (Khanna & New, 2008).

*Telecommuting* literature refers to using telecommunication technologies to perform all or part of one's work during regular working hours outside the organization's physical boundaries (Mayo et al., 2009; Olszewski & Mokhtarian, 1994). Employment relations between employees and their employers connect *telecommuting* and *telework*. Nevertheless, in contrast to *telework*, *telecommuting* focuses on employees' geographical rather than temporal flexibility. Thus, *telecommute* is connected to *remote work*, as employees can conduct work from remote workplaces (Masuda et al., 2017).

Although these two research streams differ in their focus of investigation, they are quite similar at the theoretical level. Besides the closeness of the concepts *telework* and *remote work*, the results of our analysis revealed that *remote work* differs from *telework* as employees' professional duties receive more attention (Delany, 2021). Consistent with this, *remote work* specifies if employees' tasks can be performed outside the company's offices, e.g., by accessing the internet and communication systems (Chatterjee et al., 2022).

Furthermore, researchers describe geographical flexibility in *telework* instead on a "macro level" and go more into detail when focusing on flexibility regarding the working location provided by *remote work* (Barsness et al., 2005). Based on logic, *remote work* includes *working from home* as a working location. The same holds for *home office* as a non-office location connected through ICT while experiencing temporal flexibility (Chi et al., 2021). *Distributed work* is a facet of *remote work*, as it involves collaboration among teams in remote locations across locational, temporal, and relational boundaries (Venkatesh & Vitalari, 1992; Vlaar et al., 2008). In this context, *distributed work* is characterized by collaboration and communication among team members, especially in virtual teams (e.g., Lai & Burchell, 2008).

Furthermore, *distributed work* from a contextual viewpoint is partially connected to *working from home*, as employees work at sites intentionally located near the employees' homes and work at least part of the time at home (Lai & Burchell, 2008). Using *mobile work*, employees can accomplish tasks across locational, temporal, and contextual boundaries (Chatterjee et al., 2022); thus, it can be understood as a facet of *distributed work* as it is defined via physical movement from one place to another (Yuan et al., 2010) and focuses strongly on mobile devices (Jo & Lee, 2022). Consistent with the rise of mobile devices, innovations in mobile settings characterize *mobile work* (Kietzmann, 2008).

*Virtual work* is temporally and spatially dispersed and described as working remotely (Raghuram, 2001; Robey et al., 2003). In its current use, it represents a sub-category of *remote work*. While similar to *distributed work*, researchers put *virtual work* in a more global context characterized by coworkers collaborating across different countries (Nurmi & Hinds, 2016). *Smart work* poses another generic facet of *remote work* by providing employees with maximum geographical and temporal flexibility and autonomy (Raghuram, 2001).

*New ways of work* also represent a sub-category of *remote work*, as employees can use geographical and temporal flexibility while having control over the work content and having access to organizational knowledge (Aroles et al., 2021). Further, the firm adopts new technological tools and strategies, e.g., hot desking and mobile work (Assarlind et al., 2013; Kingma, 2019). This also directly connects *new ways of work* to *mobile work*.

On the other hand, *new work* is not directly connected to any category because researchers describe *new work* practices and attributes as team-based work, job rotation and communication, job autonomy, and meaningfulness (Ollo-Lopez et al., 2010; Schmitz et al., 2021). We depicted these connections in Figure 2.

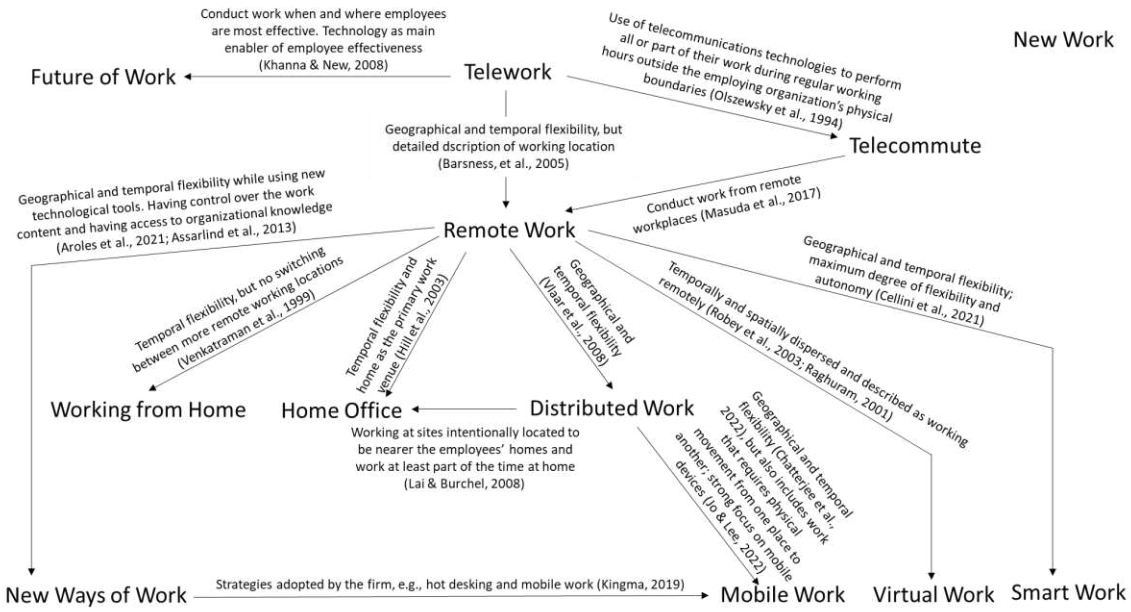



**Figure 2:** The maze and its hallways: Visualizing the connections between the categories

*The future of scientific work? Leximancer's view on the state of the art*[1]

To validate our qualitative mapping of the research streams and enrich our results, we turned to the analysis of the streams' literature through Leximancer. The concept map provided by the software identified 78 constructs and nine themes for the overall analysis of the articles. The map is depicted in Figure 3.

[1] In this section, Leximancer themes are marked ">*<, "Leximancer concepts are marked with single quotation signs'*', and research fields are written in italics.

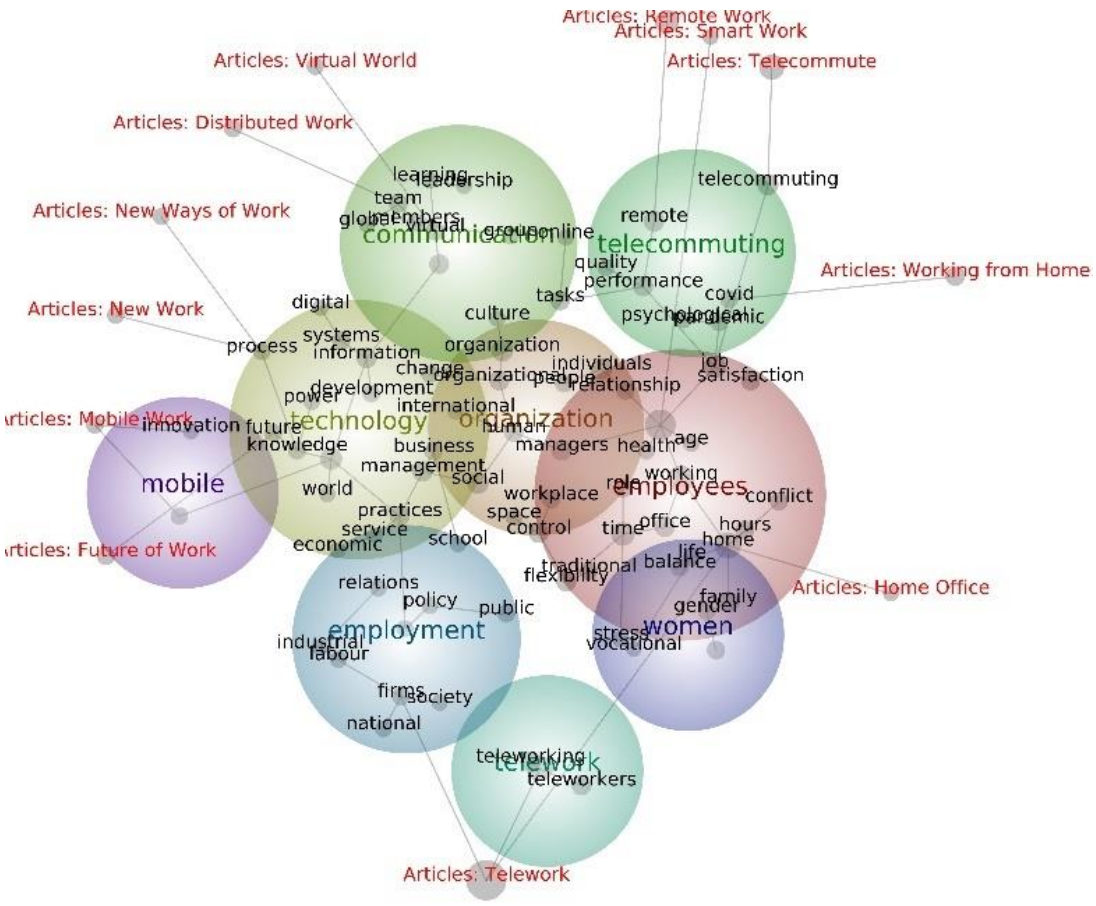



**Figure 3:** Leximancer concept map with ten themes

The theme >employees< stands at the center of the map, pointing to related concepts such as working times, hours, and flexibility. The theme overlaps with the second central theme, >organization<. The overlap includes concepts such as 'individuals,' 'relationships,' 'roles,' and 'managers,' but also 'control' and the 'workplace', concepts constituting and defining memberships of individuals in organizations. The >organization< theme mirrors this; it includes concepts such as 'people,' 'human,' and 'organizational.' Connecting 'social issues' and 'management, >organization< establishes a link with the third theme of high relevance, >technology<. Their overlap here addresses change, a concept also touching the communication theme (rated sixth most relevant by Leximancer). The >technology< theme not only addresses

the expected concepts such as 'digital' or 'information' but also 'power,' 'processes,' 'knowledge,' and especially 'business,' indicating how central technology has become for these topics.

The two research fields that emerge as themes, > *telework* < (driven by related sub-concepts) and >*telecommute*< (including 'performance', 'quality', but also 'psychological' as concepts), Leximancer stably situated on opposite sides of the map, representing their disparity compared to the other included themes. We attributed this location to their parallel development over time and the fact that *telecommuting* is a narrower sub-category of *telework*.

Our review field, *mobile work,* drove the theme >mobile<, the only concept beside itself being innovation; neither field nor theme were closely connected besides an overlap with technology (required for mobile work). The theme >employment< (purposely not merged with employees before) features macro 'economic' concepts such as 'labor,' 'employment,' and 'public' and 'policy.' The centrality of 'firms' in this theme indicates the close connection to operational issues. Finally, the theme >women< is of importance, as its significant overlap with >employees< features work-family-conflict concepts 'family,' 'balance' 'life,' 'stress,' and 'balance'. While Leximancer rates the theme as less essential, the substantial overlap with the employee theme, a split concept 'home,' and the above concepts represent its importance. However, it is not connected directly to any of our research fields, whose positioning and connections we addressed in the next step.

As we tagged the articles according to their field and these appeared on the map (red text outside of the clouds), Leximancer offered us a rich insight into the different fields and their connection.

As with the themes, the opposing positioning of the *telecommute* and *telework* fields is of interest to us. *Telework* with 12300 hits over all documents poses a distinctive but overreaching concept. Its direct connection to the >employee< theme (via 'home') and >employment< indicates its generic nature. The link to 'home' is important, as it establishes the direct

connection with the fields *working from home* and *home office*. With a 12% probability of co-occurrence with *telecommuting*, *telework* still encloses the related field.

On the other hand, *telecommuting* is rather specific and closely connected to the field of *remote work*, which in turn belongs to the >telecommuting< theme.

A comparably close relationship exists between distributed work and virtual work: both are related to 'teams,' 'members,' and 'communication,' showing their strong relationship. However, distributed work addresses a more differentiated number of concepts than virtual work.

While *new work* and *new ways of work* are directly coupled via the 'process' concept of the >technology< theme and thus co-located, the number of overlapping concepts between *new work* and *future of work* is significant. Still, *future of work*, while a smaller research field than *telework*, overarches most of the concepts on the map, representing its generic nature.

The concept map generated by Leximancer supports several of our previously stated conceptual foci, commonalities, and differences between the research streams. With this successful form of triangulation described by Lemon and Hayes (2020), we can derive further research avenues.

**Contribution: Leaving the maze – where to next?**

The *future of work* and its related research fields exhibit a maze in which many scholars have gotten lost before. We started with the aim not only to provide a map but also to tear down the walls of this maze, a process that profoundly changes the design of the labyrinth. This step also challenges the former and current constructors to help reduce the complexity and develop clear pathways for our research field rather than rebuilding the maze. It is not our intent to diminish the achievements of other scholars researching developments in the wider field. On the contrary, we argue that placing their essential work in a more clearly defined context enhances

their contribution to the discourse and increases the overall progress of research. Thus, we propose several future developments and directions:

Concerning the topic *future of work*, and the category of *new work*, we recommend caution concerning their meaning in an ever-developing field. Technological advancements, societal changes, and economic developments are ongoing with no clear starting point and no defined end. Moving forward, the *future of work* may look different, as the early papers on *telecommuting* show. However, the missing temporal reference points are neither the biggest nor the only problem. Their generic, underdefined conceptualization makes both categories appear like empty hulls, which authors can and do load with any content they feel suitable. We believe that such a category will neither lead to a common understanding nor a definition, nor will it enable progress in this field.

Furthermore, we fear that ambiguous fields will hamper the progress of other fields, as bridging between them could become obfuscated through those additional categories, further decreasing their added value.

This issue partially holds for *virtual work* and *smart work*. However, we believe that *virtual work* can still be coined more specifically and evolve into a separate, promising field. Considering rarely mentioned developments, such as augmented reality or the meta-verse, we envision that such topics being a valuable direction for *virtual work* to follow. As for *smart work*, the field needs to free itself from *remote work*. We propose that researchers do so by scrutinizing more closely the interplay of autonomy and control with the spatial-temporal independence of the workers. Another possibility lies in focusing on the interplay of dimensions involved, e.g., the concept of *Bricks, Bytes, and Behaviour* (Kok, 2016).

Further vagueness comes to light when comparing *new ways of work* and *mobile work*, as both categories offer employees geographical and temporal flexibility while relying strongly on

mobile devices and technological tools (Assarlind et al., 2013; Jo & Lee, 2022). As the categories *new ways of work* and *mobile work* are sub-categories of *distributed work*, we propose homogenizing the research streams and relating them to *distributed work*. Leximancer results support this proposal because of clear thematical overlaps between *new ways of work*, *mobile work*, and *distributed work*. Regarding *distributed work*, this category should be maintained independently of *remote work* by addressing geographical and temporal flexibility and strongly focusing on technological tools and mobile devices.

While *working from home* and *home office* offer temporal flexibility without switching between more remote working locations, these categories are strongly connected (Chi et al., 2021). In addition, the thematical overlap of both categories becomes apparent in Leximancer. Thus, we propose homogenizing the research streams of *working from home* and *home office*. At the same time, *working from home* should focus on this location only while having temporal flexibility. Excluding other non-office locations distinguishes it from concepts such as *remote work*.

For future research, we propose restricting ourselves to the categories *telework*, *telecommute*, *remote work*, *distributed work*, *working from home*, *virtual work*, and *smart work*, as we can drive clear differentiations between them. We depicted these categories and their distinctions in Figure 4. The older categories (e.g., *telework*, *telecommute*, or *remote work*) are well-researched conceptually and empirically, especially the newer categories (such as *smart work* or *virtual work*) still lack research. Regarding the overall field, scholars should consider a broader range of context variables for further research. We recommend research that investigates more specific dimensions of the ongoing increase in the virtuality of different work arrangements. Therefore, it is essential to directly incorporate dimensions such as, e.g., augmented reality, virtual reality, and metaverse to understand better the influence of the ongoing digitalization on different work arrangements, on an individual and team level.

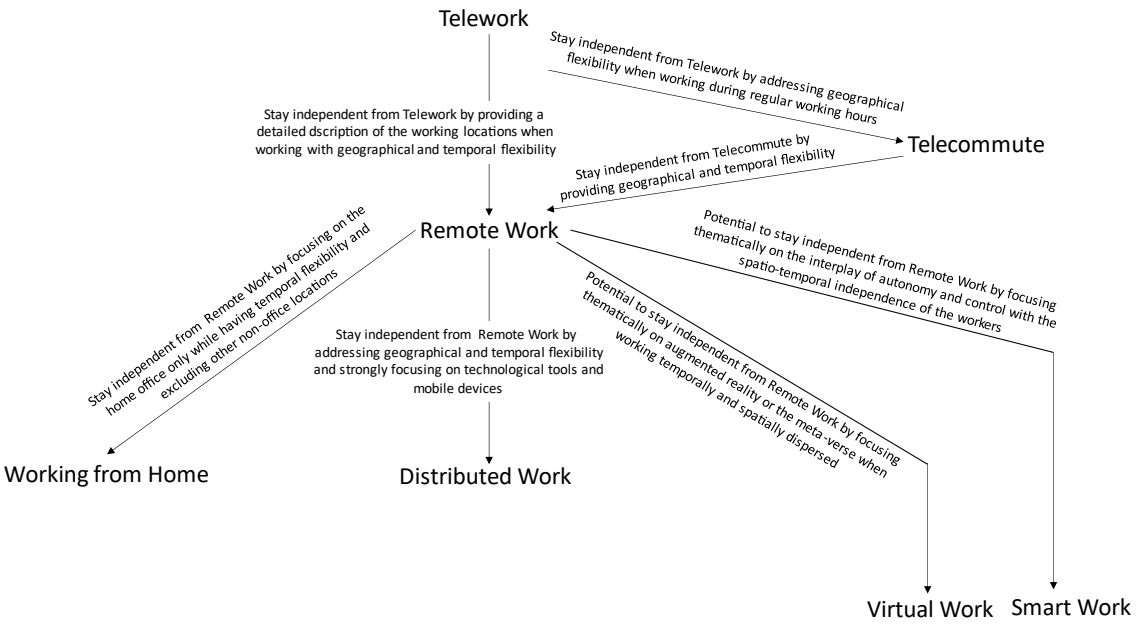



**Figure 4:** New pathways for researching the future of work

As our study has primarily focused on clearing the terminology, future research may want to focus on discussing *when* to adapt each of the categories mentioned above. The categories are different in their meaning and effective for specific types of work, distinct situations, and certain types of employees. The field would benefit from examining these specific cases.

## Conclusion: What to take from the maze

With our article, we set out to identify relevant research streams focusing on the development of the working world and somewhat connected to the term *future of work*. We identified twelve research streams related to the *future of work* through an iterative design, covering well-established and emerging fields. We characterized the development of each of the streams separately, pointing out inconsistencies, strengths, unique approaches, and possible developments for each stream.

During the second phase, we addressed the often-parallel evolution of the twelve fields, mapping the development of often related and partially redundant topics within the streams presently existing. We thus provided an overview of which streams scholars and practitioners interested in the developments of work arrangements can turn to for relevant information and where to expect co-existing yet isolated research.

We believe that the most significant contribution of this article lies in its proposal to establish a higher concept clarity. We propose to do so by merging research streams (e.g., *working from home* and *home office*), clearly dedicating streams to unique topics (e.g., *virtual work* to research on augmented reality or the metaverse), and discontinuing the use of catch-all terms like *new work* but also more established, yet equally ambiguous streams like *future of work*. Through the first step we became aware of the tremendous amount of relevant information 'buried' in these indistinct fields. Thus, discontinuing or merging streams does not devalue their research but makes future publications more accessible for scholars and practitioners. As new buzzwords lead to the emergence of supposedly new streams (e.g., hybrid work), keeping a parsimonious terminology leading to a focused exchange and progress will be an ongoing challenge.

While we are aware of the irony of our argument to discontinue the exact stream we have augmented, we hope that fellow scholars agree with us and frame their research under more precise concepts.

Our article also allows practitioners and policymakers to access fellow researchers' works more efficiently. By reducing the number of parallel research streams and discontinuing those with catch-all terms, it will become easier to identify those works and researchers that can help with specific challenges. At the same time, reducing uncertainty will allow researchers to explain new research results to practitioners by precisely explaining their objectives.

*Limitations*

While we have contributed to the state and future development of the named fields through rigorous research, our paper underlies limitations inherent in literature reviews. The emergence of alleged new fields and topics has gained substantial momentum. Even though we adapted and extended the search terms during the search process, we are aware that we may have missed related fields or new fields that have arisen even while we were completing our analysis. This potential weakness demonstrates the necessity to reframe and sharpen our far-spread research to create shared insights for academia and praxis. The analysis process of large amounts of literature, aligning insights, is prone to subjective influences, even when keeping to the RAMSES methodology. By drawing upon Leximancer for triangulation, we attempted to mitigate this risk (Lemon & Hayes, 2020).

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Manuscript 2

**Feedbacking research on virtual feedback: A literature review.**

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Submitted to *Personnel Review*

**Abstract**

**Purpose** – Remote work has become a prominent part of the current working environment coming with new challenges for employees and managers. This includes finding ways to provide feedback to support the development of virtual or hybrid teams and their members, which has led to an uprising interest in virtual feedback. While this topic is not new to management research, a thorough understanding of how virtual feedback influences its recipients remains lacking.

**Design/methodology/approach** – Our semi-systematic review draws on 110 peer-reviewed academic articles published between 1986 and 2023 in Management, Business, and Psychology.

**Findings** – Delving into virtual feedback through the lens of the feedback process model (Ilgen *et al*., 1979), we firstly identify the elements of virtual feedback that impact a) the recipient's perception, b) the way it is accepted, c) the recipient's willingness to respond to the feedback, and ultimately, d) the response. Secondly, we identify unexplored areas of virtual feedback and propose promising avenues for future investigation. Thirdly, our study offers implications on

the individual and team-level to support practitioners in communicating virtual feedback to mitigate misunderstandings, enhance feedback acceptance, and achieve the desired outcomes of virtual feedback.

**Originality/value** – The literature review provides a comprehensive and unique picture of a feedback recipient's multifaceted behavioral reactions to virtual feedback in a hybrid and virtual working environment and the underlying mechanisms (e.g., cognitive processes) explaining the effects.

**Keywords** Virtual feedback; Feedback process model; Virtual collaboration; Literature review

**Paper type** Literature review

## 1. Introduction

Organizational leaders are currently engaged in discussing their employees' return to the conventional office environments as the pandemic no longer presents any major safety risks and organizations noticed a lack of collaboration among employees in the virtual work environment (Gibson *et al*., 2023; Kim and Dirks, 2023). In contrast, resent research shows that employees prefer a hybrid workplace that combines in-person interactions and the option to work remotely (Gibson *et al*., 2023).

In light of the above-mentioned ongoing discussion, organizations are currently navigating the workplace of the future towards the different types of working arrangements, e.g., in-person, hybrid and virtual (Gintova, 2023). Even though enabling employees to work in-person in the conventional office, or in hybrid or virtual environments, a key driver for achieving an organization's competitive advantage is performance (Crook *et al*., 2008). In this vein, feedback is a crucial means in ensuring team collaboration and organizational performance (Jung *et al*., 2010; Geister *et al*., 2006). For instance, feedback encompasses evaluative or corrective information provided to individual team members or the entire team concerning behavior, performance, or processes, aiming to influence future actions (Gabelica *et al*., 2012; Geister *et al*., 2006).

As previous researchers gained tremendous insights into in-person feedback communicated in the conventional office environments (e.g., see Smither *et al*., 2005), the communication of virtual feedback and its academic investigation was strongly boosted by government-enforced lockdowns during the COVID-19 pandemic and changing working conditions towards the hybrid and virtual work environment (e.g., see Gibson *et al*., 2023; Handke *et al*., 2022). As virtual feedback has been a subject of scholarly investigation since 1986 (Siegel *et al*., 1986), researcher have extensively studied the influence of virtual feedback on individual and team behavior (Ouverson *et al*., 2021). Thus, researchers refer to virtual feedback (or digital or

computer-mediated feedback), when provided with information and communication technologies (ICTs), e.g., email, instant messages, and video conferencing (Eisenberg *et al*., 2021; Hertel *et al*., 2005). Researchers investigated virtual feedback from diverse theoretical perspectives, e.g., exploring the cognitive processes individuals undergo when receiving virtual feedback (Wang *et al*., 2014) or the various effects it has on an individual and team level (Biron *et al*., 2023; Chen *et al*., 2020). Although previous researchers made attempts to review the literature on virtual feedback (see Handke *et al*., 2022; Leibold and Schwarz, 2022; Carranza-Dávila *et al*., 2022), they provide only a limited portrayal of the literature in light of their involvement in their respective research context. As researchers reviewed literature on virtual feedback by either focusing exclusively on the effects (Carranza-Dávila *et al*., 2022) or perceptions (Leibold and Schwarz, 2022) of virtual feedback in the educational context, Handke *et al*. (2022) are solely focusing on effects of virtual feedback in completely virtual teams.

Amidst the growing body of research on virtual feedback, a comprehensive picture of the conducted research and its findings is missing as empirical investigations on virtual feedback also lead to different and partially contradicting results (see Johnson and Connelly, 2014; Tavoletti *et al*., 2019). In more detail, virtual feedback via email resulted in performance improvements of team members (Johnson and Connelly, 2014), whereas virtual feedback communicated by a peer evaluation system did not improve the performance of team members (Tavoletti *et al*., 2019). Thus, it seems that the effects of virtual feedback and the reasons for their emergence are not yet well understood. At the same time, a comprehensive picture of the literature on virtual feedback, remaining research gaps, and a roadmap for further research endeavors are required to advance our understanding of virtual feedback.

To capture the richness of research on virtual feedback in organizations, we conducted a semi-systematic literature review, drawing on 110 peer-reviewed academic articles published between 1986 and 2023 in Management, Business, and Psychology Sciences. As organizations

are currently navigating the workplace towards the different types of working arrangements, e.g., hybrid and virtual (Gintova, 2023), we concentrate our investigations on virtual feedback communicated via ICTs in the hybrid and virtual working environment. Drawing upon the feedback process model (Ilgen *et al*., 1979), we comprehensively capture the multifaceted dimensions of virtual feedback and systematically examine how feedback impacts an individual's behavior. The model specifies the stimulus-organism-response (SOR) model (Mehrabian and Russell, 1974) for explaining individual behavior stimulated by feedback. The SOR model indicates that environmental cues (*stimuli*) activate an internal assessment process of an individual (*organism*), which ultimately determine an individual's behavioral response (*response*) (Mehrabian and Russell, 1974). Due to Wang *et al*. (2014), Ilgen *et al*.'s (1979) feedback process model demonstrates a solid basis for subsequent research on feedback, so that it serves as a cornerstone for organizing and synthesizing the vast array of literature on virtual feedback. This procedure allows us not only to determine the effects of virtual feedback but to understand how these effects arise on an individual level due to the cognitive processes of a feedback recipient, e.g., perception and acceptance of virtual feedback. By comprehensively identifying an individual's cognitive processes, we are able to provide an essential lever in the transmission of virtual feedback to a) explain an individual's behavior and b) how to promote an individual's desired behavior.

Hence, our literature review allows us to clearly differentiate from existing works by comprehensively turning the attention to a feedback recipient's multifaceted cognitive and behavioral reactions on an individual and team level in a hybrid and virtual working environment.

Our work enriches the academic discussion on virtual feedback in at least three ways. We first identify the elements of virtual feedback that impact a) the recipient's perception, b) the way it is accepted, c) the recipient's willingness to respond to the feedback, and ultimately, d) the

response. By applying the feedback process model (Ilgen *et al*., 1979) in a context-specific way, we provide a comprehensive understanding of an individual's reaction to virtual feedback, we clearly identify the model's components that have been investigated in the virtual context, and components that require further examination. Second, we identify gaps in the literature and propose promising avenues for future investigation on virtual feedback. Third, with our specific literature review, we contribute to the discussion on virtual feedback by focusing on the hybrid and virtual working environment and, thus, deriving implications on the individual and team level to support scholars and practitioners to advance our understanding of virtual feedback.

## 2. Methodology

To ascertain the academic discourse on virtual feedback in the management, business, and psychology context, we conducted a semi-systematic review and a content analysis (Snyder, 2019). As diverse fields are underlying the research stream on virtual feedback, we base our approach on the RAMESES publication standards for meta-narrative reviews (Wong *et al*., 2013).

Drawing on the feedback process model (Ilgen *et al*., 1979), we code and analyze the academic articles on virtual feedback to identify the model's elements related to the feedback message, the source, the recipient's individual characteristics and the recipient's cognitive processes, which explain the individual's response to virtual feedback when using information and communication technologies.

In a first step, we delved into academic literature as well as relevant fields to find academic works on virtual feedback in organizations by referring to the EBSCO and Web of Science databases. Further, we added relevant articles from Google Scholar. For this review, we used a comprehensive list of relevant search terms (see Table I) to locate journal articles in fields of

Business, Management, Psychology, Psychology Multidisciplinary, and Psychology Experimental. During this phase, we eliminated the doublets, leading to 5,857 published articles.

| | | |
|---|---|---|
| "Virtual" | "Telework" | "Work* at Home" |
| "Digital" | "Virtual Collaboration" | "Work* from Home" |
| "Online" | "Distributed" | "Home Office" |
| "Remote" | "Distance" | |
| AND | | |
| "Feedback" | "Appraisal" | "Peer Evaluat*" |

*Table I: Search terms used in Web of Science, EBSCO, and Google Scholar (incl. quotation marks)*

In a second step, we applied pre-defined inclusion and exclusion criteria to screen the titles of the academic works. Due to this work's specific aim in providing a comprehensive understanding of an individual's reaction to virtual work-related feedback communicated via ICTs and to understand an individual's underlying cognitive processes, we defined inclusion criteria. As the feedback process model (Ilgen *et al*., 1979) is focusing on feedback in performance-oriented organizations, we excluded all articles with contextual misfit, namely, feedback in social information space and social networking sites, e.g., Facebook (Matschke *et al*., 2014; Tian *et al*., 2023), online feedback forums and marketplaces, e.g., Kununu and eBay (Dellarocas, 2003; Phang *et al*., 2015), consumer markets (Gibbs *et al*., 2022), distributed social arrangements, e.g., gambling and virtual reality games (Parkinson, 2008; Xu *et al*., 2023), neuroscientific investigation of feedback (Schindler *et al*., 2019), therapeutic mechanisms (Dercon *et al*., 2023), and technical feedback in the development and implementation process, e.g. apps and motors (e.g., see Kuk, 2023).

In a third step, we screened the abstracts of the remaining 1,253 articles excluding 1,081 papers by applying these exclusion criteria. In a fourth step, we excluded another 62 articles, as five

were inaccessible, even after directly contacting the authors and 57 articles did not fit the language scope or to missing organizational context. These steps resulted in a final collection of 110 articles that were thoroughly analyzed encompassing their theoretical approach, employed methodology, and the feedback process model's elements (Ilgen *et al*., 1979) and were included in this review. Figure 1 illustrates the literature review process.

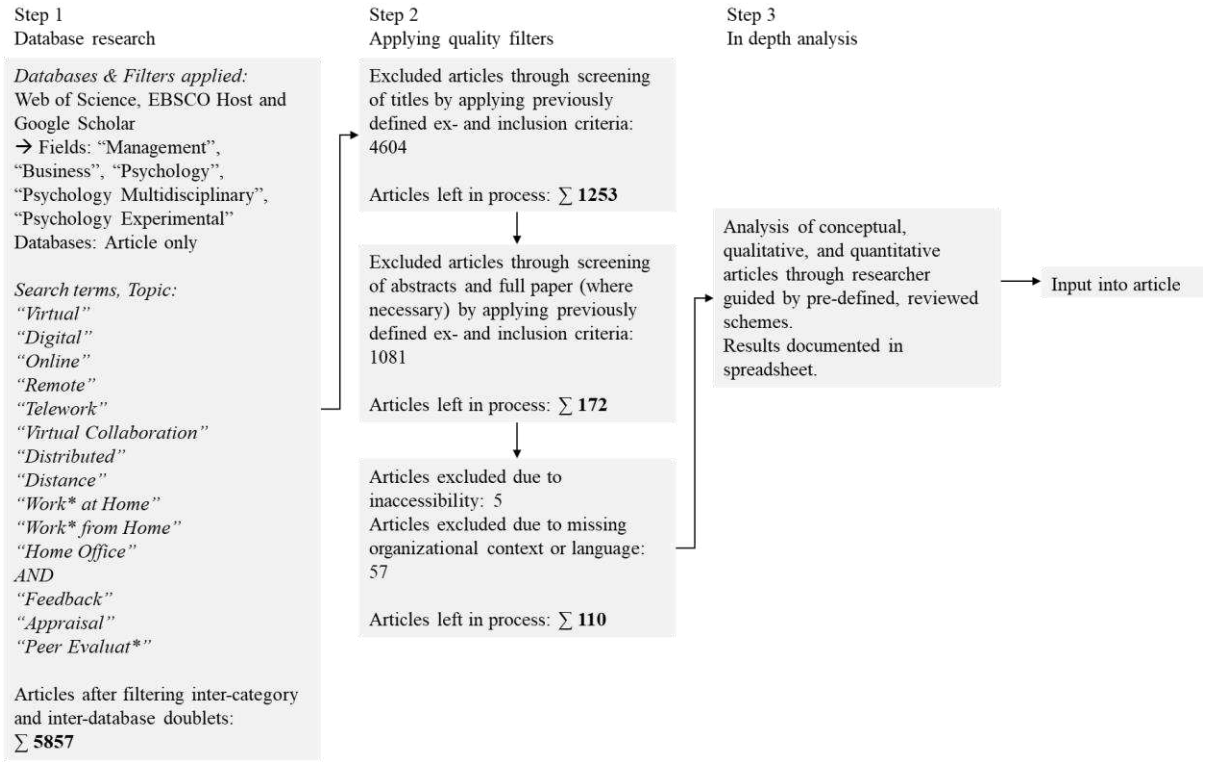



*Figure 1: Literature review process*

## 3. Results

A multitude of theoretical lenses and methodologies has been applied to research virtual feedback. In line with the SOR logic (see Mehrabian and Russel, 1974), the feedback process model demonstrates a sound basis by visualizing the stimulus of feedback, which influences the cognitive processes of a feedback recipient and, thus, determines the individual's response to feedback (Ilgen *et al*., 1979). By applying the model (Ilgen *et al*., 1979) to the virtual context,

we are able to organize and integrate the academic works on virtual feedback in organizations. Our conceptual framework, depicted in Figure 2, demonstrates the components of the feedback process model (Ilgen *et al*., 1979) that have been investigated in the academic works on virtual feedback.

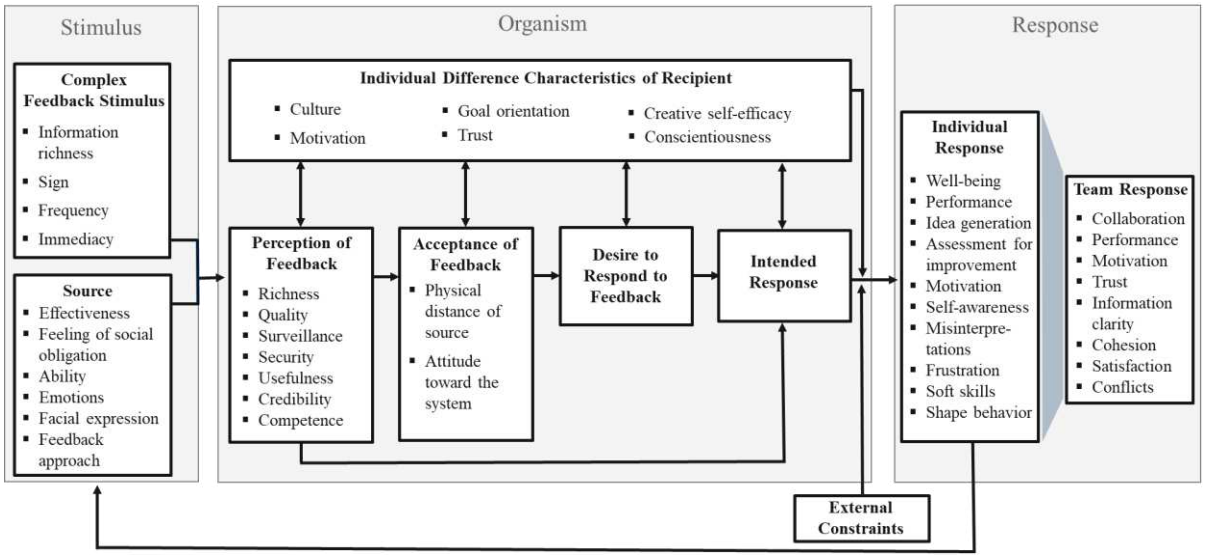



*Figure 2: Conceptual framework of virtual feedback investigated in the academic literature*

### *3.1 Stimulus*

#### *3.1.1 Effects of the Complex Feedback Stimulus: Virtual Feedback Sign*

In 15 out of 110 papers, researchers investigated feedback sign and mention that virtual feedback can be positive or negative (Kahai *et al*., 2012). On the one hand, literature on virtual feedback demonstrates that a positive feedback message has positive effects on building open mind (Sung and Mayer, 2012), cohesion, discussion satisfaction, task time, and group efficacy (Kahai and Cooper, 2003), identification with the team (Sivunen, 2006), and confidence in the abilities of the team (Schepers *et al*., 2011). On the other hand, Jaakson *et al*. (2019) demonstrate that a negative sign of the feedback message on team performance reduced the trust and trustworthiness of the team members. Additionally, researchers found that negative

feedback from team members led to distractions (Marler and Marett, 2013). Nevertheless, we must consider these results with caution, as early studies examined the direct effect of the complex feedback stimulus on response. Later studies have devoted their scientific investigation to the organism, addressing moderators and mediators to explain the mechanisms behind the complex feedback stimulus-response relationship.

A significant moderator in the literature, which influences the effect of feedback sign on response, is team members' trust (Vinagre and Corral Esteban, 2018). In their research, Vinagre and Corral Esteban (2018) argue that team members' trust moderates the effect of positive feedback on team collaboration, which increases when there is trust in teams. They observed that creating supportive social bonds and a positive emotional climate among individuals are crucial for collaboration and learning when communicating virtual feedback (Vinagre and Corral Esteban, 2018). Besides team trust, employees' creative efficacy and goal orientation moderate the relationship between negative feedback and creative tasks, and the relationship is stronger with employees characterized by high levels of both, creative self-efficacy and goal orientation (Wong *et al*., 2021). Wong *et al*. (2021) propose that employees with high levels of creative self-efficacy and goal orientation demonstrate increased effort in creative tasks.

In contrast to the above-demonstrated moderators, mediators explaining the effect of feedback sign on response are not widely researched in the literature yet. Of all mediators in the feedback process model (Ilgen *et al*., 1979), researchers investigated an individual's perception (Wong *et al*., 2021) and acceptance of virtual feedback (Wang *et al*., 2014). Nevertheless, researchers did not yet examine the model's mediators 'desire to respond' and 'intended response' in the context of virtual feedback.

Studies examining the perception of virtual feedback found that individuals perceived feedback as surveillance and, thus, reduced the creative performance of individuals with a low goal orientation (Wong *et al*., 2021). Further, Golden *et al*. (2009) demonstrate contradictory effects

because individuals view negatively framed feedback in a remote working environment as less credible than observed in-person.

The article by Hoyt *et al*. (2007) belongs to the two works in this field explaining an individual's acceptance of virtual feedback. The culture of the feedback recipient moderates this relationship because they found in their study that ethnic minorities, e.g., Latinos, are particularly sensitive to negative and positive feedback, which undermines their acceptance of the virtual feedback (Hoyt *et al*., 2007). However, the researchers did not measure an individual's acceptance of feedback but instead used it as an explanation when discussing the results of their study (Hoyt *et al*., 2007). Only Wang *et al*. (2014) conducted experimental work, measuring the effect of perceived feedback negativity on an individual's acceptance. The researchers found that perceived feedback negativity decreased the feedback acceptance level (Wang *et al*., 2014).

### *3.1.2 Effects of the Complex Feedback Stimulus: Frequency of Virtual Feedback*

Feedback frequency is a measure of regularity with which respondents receive feedback, e.g., from their coworkers and supervisors (Gerards *et al*., 2021). The literature analysis reveals that researchers investigated frequency of virtual feedback in 16 out of 110 papers. Findings demonstrate positive effects of weekly virtual feedback on performance (McLarnon *et al*., 2019; Geister *et al*., 2006) and virtual feedback at midterm (in the educational context, it is the middle of the semester) on teamwork skills (Andrade *et al*., 2020). In line with the previously demonstrated findings, a reduced feedback frequency in terms of slow feedback cycles reduces the amount of feedback and, thus, increases the likelihood of erroneous interpretations (Cramton, 2001) while decreasing the informal learning of team members (Gerards *et al*., 2021). Researchers found that an individual's level of motivation moderates the impact of

weekly feedback on satisfaction, motivation, and performance and that the effect is stronger for team members who were initially less motivated (Geister *et al*., 2006).

In sum, current studies primarily examine the direct effects of virtual feedback frequency on response. Researchers did not pay much attention to the underlying mechanisms regarding the effects of virtual feedback frequency on response, which limits our understanding.

### *3.1.3 Effects of the Complex Feedback Stimulus: Immediacy of Virtual Feedback*

Researchers investigated the complex feedback stimulus regarding immediacy, which refers to the time between an outcome and receiving outcome-related virtual feedback (Chen *et al*., 2020). Thus, immediate and delayed virtual feedback refers to whether the time to give feedback after an outcome is short or long (Chen *et al*., 2020).

Studies examining virtual feedback immediacy, for instance 16 out of 110 papers, found a direct complex feedback stimulus-response relationship and mediators explaining this relationship without addressing any moderator.

The lack of immediate virtual feedback in electronic communication results in task conflict (Kankanhalli *et al*., 2006) and increased frustration (Powers *et al*., 2011), whereas contemporaneously available virtual feedback leads to motivation gains (Hertel *et al*., 2008), productivity of employees (Shepherd *et al*., 1995) and virtual team success (Fan *et al*., 2014).

Interestingly, immediate feedback does not automatically lead to positive responses, as demonstrated by Chen *et al*. (2020). The researchers found that the receiver can perceive rapid feedback as negative if it provides only limited informational support because of its limited length (Chen *et al*., 2020). Especially in idea development contexts, it would be helpful if feedback providers took ample time to deliver more informational feedback (Chen *et al*., 2020).

### *3.1.4 Effects of the Complex Feedback Stimulus: Virtual Feedback Richness*

The direct effect of feedback richness on response and the organism addressing moderators and mediators to explain the mechanisms behind this relationship were rarely investigated because six out of 110 papers addressed virtual feedback richness.

In their quantitative study, Sardeshmukh *et al*. (2012) refer to Daft and Lengel (1986) for defining media richness – in their understanding, media differ in their capacities for transmitting immediate feedback, variety of cues, and linguistic diversity. Sardeshmukh *et al*. (2012) found a negative relationship between telework and communicating feedback due to a lack of richness of the communication media and separation from colleagues. Consequently, team members put significant effort into seeking information about essential tasks or resolving misunderstandings and conflicts when teleworking (Sardeshmukh *et al*., 2012).

Eisenberg *et al*. (2021) provide a more detailed explanation of information richness by referring to media that are rich in cues, such as video conferencing, which allows immediate verbal and nonverbal interactions. In contrast, media that involve fewer verbal and nonverbal interactions like written media, such as instant messages or email causes lean feedback (Eisenberg *et al*., 2021). Dennis and Kinney (1998) recommend using media that provides rich feedback if a quick decision-making process requires extensive feedback because it leads to enhanced performance.

By comparing the effects of employees' reactions when receiving feedback from an online performance appraisal system and a traditional approach (paper-and-pencil), researchers found that employees who received virtual feedback reported higher levels of rater accountability (Payne *et al*., 2009). Employee's perception of feedback mediates this relationship, and team members who received virtual feedback reported lower levels of quality for the feedback ratings than team members who received feedback with the traditional approach (paper-and-pencil)

(Payne *et al*., 2009). Further, employee's acceptance of feedback mediates the complex feedback stimulus-response relationship because employees' attitudes toward an online performance appraisal system, e.g., satisfaction, can determine employees' usage behavior of the feedback (Payne *et al*., 2009).

### *3.1.5 Effects of the Complex Feedback Stimulus: Virtual Feedback availability*

Researchers experimentally examined outcomes related to the availability of virtual feedback in teams, thus, that the manipulations allowed for either providing virtual or no feedback to the teams. These studies, in more detail 11 out of 110 papers, most prominently addressed the direct effects of the complex feedback stimulus on response, while they partially neglected moderating and mediating effects.

Researchers have found that teams receiving virtual feedback showed higher levels of actual reflection (Konradt *et al*., 2015) and reduced errors (Ouverson *et al*., 2021) than teams that did not receive virtual feedback.

In their experimental study, He *et al*. (2017) demonstrate that virtual feedback had contradictory effects on culturally diverse teams. Unlike the no-feedback condition, virtual feedback made cultural differences more apparent and encouraged employees to empathize with their team members (He *et al*., 2017). An individual's culture causes the same feedback to be perceived differently by team members (He *et al*., 2017). Whether virtual feedback mitigated perceptions of conflict for Canadian team members by establishing a feeling of commonality with their team members, virtual feedback did not reduce the perceptions of conflict for Japanese team members (He *et al*., 2017).

### *3.1.6 Effects of the Source*

In 12 out of 110 papers, literature on virtual feedback reveals the effects of the feedback source on response. Studies have devoted their scientific investigation primarily to the organism, addressing moderators and mediators for explaining the source-response relationship.

One of the few studies examining the direct effect of the source on response was conducted by Fan *et al*. (2014) examining the feedback approach. The researchers found a positive effect of direction-giving feedback on idea generation in teams when the source used a demanding feedback approach (Fan *et al*., 2014). Further, the findings demonstrate a positive effect of virtual feedback communicated with empathetic language in an encouraging feedback approach on the creativity performance of employees (Fan *et al*., 2014).

Studies concerning mediators and moderators show that emotions and facial expressions of the source are of particular importance in communicating feedback: Employees who received feedback from a source expressing anger were offended and responded by either questioning the source's credibility or making other excuses (Johnson and Connelly, 2014). Perception of feedback mediates this relationship as recipients perceive an angry feedback source as blaming others and, consequently, perceive the source as less competent than emotionally neutral feedback providers (Johnson and Connelly, 2014).

Nevertheless, the psychological closeness of the source and the recipient needs to be considered when addressing an employee's acceptance of feedback (Driskell *et al*., 2003). The researchers argue that psychological distance between the feedback source and the recipient might negatively impact the recipient's acceptance of the feedback (Driskell *et al*., 2003). Hence, an individual's acceptance of feedback might be lower when receiving virtual feedback in an alternative work arrangement from individuals perceived as distant from the direct social context – without empirically investigating this assumption (Driskell *et al*., 2003).

Further, the feedback channel moderates the relationship between the feedback source and the feedback sign. Feedback sources offered more negative feedback to team members when using email than traditional paper-form methods (Kurtzberg *et al*., 2005). The study authors attributed this effect to decreased social obligation in the email condition (Kurtzberg *et al*., 2005).

When examining the effect of the feedback source on response, researchers argue to consider a team's culture. Milliman *et al*. (2002) show that a team's culture moderates the relationship between a source providing constructive or critical feedback and the team's performance improvement. This relation is stronger when team members have an individualistic culture (compared to a collectivistic culture) (Milliman *et al*., 2002). In contrast, collectivistic cultures prioritize the development of harmony and loyalty among team members; consequently, direct and critical feedback is perceived as inappropriate because it jeopardizes group harmony (Milliman *et al*., 2002).

Since several moderators and mediators should come into consideration when communicating virtual feedback, Martínez-Moreno *et al*. (2015) propose creating guidelines for team leaders regarding providing feedback to team members.

### *3.2 Organism*

#### *3.2.1 Effects of Desire to Respond* as well as *Intended Response*

The variable desire to respond represents a feedback recipient's willingness to respond to the feedback (Ilgen *et al*., 1979). In effect, the desire to respond to the received feedback forms beliefs about the recipient's intended reaction, which is described as intended response (Ilgen *et al*., 1979). Surprisingly, and even after additional search efforts, our analysis of the academic works on virtual feedback highlights a notable absence of research efforts examining a

recipient's desire to respond to virtual feedback as well as a recipient's intention to respond to virtual feedback.

### *3.2.2 Effects of Individual Difference Characteristics of Recipient*

Researchers found moderating effects of a feedback recipient's characteristics on the stimulus-response relationship while not further considering the characteristics of the complex feedback stimulus.

Glikson *et al*. (2019) emphasize the need to address team composition, especially team members' conscientiousness, when providing virtual feedback. The researchers found that team members' conscientiousness moderates the effect of virtual feedback on team effort and team performance because this effect is more substantial in teams with a low proportion of highly conscientious individuals (Glikson *et al*., 2019).

Further, Van Kleef *et al*. (2009) demonstrate that the epistemic motivation of the employees moderates the relation of the feedback source and performance that this relation is stronger in teams with high epistemic motivation when the feedback source displayed anger. Contradictory, when the feedback source displayed happiness, the relation between the feedback source and performance is stronger in teams with low epistemic motivation (Van Kleef *et al*., 2009).

### *3.2.3 Effects of External Constraints*

External constraints demonstrate obstacles preventing an individual from what he or she wants to do (Ilgen *et al*., 1979). These limitations can stem from external factors, like a lack of equipment or insufficient staff support, as well as internal factors, such as restricted skills or abilities (Ilgen *et al*., 1979). The literature analysis on virtual feedback identified a lack of

articles examining the influence of an individual's external constraints on a recipient's response to virtual feedback.

### *3.3 Response*

#### *3.3.1 Individual Response*

Studies examined the direct effects of the stimulus on response which moderators and mediators did not yet explain. On the one hand, the literature reveals that virtual feedback leads to well-being (Mishima-Santos *et al*., 2021), enhances performance (Petrucci and Rivera, 2018), and improves idea generation and idea quality (Zhu *et al*., 2019). On the other hand, virtual feedback enables individuals to assess areas of improvement, e.g., leadership behavior (de Vries *et al*., 2004). To shape an individual's behavior, supervisors should provide virtual feedback to compare an individual's actual and desired outcomes and encourage the expected behavior (Biron *et al*., 2023; Petrucci and Rivera, 2018).

#### *3.3.2 Team Response*

Researchers mentioned that limited virtual feedback can cause conflicts in teams when ascribing the wrong meanings to instances of silence due to delayed feedback (Kankanhalli *et al*., 2006).

In response to conflicts related to virtual feedback, researchers found ways to mitigate these conflicts: Ayoko *et al*. (2012) argue that feedback-seeking behaviors help manage conflicts by increasing information clarity and ensuring that an individual's actions are not misinterpreted. In addition, a feedback-friendly culture reduces the challenges related to accurately interpreting virtual feedback (Baker *et al*., 2013). In an experimental study, Peñarroja *et al*. (2015)

emphasize that team trust mediates the effect of virtual feedback on improvements in group information elaboration and learning.

## 4. Developing a Research Agenda moving forward

We addressed the literature on virtual feedback by connecting 110 articles through the feedback process model (Ilgen *et al*., 1979). Our findings reveal that prior research has predominantly focused on the complex feedback stimulus itself, the source, how a recipient perceives the virtual feedback message, and the subsequent impacts on individuals and teams. This review highlights a surprising gap in research on virtual feedback, because other cognitive variables critical for feedback processing, including acceptance of feedback, desire to respond to feedback, and the intended response to feedback were marginally touched upon or largely overlooked. Further, the existing body of research on virtual feedback lacks investigating external constraints which might influence an individual's response. Areas for future research concerning virtual feedback are depicted in Figure 3.

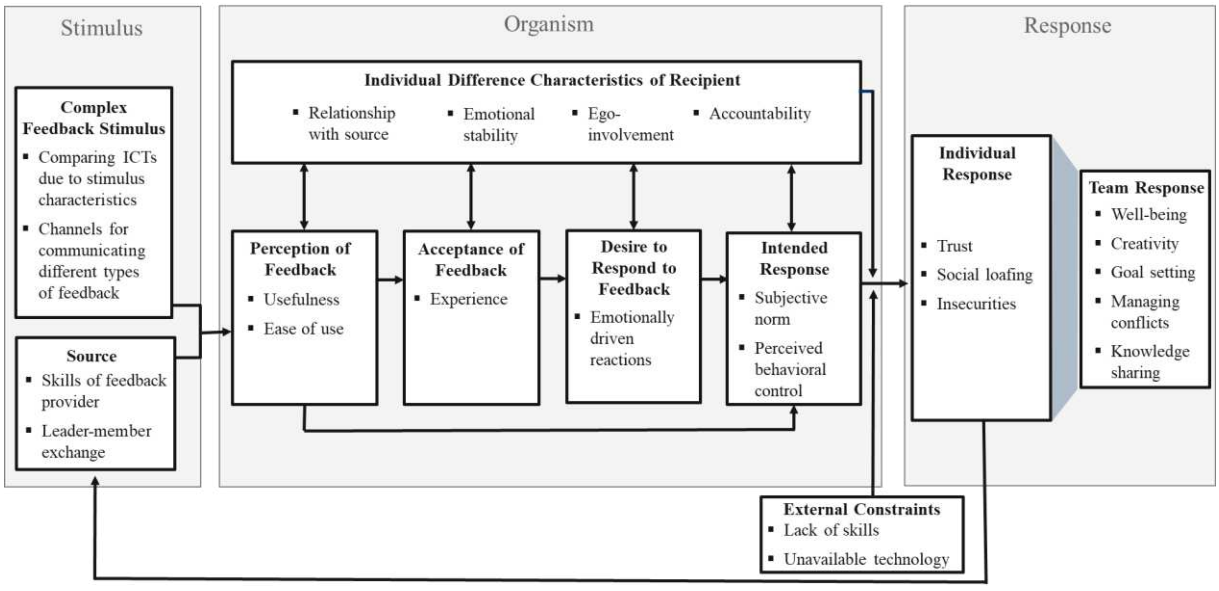



*Figure 3: Future fields of research for virtual feedback*

Researchers focusing on virtual feedback primarily examined the direct effects of the stimulus on response. However, it often remains unclear how and why a stimulus-response effect occurs, and thus, we strongly recommend paying more attention to the underlying mechanisms explaining this effect.

To explain the effect of the complex feedback stimulus on response, Hoyt *et al*. (2007) and Driskell *et al*. (2003) argue that acceptance of feedback serves as a variable for explaining this relation – without examining acceptance of feedback empirically. Gaining a more empirical understanding of acceptance of feedback seems to be of significance, especially in the virtual working context, as the recipient's acceptance of feedback might be lower when receiving virtual feedback from colleagues because of being perceived more remote and distant regarding the direct social context (Driskell *et al*., 2003).

Further, the Theory of Reasoned Action (Ajzen and Fishbein, 1980), especially its extension within the Technology Acceptance Model (Davis *et al.*, 1989), demonstrates theoretical perspectives we must consider to broaden our understanding of virtual feedback. As an individual's perceived usefulness and perceived ease of use of a particular system determine his or her behavioral intention (Davis *et al*., 1989), we expect that an individual's perceived usefulness and perceived ease of use of virtual feedback might influence the individual's willingness to use virtual feedback. We base our consideration on Anderson *et al.* (2016), as the researchers argue that the recipient must perceive feedback as beneficial to be effective now or in the future. Building on the abovementioned argumentation, we recommend examining an individual's past virtual feedback experiences, e.g., regarding the usefulness of the virtual feedback, on an individual's acceptance of virtual feedback.

Surprisingly, we identified the absence of studies exploring a recipient's desire to respond to the virtual feedback. As the mediating variables in the complex feedback stimulus-response relation seem to be rationally constructed, we consequently, strongly recommend involving any

individual's emotional state of mind and emotional reactions toward the received virtual feedback.

Our suggestion to shed more light on an individual's intended response is to consider whether subjective norms determine an individual's reaction to virtual feedback. According to the Theory of Planned Behavior, subjective norms directly influence an individual's behavioral intention by referring to the belief about whether most individuals approve or disapprove of a particular behavior (Ajzen, 1991). As individuals' actions might be less observable in a remote working context than in the conventional office environment, it is still open to scientific investigation whether and to what extent subjective norms influence an individual's intended response to virtual feedback.

When looking deeper at the complex feedback stimulus, scholars have investigated the effects of environmental stimuli, e.g., online performance appraisal system vs. traditional paper-and-pencil approach (see Payne *et al*., 2009) on the recipient's reactions to feedback. However, comparing the effects of virtual feedback through diverse ICTs on an individual's cognitive processing (e.g., acceptance) of virtual feedback remains unexplored. As some ICTs can be richer (e.g., metaverse, virtual reality, and videoconferences) in communication than others (e.g., email, chat) (see Eisenberg *et al*., 2021), it seems plausible to assume different effects of the complex feedback stimulus on the individual's processing of virtual feedback and reaction. Thus, we need more empirical investigations on the effect of virtual feedback through various ICTs on an individual's cognitive processing and response. Hence, research should address several questions: Which ICTs should organizations use to communicate positively or negatively framed virtual feedback, increasing its acceptance and use by the recipient? What are effective strategies regarding the timing and frequency for communicating feedback through various ICTs to maximize an individual's acceptance of feedback? Which type of feedback (e.g., performance, process, or developmental feedback) requires in-person or virtual

communication to increase acceptance? Such insights enable scholars and practitioners to identify the most appropriate communication channels for delivering diverse types of feedback. Future research will guide scholars and practitioners in choosing channels for communicating feedback, especially in hybrid settings with employees working partially geographically dispersed and partially from the conventional office environments.

While Breuer *et al*. (2020) mention that essential competencies for feedback providers include the ability to deliver positive and negative virtual feedback constructively and with a friendly and encouraging demeanor, empirical insights into specific skills are still missing in recent research. Especially when individuals are more remote from the immediate social setting, skills for providing feedback effectively might need to be adapted to the virtual context. Thus, we encourage researchers to examine whether and to what extent the feedback source's skills in the in-person context, e.g., showing empathic concern when delivering feedback and recognizing team members' emotional reactions as well as expressing understanding and care for team members' well-being when communicating feedback (Young *et al*., 2017; Saunders and Ahuja, 2006) can be transferrable to the virtual working context.

While a multitude of studies exists, we also urge for replicating studies in order to renewing their validity as technology has developed tremendously and users experiences have changed dramatically, not at least because of the pandemic (e.g., see Payne *et al*. (2009) examining employees' attitudes toward an online performance appraisal system).

## 5. Managerial Implications

Based on our literature review, we derive several implications for managing virtual feedback. First, we encourage supervisors as well as team members to strategically select ICTs that align with their specific communication needs and the nature of the virtual feedback. For example,

whenever the need for immediate feedback, teammates' direct reactions to comments, and high levels of group interaction exists, we recommend a rich communication channel to enable synchronous group interactions, e.g., video conferencing (Kayworth and Leidner, 2000). Opting for a rich communication channel facilitates real-time exchange of both verbal and nonverbal cues, including facial expressions, gestures, and tone of voice, thereby minimizing the potential for misinterpretations and fostering a greater acceptance of virtual feedback, which might lead to the desired outcomes of the feedback. In contrast, for asynchronous feedback that necessitates a limited need for real-time interaction between colleagues, we recommend choosing email as a communication technology (Kayworth and Leidner, 2000).

Second, we emphasize the importance of communicating virtual feedback consistently, timely, and concretely to both individuals and teams when working in a virtual working environment. This is of particular relevance in virtual collaboration, where staying informed about individual and collective progress towards goals is more challenging because of the lack of rich face-to-face interaction and given disconnectedness among colleagues (Hertel *et al*., 2005; Kayworth and Leidner, 2000). Establishing clear and defined guidelines for feedback frequency, meeting schedules, and agendas for discussion can offer a promising solution (Kayworth and Leidner, 2000).

Third, virtual feedback is essential to manage and foster the creative performance of individuals within an online collaborative environment (Wong *et al*., 2021). The absence of feedback might impede individuals' recognition of professional advancement opportunities, resulting in a subsequent decline in their motivation to express their creative potential (Wong *et al*., 2021). Wong *et al*. (2021) found that any virtual feedback (e.g., positive or negative) on performed tasks appears beneficial in an online collaborative environment. While Hoyt *et al*. (2007) show that negative feedback might lead to self-protective effects by the feedback recipient and, thus, might not be accepted, we recommend providing both positive and negative feedback virtually.

When managers constructively give feedback on a worker's poor performance, they foster a learning culture within an online collaborative environment (Wong *et al*., 2021). For this logic to be effective, we emphasize that the recipient must perceive negative virtual feedback as benefitting them immediately or on the long-term (Anderson *et al*., 2016).

Lastly, in culturally diverse organizational settings, the interpretation of computer-mediated feedback can vary significantly across national cultures (He *et al*., 2017). Thus, there should be a way for employees to express their subjective interpretation of that feedback to avoid intercultural conflicts due to misunderstandings. A handy example to mitigate intercultural conflicts is to ask employees to share their reactions to the virtual feedback and explain whether they were satisfied with it and how they plan to implement it.

## 6. Conclusion

A growing body of research has focused on virtual feedback throughout the last decades. Due to distortions in electronic communication, individuals might process virtual feedback differently than feedback communicated in-person. Our semi-systematic review of 110 articles on virtual feedback draws on the feedback process model proposed by Ilgen *et al*. (1979) to comprehensively analyze the identified literature. We provide an overview of how feedback recipients process the virtual feedback and thereby highlight the applicability of the feedback process model (Ilgen *et al*., 1979) in this contemporary context. We further contribute to the discussion by pointing out blind spots in current literature and proposing future research directions. We thereby set the stage to develop a more complete picture of virtual feedback that is needed to guide practitioners in building globally distributed workforces.

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Manuscript 3

# Is virtual feedback less effective than in-person feedback for improving team performance? An experimental study.

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Submitted to *Team Performance Management*

## Abstract

**Purpose** – While the world moves out of the COVID-19 pandemic, organizations around the world have introduced hybrid work by combining in-person and virtual interactions. Feedback is an essential means for individual and team success and, thus, supervisors now face the decision of whether to give feedback virtually or in-person. Nevertheless, virtual feedback might have a different influence on team performance than in-person feedback due to reduced nonverbal behavior in virtual communication. This work examines whether and to what extent the effect of feedback on improving team performance is equivalent when feedback is communicated virtually and in-person.

**Design/methodology/approach** – Using an experimental research study with a between subject-design, the author investigated the effect of virtual and in-person outcome feedback on performance improvement in student teams. The study was conducted with 117 participants resulting in 32 team-level observations working on a team project.

**Findings** – Findings of the experimental study demonstrate that performance improvement of teams that received in-person feedback and virtual feedback does not differ significantly.

**Originality/value** – This work contributes to the academic discussion in three ways. First, the experiment responds to calls of previous researchers comparing communication modalities and their effects on team performance when providing feedback. Second, the study contributes to recent research in the educational context by supporting blended-learning approaches for communicating, both, virtual feedback (via videoconferencing) and in-person feedback to students to improve team performance. Third, this work supports the digital transformation of organizations as well as working in hybrid workplaces for collaborating with team members and communicating feedback virtually and in-person.

**Keywords** Virtual feedback, Computer-mediated communication, Team collaboration, Team performance

**Paper type** Research manuscript

## Introduction

Ongoing advances in digitalization, especially notable events like the COVID-19 pandemic have rapidly advanced the adoption and utilization of a range of technologies, changing the ways in which individuals collaborate in both, organizational and educational institutions (Malhotra, 2021; Thai *et al*., 2017). When working under conditions of geographical and temporal dispersion and strongly relying on information and communication technologies (ICTs), virtual feedback, also known as computer-mediated or digital feedback, became a powerful vehicle for enhancing team collaboration (Karl *et al*., 2022), team learning (Peñarroja *et al*., 2015), and team performance (Konradt *et al*., 2015). In this vein, virtual feedback comprises the digital transmission of evaluative or corrective information regarding individual or team behavior, performance or processes to control future actions (Gabelica *et al*., 2012; Geister *et al*., 2006).

Researchers mention that organizations around the world have introduced hybrid work and, thus, employees remain working in alternative workplace arrangements to some extent even beyond the COVID-19 pandemic (Lal *et al*., 2023; Spitzmuller *et al*., 2023). In this vein, the academic debate is heating up by researchers, who argue, that "Technology dependence is mostly compared unfavorably with face-to-face interaction and is shown to have negative implications for […] giving and interpreting feedback" (Raghuram *et al*., 2019, p.13). Thus, the disembodied nature of online environments introduces several challenges related to interpreting and using virtual feedback (Cramton, 2001). As electronic communication is characterized by limited nonverbal cues, e.g., facial expressions, head nods, gestures, and intonation, the virtual feedback, which individuals receive is limited and might lead to different effects on team performance than in-person feedback (Daft and Lengel, 1986; Driskell *et al*., 2003; Weisband and Atwater, 1999). As a hybrid workplace combines traditional in-person interactions and virtual work (Spitzmuller *et al*., 2023), supervisors are now faced with the decision of whether

to give feedback in-person or virtually, which leads to the following research question: Whether and to what extent is the effect of feedback on improving team performance equivalent when feedback is communicated virtually and in-person?

Although virtual feedback has been widely addressed, the effect of virtual vs. in-person feedback on performance improvements of teams lacks comprehensive investigation and remains poorly understood in extant literature, which necessitates further scholarly attention. Thus, Brown *et al*. (2019) state that "Scholars could look at reactions related to the provision of PM[Performance Management] feedback online or through email versus physical face-to-face formats." (p.67). Referring to Brown *et al*. (2019), the necessity to examine "the extent to which current findings from traditional work environments hold true in these new work contexts" (p.67) becomes obvious.

Accordingly, this study delves into a previously unexplored area and contributes to a deeper understanding regarding the effects of outcome feedback on performance improvement of teams when communicating feedback in-person and virtually by using computer-mediated communication. I close this gap with this research project, set in actual classes implementing a rigorous experimental setting with a between-subjects design.

This work makes several contributions regarding the educational context and management practices and, thus, enriches the current discussion in at least three ways. First, as previous researchers mentioned that feedback might not function the same when being communicated virtually and in-person (Johnson and Connelly, 2014), surprisingly, this experimental study found that performance improvement of teams that received in-person feedback and virtual feedback (via videoconferencing) did not differ significantly. Thus, this work responds to calls of previous researchers comparing communication modalities and their effects on team performance when providing feedback. Second, this experiment hereby helps to extend recent

research in the educational context by supporting blended-learning approaches for communicating, both, virtual feedback (via videoconferencing) and in-person feedback to students to improve team performance. Third, as organizations continuously adapt their management practices to the new work conditions (Malhotra, 2021), this work can be transferred to the organizational context by supporting face-to-face and virtual collaboration among employees as no significant difference in performance improvement of teams exists when receiving virtual feedback via videoconferencing and in-person feedback.

## Literature Review

### *Distinguishing between different types of feedback and modalities for communicating virtually*

Virtual feedback is transmitted by ICTs, e.g., email, instant messages and video conferencing, and its impact on individual and team behavior has been extensively explored since 1986 (Eisenberg *et al*., 2021; Hertel *et al*., 2005). Accordingly, feedback sources can communicate feedback on an individual and team level: When being provided on an individual level, feedback addresses specific employees, whereas feedback is available to all team members when being communicated on a team level (Barr and Conlon, 1994). In their investigations, researchers also distinguish between different types of virtual feedback in teams, namely outcome feedback and process feedback (Glikson *et al*., 2019; Peñarroja *et al*., 2017). While outcome feedback provides details about whether an individual's or team's efforts have met predetermined goals, e.g., performance, process feedback refers to information concerning "how" an individual or a team is accomplishing a task and, thus, provides insights into group processes, e.g., team effectiveness (Peñarroja *et al*., 2017).

Researchers not only distinguish between different levels and types of feedback, but also the communication medium to provide feedback virtually (Kankanhalli *et al*., 2006). Thus, ICTs

in form of videoconferencing and teleconferencing belong to virtual tools with high media synchronicity and information richness, allowing for immediate feedback and transmission of information, e.g., gestures, facial expressions, and tone of voice (Eisenberg *et al*., 2021; Weisband and Atwater, 1999). In contrast, ICTs like email and informational databases are characterized by low media synchronicity and information richness, which tend to delay feedback and reduce the overall volume of information sharing (Kankanhalli *et al*., 2006; Mesmer-Magnus *et al*., 2011).

*Demonstrating diverse effects of virtual and in-person feedback on team performance*

In their historical review and meta-analysis, Kluger and DeNisi (1996) demonstrate contradictory effects of in-person feedback on performance improvements. Although feedback improved performance on average, the researchers found, that under certain conditions, feedback has no effect on performance improvements or even weakens performance (Kluger and DeNisi, 1996). For instance, feedback on a task has no effect on an individual's performance improvement if the goals of a given task are not provided or if the informational value of feedback is redundant with an individual's preexisting knowledge (Kluger and DeNisi, 1996).

Researchers demonstrate that performance improvements of teams stimulated by virtual feedback also led to partially contradicting results (Johnson and Connelly, 2014; Tavoletti *et al*., 2019). Whereas there is substantial positive support that virtual feedback via mobile real-time feedback apps and email results in performance improvements of team members (Johnson and Connelly, 2014), virtual feedback communicated by a peer evaluation system did not improve performance of team members (Tavoletti *et al*., 2019). Further, researchers found that virtual feedback can hinder creative performance in a virtual work setting, because employees

perceived virtual feedback as surveillance, which hurt the creative performance of employees (Wong *et al*., 2021).

Regarding the above-mentioned differential effects of feedback, researchers reveal that both, the content and timing of the virtual feedback message have a crucial importance, because virtual feedback should be frequent and concrete to increase trust, satisfaction, performance, and to prevent motivation losses in teams (Hertel *et al.*, 2005). This is supported by McLarnon *et al*. (2019) because they found a positive effect of communication frequency on performance in teams when team members provided and received weekly virtual feedback.

Whereas feedback frequency represents a measure of consistency with which employees receive feedback, e.g., from their supervisor or co-workers (Gerards *et al*., 2021), academic investigations encompass the effects of immediacy of the feedback message on performance. When using communication technology that provide immediate virtual feedback – the time between an outcome and providing outcome-related feedback – researchers found a positive relation of virtual feedback and performance (Raghuram *et al*., 2019).

Whether feedback is communicated virtually or in-person researchers emphasize the importance of the feedback recipient's cognitive state as a determinant of behavior because an individual's acceptance of feedback plays a crucial role to increase performance (Phielix *et al*., 2010; Pichler *et al*., 2020).

## Theoretical model

The feedback process model (Ilgen *et al*., 1979) serves as a foundation to explain an individual's reaction to feedback and, thus, the model demonstrates a basis for subsequent research on feedback and its multifaceted effects (Wang *et al*., 2014). Ilgen *et al*.'s (1979) feedback process model comprises factors referring to the elements involved in the transmission of feedback,

namely the *stimulus*, the *response* to the feedback and the underlying *cognitive processes* of individuals (e.g., how a recipient perceives and accepts the feedback) that explain an individual's reaction to the received feedback (Ilgen *et al*., 1979). Whereas perception of feedback relates to how the recipient experiences the feedback from a feedback source, e.g., supervisor and colleagues, acceptance of feedback concerns the belief of the recipient that the feedback accurately portrays his or her behavior (Ilgen *et al*., 1979).

As this theoretical model provides a solid foundation for examining virtual feedback (Wang *et al*., 2014), I adapted the feedback process model to achieve the study's goals (Ilgen *et al*., 1979). For investigating the effects of outcome feedback on performance improvement of teams, I consider the variables *stimulus* and *response* of the feedback process model (Ilgen *et al*., 1979) as team-level variables. Figure 1 presents the proposed research model for examining the effect of virtual feedback (via videoconferencing) and in-person feedback (*stimulus*) on performance improvement of teams (*response*).

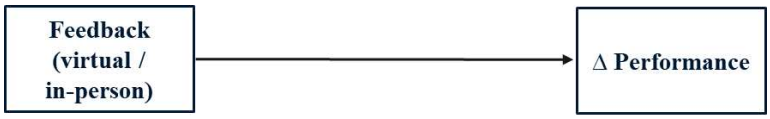



Figure 1: Proposed research model

Researchers show empirical support for the positive effect of virtual feedback and in-person feedback on individual and team performance (Geister *et al*., 2006; DeShon *et al*., 2004). Nevertheless, the utilization of ICTs is essential to ensure communication and collaboration among colleagues when working in geographically dispersed teams or across different time zones (Handke *et al*., 2020). As face-to-face interactions are shifted to the computer-mediated environment, electronic communication among employees might be more difficult than in-person conversations, e.g., by an absence of nonverbal information like gestures, facial

expressions, and tone of voice (Kayworth and Leidner, 2000). Thus, body language is perceived differently by employees when communicating in a computer-mediated environment, which might lead to strongly reduced emotionality in conversations (Ayoko *et al*., 2012). The lack of emotionality impedes the development of teams because team members could misunderstand the received feedback (Golden *et al*., 2009).

This might pose major obstacles when providing outcome feedback via ICTs to improve team performance, because the feedback might indicate the team's inadequate performance (Wang *et al*., 2014). In contrast to in-person conversations, feedback providers in a computer-mediated environment cannot use diverse facial expressions and body language to soften the feedback's negativity (Kluger and DeNisi, 1996). Consequently, the recipients might be reluctant to accept the received feedback, which is perceived negatively, and behave defensively, because e.g., the received feedback might be a threat to their aspired self-image (Wang *et al*., 2014).

Further, Driskell *et al*. (2003) argue that teams using computer-mediated communication might experience reduced decision-making effectiveness and, thus, they need more time to reach decisions compared to in-person conversations (Driskell *et al*., 2003). As computer-mediated communication along with the absence of nonverbal cues might negatively influence message-understanding, lead to misinterpretations and, thus, impede performance improvement in teams (Weisband and Atwater, 1999), I predict the following:

Hypothesis 1: Performance improvement of teams that received virtual feedback is lower than performance improvement of teams that received in-person feedback.

## Method

### *Participants*

I recruited 117 students from the Catholic University of Eichstätt-Ingolstadt, Germany, to participate in the experiment voluntarily. Participants had an average age of 24.2 years and were 54% female and 46% male. Participants were demographically distributed 92.3% German and 7.7% other nationalities like Bolivian, Czech, French, Ghana, Italian, and Turkish. Participants were graduate students and they were pursuing a degree in Business Administration and Business and Psychology. Students provided permission for their data to be used for research purposes. The study was approved by the Ethics Committee of the Catholic University of Eichstätt-Ingolstadt.

### *Experimental design and experimental manipulation*

I conducted an experimental research study with a between-subjects design to test the effects of virtual and in-person feedback on performance improvement of teams. The aim was to examine whether and to what extent virtual feedback is less effective than in-person feedback for improving team performance.

The experiment was conducted in four courses for graduate students at the Catholic University of Eichstätt-Ingolstadt, Germany, from October 2021 to February 2023. The sample size for this experiment composed 32 team-level observations with three to four members per team. The number of members per team in this study is theoretically based on Kozlowski and Bell's (2003) foundation for defining a "work team", which should compose of two or more individuals. Participants worked in teams to solve a case study and presented their results in a mid-term and in a final presentation. After each presentation, the teams received in-person feedback in terms of a face-to-face conversation or virtual feedback via videoconferencing in a

Zoom meeting. The duration of the teams to work on the case study in the four courses was on average 2.5 months.

Due to the between-subjects design, I randomly assigned participants to a group receiving in-person feedback or receiving virtual feedback. For the purpose of this study, only the following data was analyzed from the overall data set: At the milestone "Kick-off", the teams received the case study and started to work for four weeks on the case study. One day after the milestone "Submission of mid-term presentation", the teams presented their mid-term presentation to the lecturers who evaluated the performance per team at the milestone "Mid-term presentation". Three work days after the mid-term presentation, each team received feedback on its mid-term presentation at the milestone "Feedback t1". Teams in the treatment group were provided with virtual feedback, and the control group got in-person feedback. Out of the 32 teams, 17 teams received virtual feedback and 15 teams received in-person feedback. For providing feedback to the teams, a blind-to-treatment process was applied. Due to Wright *et al*. (2012), a blind-to-treatment approach serves as a crucial method for mitigating bias in randomized controlled samples. This way, the two lecturers who evaluated the teams' performance were unaware of the manipulated variable (kind of feedback). Without suspecting what teams will receive in-person feedback and virtual feedback, the two lecturers handed over the feedback to the third lecturer who provided the feedback to each team separately. In effect, the risk of manipulating the outcome variable (performance improvement) was eliminated. Further, each team received the virtual feedback or in-person feedback from the same feedback provider.

After receiving the feedback on their mid-term presentation, teams worked for four weeks on the case study. One day after the milestone "Submission of final presentation", teams presented their final presentation to the lecturers, who evaluated the performance per team and handed over the feedback to the third lecturer. Three work days after the final presentation, teams received feedback on their final presentation at the milestone "Feedback t2" by applying a

blind-to-treatment process. The procedure of the experiment is depicted in Figure 2.

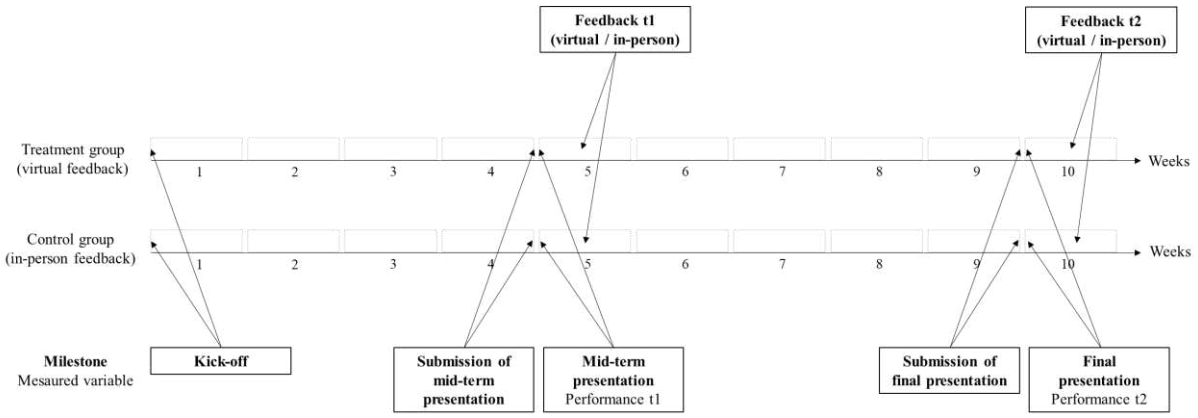



Figure 2: Visualization of the research process

*Measures*

Team performance was operationalized by course grades on a 100-point scale (El Said, 2021). Course grades were measured with an evaluation sheet developed by the Chair of Organizational Theory and HRM at the Catholic University of Eichstätt-Ingolstadt, Germany, that is used for grading team projects in the courses. The performance dimensions included in the evaluation sheet comprise the dimensions *structure of the presentation* and *logic of argumentation*, *quality of the content* and *depth of argumentation*, *manner of presentation*, *rhetoric and presentation style*, *commitment* and *creativity* as well as *reaction to queries*. The necessity of operationalizing the course grades on a 100-point scale lies in enabling an exact calculation of the teams' performance improvement between the mid-term and final presentation as well as identifying any differences in performance improvement between the groups (El Said, 2021).

*Level of analysis*

As the study aims to examine the influence of outcome feedback on performance improvement of teams, both variables are team-level variables. First, outcome feedback was communicated either in-person in a face-to-face conversation or virtually via videoconferencing in a Zoom meeting to the whole team. Second, performance improvement of the teams was measured on a team level because the overall performance of the team was assessed during their mid-term presentation and final presentation.

## Results

The research question of this study is whether and to what extent virtual feedback is less effective than in-person feedback for improving team performance. First, a Wilcoxon test was conducted to examine total performance improvement of teams between the mid-term and final presentation. When comparing the mean values of total performance in t1 and t2, total performance of the teams improved by 5.31 points (see Figure 3), which demonstrates a significant performance increase of teams between the mid-term presentation and final presentation (p=.002).

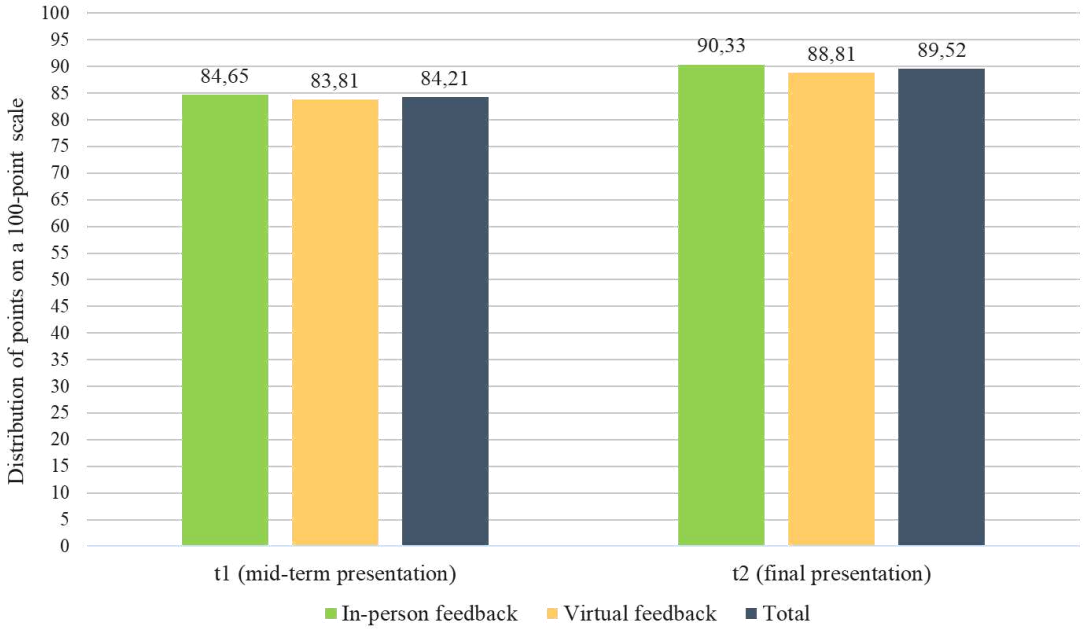



Figure 3: Mean values for team performance of the treatment group, control group and total at the mid-term presentation and final presentation

An examination of between-subject results demonstrates that there is no statistically significant difference between the treatment group and control group on performance improvement in teams [F=.054; p > 0.05]. Looking at the means, shown in Table I, the treatment group that received virtual feedback via videoconferencing in a Zoom meeting increased team performance by 5.00 points. The control group that received in-person feedback in a face-to-face conversation improved team performance by 5.67 points.

| Dependent measure | Experimental group | Mean | SD | N | F | p |
|---|---|---|---|---|---|---|
| Performance improvement | Control | 5.67 | 9.040 | 15 | | |
| | Treatment | 5.00 | 7.289 | 17 | | |
| | Total | 5.31 | 8.027 | 32 | .054 | .818 |

Table I: Analysis of dependent measure by group

## Discussion

This work investigates the impact of outcome feedback on performance improvement of teams, comparing communication modalities, both virtual through computer-mediated communication and in-person. I therefore conducted an experimental study with a between-subjects design in courses for graduate students at the Catholic University of Eichstätt-Ingolstadt, Germany with 117 participants resulting in 32 team-level observations. As total performance of the teams improved significantly (p=.002) between the mid-term presentation and final presentation, this study supports previous findings of Geister *et al*. (2006) and DeShon *et al*. (2004) that feedback has a positive effect on performance in teams. Contrary to my expectations and previous researchers' suggestions that team performance might vary between virtual feedback and in-person feedback (see Johnson and Connelly, 2014), this experimental study reveals no significant differences in performance improvement between teams receiving virtual feedback (via videoconferencing) or in-person (p=.818). Surprisingly, reduced nonverbal behaviors in electronic communication like gestures, facial expressions, and tone of voice (Weisband and Atwater, 1999) did not affect performance improvements of teams negatively when receiving virtual feedback via videoconferencing.

In response to Eisenberg *et al*. (2021) as well as Weisband and Atwater (1999), media synchronicity and information richness need to be addressed when examining effects of virtual feedback. As videoconferencing (e.g., via Zoom) is characterized by high media synchronicity and information richness, allowing for immediate feedback (Eisenberg *et al*., 2021), the transmission of facial expressions, gestures, head nods, and intonation in virtual feedback might lead to less misunderstandings and conflicts than feedback communicated with asynchronous and less rich virtual tools, e.g. email. When providing virtual feedback via email, which tends to delay feedback and reduce the overall volume of information exchanged (Mesmer-Magnus *et al*., 2011), it might increase misinterpretation of information and conflicts, leading to less

performance improvement of teams than feedback communicated in-person or with ICTs characterized by high media synchronicity and information richness, e.g., videoconferencing.

Regarding the feedback message, the feedback provider communicated both, positive and negative information to the treatment and control group. In contrast to previous researchers' findings that individuals might behave defensively to the received negative feedback when misunderstood (Wang *et al*., 2014), this study found no significant differences of performance improvement between the treatment group and the control group. Due to Breuer *et al*. (2020), feedback providers should be skilled to deliver positive as well as negative virtual feedback in a way that is constructive and friendly.

Regarding the feedback source in this study, there might be a distinction between the educational and organizational context. Whereas students received feedback from the same lecturer in the educational context, several more feedback sources might exist in organizations, e.g., colleagues, supervisor, and customers (Alvero *et al.*, 2001; Ilgen *et al*., 1979).

*Implications for theory and practice*

As virtual feedback does not result in a significantly lower performance improvement of teams than in-person feedback, the experimental study is of great interest for scholars and practitioners in the educational as well as in the management context. This work contributes to the academic debate by responding to previous researchers' recommendations to "look at reactions related to the provision of PM[Performance Management] feedback online or through email versus physical face-to-face formats." (Brown *et al*. 2019, p.67). Thus, the experiment fills this gap by investigating the effects of outcome feedback on performance improvement of teams when communicating feedback in-person and virtually by using computer-mediated communication. In contrast to previous researchers assumptions that online environments demonstrate several

challenges related to interpreting and using virtual feedback compared to in-person conversations (Driskell *et al*., 2003), this study enriches the academic discussion by demonstrating that performance improvements of teams are possible when communicating feedback in-person and virtually.

In the educational context, this work encourages blended-learning approaches for communicating both, virtual feedback via videoconferencing and in-person feedback to students to improve team performance. The findings highlight the importance of focusing on underlying pedagogical approaches to establish an adequate learning environment for students and their individual needs, e.g., blended learning (e.g., see Peimani and Kamalipour, 2022; Varma and Jafri, 2020). Further, this study provides a basis for reflecting and revising traditional (in-person) classroom settings to adapt to the ongoing digitalization in the educational context, e.g., digital classrooms (Kong, 2014).

Given the necessity for organizations to adapt their management practices to changing work conditions, e.g., due to ongoing advances in digital technologies (Malhotra, 2021; Lal et al., 2023), the results can be transferred to the organizational context. This study supports face-to-face and virtual collaboration among employees because performance improvement of teams that received virtual feedback or in-person feedback does not differ significantly. As previous researchers found that alternative workplace arrangements provide advantages to, e.g., employees' work-life balance (Felstead and Henseke, 2017) and job satisfaction (Nakrošienė *et al*., 2019), this study supports hybrid workplaces which enable employees working remotely and collaborating in person in the conventional office environments.

*Limitations and future fields of research*

Regarding the research limitations, I acknowledge that the information communication technology for providing feedback virtually in this study was videoconferencing, which

demonstrates only one facet for virtual communication. As ICTs comprise also, e.g., email, messenger, and teleconferencing which are characterized by varying media synchronicity and information richness (Eisenberg *et al*., 2021; Mesmer-Magnus *et al*., 2011), I strongly encourage future research examining the effect of virtual feedback through diverse ICTs on team performance and performance improvements of teams. This would provide valuable insights into the effectiveness of feedback on improving team performance when comparing the communication modalities, e.g., in-person feedback and various ICTs, e.g., email, chat, and videoconferencing. In effect, this would enrich the academic debate with recommendations for choosing adequate ICTs for communicating feedback in teams to achieve desired effects in terms of performance improvements.

Due to the fact, that this experimental study was conducted in four courses for graduate students at the Catholic University of Eichstätt-Ingolstadt, Germany, the transferability of the findings to the organizational setting is limited. Since teams in an organizational context might be more diverse regarding demographic factors, e.g., age and non-demographic factors, e.g., educational and functional background (Mannix and Neale, 2005), future studies should explore whether the findings of this experimental study work with teams in organizational settings as it did with graduate student participants. One area ripe for future research is further exploring potential factors moderating the relation of feedback on performance improvement of teams because previous researchers argue that team members' trust moderates the effect of feedback on team collaboration (Vinagre and Corral Esteban, 2018), which might have an impact on performance improvement in teams.

Lastly, it is important to note the small and relatively homogeneous sample of this study, which comprises 32 team level observations. Further, I am aware of the slightly unequal distribution in the size of the treatment and control group in this study. Out of the 32 teams, the treatment group comprises 17 team observations and the control group comprises 15 team observations.

The reason for this is that the provision of feedback to one team had to be switched to the virtual format due to a coronavirus infection of team members. Regarding the sample size of 32 team level observations, the power calculated at a < 0.05 is 0.87, which is above the 0.80 recommended power value (see Serdar *et al*., 2021) and thus, reduces the potential limitation. As the statistically significant result (total performance improvement of teams between the mid-term and final presentation) is reducing the concern of sample size, I strongly recommend that future research should comprise a broader sample diversity regarding, e.g., academic and cultural backgrounds. This would enrich the academic discussion regarding the effects of feedback on performance improvements of teams in various educational contexts, e.g., courses for undergraduate students and global education.

## Conclusion

Although digitalization and its challenges are often a matter of debate, the discussion of whether employees should return to the conventional office environment or keep working in alternative workplace arrangements, e.g., home office is heating up (Lal *et al*., 2023; Spitzmuller *et al*., 2023). This study contributes to this debate by investigating the extent to which virtual feedback is less effective than in-person feedback for improving team performance. Surprisingly, this experimental study reveals no significant differences in performance improvements of teams receiving virtual feedback (via videoconferencing) or in-person feedback.

This work enriches the current discussion in at least three ways. First, as previous researchers mentioned that feedback might not function the same when being communicated in-person and virtually due to reduced nonverbal behaviors in electronic communication (Johnson and Connelly, 2014), surprisingly, this experimental study found that performance improvement of teams that received in-person feedback and virtual feedback (via videoconferencing) does not

differ significantly. Thus, this work responds to calls of previous researchers to compare communication modalities and their effects on team performance when providing feedback (Brown *et al*., 2019). Second, this experiment hereby helps to extend recent research in the educational context by supporting blended-learning approaches for communicating, both, virtual feedback (via videoconferencing) and in-person feedback to students to improve team performance. Third, this work supports the digital transformation of organizations as well as working in hybrid workplaces for collaborating with team members virtually and in-person.

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