

7. A blended social interaction and learning framework for the use of digital tools in co-production

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INTRODUCTION

Exploring the role of digital technologies in co-production, Lember (2018) observes that technology plays a central role in providing the potential to increase the participation of citizens and the effectiveness of service delivery, and to change or enable new forms of co-production. Yet it also creates a risk of replacing human-centric processes and diminishing the potential for co-production. In this chapter, we build upon this work by exploring how digital tools can enhance collaborative processes involving digital social interaction and the challenges that can be encountered through a discussion of two case studies.

The digital transformation of society, where digital technology imposes social change, can be considered as a wave of humanity's socioeconomic evolution (Hilbert, 2020). It influences visions and policies on a political level as well as on the individual level of citizens' everyday lives (Habibipour et al., 2021). According to the Organisation for Economic Cooperation and Development (OECD, 2019, p. 18), 'digital transformation' refers to 'the economic and societal effects' of 'the conversion of analogue data and processes into a machine-readable format' (i.e. digitisation) and 'the use of digital technologies and data as well as interconnection that results in new or changes to existing activities' (i.e. digitalisation). The entry of information and communication technology into people's everyday lives has created new opportunities for social interaction. In light of this, Meijer (2012) called for a reassessment of the need for opportunities for and forms of co-production.

Moon (2018) revisited the concept of co-production in the context of being web-based and crowdsourcing of public services, identifying four types of web-based co-production. These include crowdsourcing co-design (type 1), crowdsourcing design and government delivery (type 2), government design

and crowdsourcing delivery (type 3), and government and citizens co-delivery (type 4). The first two types are government-led, such as web-based systems for citizen participation in public services (type 1) or citizens offering input to inform service delivery (type 2). The third is citizen-led, where citizens or non-governmental actors generate public services with governments being involved in planning and design. The fourth type of web-based co-production is undertaken together, with citizens and governments forming a collaborative structure to produce public services. Moon (2018) argued that while web-based co-production was often limited to e-consultation, web-based co-production would continue with an increasing demand for crowdsourcing delivery and co-delivery (types 3 and 4) rather than crowdsourcing design and co-design (types 1 and 2).

Perikangas and Tuurnas (2023) identified the importance of preparation as well as good facilitation of the process, the careful design of which can mitigate challenges in relation to digital co-production, such as the need to sustain and increase inclusion. Kjellström (2021) highlighted the opportunities of digital collaboration for improved accessibility and, subsequently, attendance. These included designing shorter yet more frequent interactions over a longer period and opportunities for pre-recorded video content to prioritise live meetings for interaction.

However, Allam et al. (2021) reported that effective ‘virtual co-production’ requires more time, resources, facilitation and planning than face-to-face co-production. They highlighted the risk of ‘digital fatigue’ and cautioned those who may view digital co-production as a cheap or quick alternative. Allam et al. (2021) also argued for accessible yet offline ways of working, such as phone calls or sharing documents by post. Rather than a replacement for face-to-face interaction, Meijer (2012) argued that the new kinds of connections as a result of digital technologies, such as social media, have their benefits, which cannot be easily re-created in a physical, offline setting.

This chapter explores the use of digital tools for co-production by first presenting a framework to understand blended social interaction and learning, and then presenting two case studies: one in a digital learning context (education) and the second in a blended interaction context (research). We move on to discuss the use of digital tools in facilitating blended co-production, concluding with lessons learned to inform future research and practice.

A FRAMEWORK FOR UNDERSTANDING SOCIAL INTERACTION AND LEARNING IN A BLENDED CONTEXT

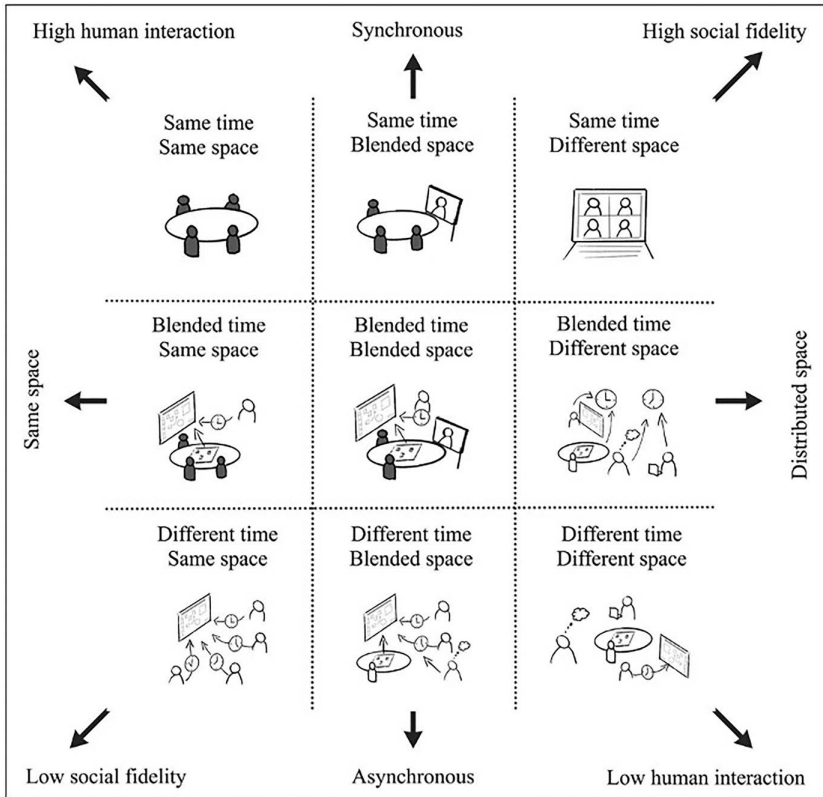
Rather than a specific technique to apply in a particular way, co-production has been described as a ‘journey of learning’ (Langley et al., 2022, p. 112). The

challenges of blended learning (Bonk & Graham, 2006) align with the challenges of digital co-production, which is to create an interactive context with appropriate levels of social presence (Keller & Hrastinski, 2009). Learning requires interaction and collaboration. Collaborative learning involves experiencing shared challenges through knowledge creation and trusting relationships (Lubicz-Nawrocka & Owen, 2022).

The four dimensions of interaction in face-to-face and distributed learning environments (Graham, 2006) provide a useful framework to describe how authentic social interaction can be achieved within a digital context. These refer to four continuums, including space (live/virtual), time (synchronous/asynchronous), humanness (high human/high machine) and fidelity (high/low). Fidelity can be considered in relation to how accurately digital environments replicate physical, psychological, functional or social elements (Lowell & Tagare, 2023).

Traditionally, interaction within both co-production and collaborative learning tends to occur synchronously (time) and face-to-face (space), though this is not always the case, and there are opportunities for blended approaches. For example, Davis et al. (2021) visualise face-to-face, distributed/virtual and asynchronous interaction as both distinct approaches and on a continuum. Further, they present a spatiotemporal framework with an intersection between space and time with four quadrants: same time–same space, same time–different space, different time–same space, and different time–different space.

Combining elements from Graham's (2006) blended learning framework and Davis et al.'s (2021) spatiotemporal quadrants framework, we can visualise a blended social interaction and learning framework (Figure 7.1) with 'space' on the X-axis and 'time' on the Y-axis, 'human interaction' on the negative diagonal and 'social fidelity' on the positive diagonal. Incorporating a 'blended approach' allows us to convey that some people may be interacting by using digital tools while others are interacting in person. Further, some people may interact synchronously, and others may interact asynchronously. In this adapted framework, 'human interaction' refers to the perceived degree of real-world social interaction with people. 'Social fidelity' refers to the degree to which digital tools or virtual environments are perceived to replicate or accurately depict real-world social interaction (Sinatra et al., 2021). This provides a useful framework for explaining social interaction and learning within a blended process, which includes varying degrees of face-to-face and digital co-production. This framework will be used to explain and reflect on the dialogic and reflective processes undertaken and the digital tools used in the two case studies.



Source: Adapted from Graham (2006) and Davis et al. (2021).

Figure 7.1 Blended social interaction and learning framework

LEARNING AND COLLABORATION IN DIGITAL ENVIRONMENTS

The question for both blended learning and digital co-production is how to achieve sufficiently rich, fruitful social interaction to develop trusting relationships within a digital context. We explore this through the description of two cases to illustrate how digital social interaction can take shape in different forms and to exemplify both the opportunities and challenges of using digital tools in co-production. Aligning with Lember, Brandsen and Tönurist’s (2019) definition, the first case study of digital co-production is an example where

students and patients actively engage in the design and delivery of their services (education) through a digital education platform provided by the service organisation (university). The second case study is an example of citizens with a shared interest in co-production coming together to explore solutions to challenges in undertaking co-production in practice. This was part of a participatory research initiative exploring mechanisms for co-production in health and research (Kjellström et al., 2019)

Before we proceed, we note that the terms ‘blended learning’ and ‘hybrid learning’ have, like the terms ‘co-production’ and ‘co-creation’, been subject to much confusion. For example, the terms ‘blended’ and ‘hybrid’ have been considered interchangeable (Graham & Dziuban, 2008). Blended learning combines ‘face-to-face’ with ‘computer-mediated’ instruction (Bonk & Graham, 2006). More recent definitions refer to blended learning as ‘a mix of theories, methods and technologies to optimise learning in a given context’ (Cronje, 2020, p. 120). Much like the term ‘co-production’, the detailed meaning of the concept is context-dependent. The term ‘blended’ conveys a mixture of elements, whereas ‘hybrid’ lends itself well to a combination of two different elements. Regardless of the conceptual term, what is important is that learning and collaboration in digital environments require opportunities for social interaction. Moving forward, we use ‘digital co-production’ to refer to co-production in a fully digital context and ‘blended co-production’ to refer to a mixture of digital and face-to-face interaction.

A TALE OF TWO CASE STUDIES

Digital Co-Production: An Educational Context

The Co-production in Health and Welfare course was an online, international course held at Jönköping University, which first launched in 2019. The pedagogical ethos was to ‘learn by doing’ (Kolb, 1984). The intended learning outcomes were assessed through a reflection of ‘giving it a go’ where students and patients collaborated to develop practical tools to guide them in future practice. The intention was for students to first experience the benefits of co-production by having a dialogue about their learning journey, to then learn about theory and processes for co-production as part of their independent learning, and finally to experience and reflect upon the implementation of co-production by applying their independent learning in practice by co-producing with patients for their assignment. By the end of the course, not only did students complete their learning objectives, but they also had a co-produced tool to apply in a context of their choosing.

The expected challenge for this online course was how to achieve collaboration in a fully digital context, as this was an international course with different

time zones and limited resources. Furthermore, patient representatives raised concerns as to whether it would be possible to have meaningful co-production in a fully digital setting. We will here explain how we reached a point where all patient representatives reported feelings of connection, rapport and meaningful relationships with students through digital co-production.

Facilitators designed diverse digital interactions to compensate for the lack of face-to-face engagement. The first opportunity to listen to students was their welcome email (different time–different space), which provided an opportunity for students to begin influencing their learning journey via an online survey (different time–same space). This survey was informed by Graham's (2006) four dimensions of blended learning to explore the students' preferences for learning, method of delivery and interaction. The results of this were used to inform interactive, asynchronous dialogue in a discussion forum (blended time–same space) to refine the student's learning journey, clarify the objectives and establish the learner's goals with students and patients.

Considering the blended social interaction and learning framework, this initial step had low social fidelity as it was fully reliant on completing a survey (different time–same space) and interacting through an online discussion forum (blended time–same space). It is only when coming together in a video call (same time–different space) that dialogue with high social fidelity begins to take place. However, this initial listening exercise was an essential step as without it, all student perspectives could not have been heard. This would have meant that the learning content of the course may only have matched the needs of those students who voiced them. This synchronous, high social fidelity dialogue, which was undertaken in a video call (same time–different space), also provided an opportunity for facilitators, students and patients to agree on ways of working to best meet the learning goals for the group assignment.

To cater for different learning needs and promote flexibility, the course employed a combination of independent learning (blended time–different space) and interactive sessions (same time–different space). The asynchronous interaction allowed students to pace their learning and delve into the theoretical and practical aspects of co-production. Furthermore, this allowed for live, synchronous seminars to be reserved for interaction where students could actively engage with facilitators, patients and their peers. These interactive sessions allowed for real-time, high social fidelity, sharing of insights and experiences, and exploration of the patients' perspectives.

Overall, the combination of flexible asynchronous learning (different time–same space) and interactive synchronous sessions (same time–different space) created a comprehensive learning experience. This ensured that students had the freedom to engage with course materials at their own pace while also benefiting from real-time interactions and practical applications. This collaborative

approach continued throughout the course as students learned about power dynamics, values and successful processes for co-production.

In order to promote interaction between the students and the course facilitators, a wide range of digital tools were employed to promote interaction and evaluate the course. These included electronic surveys, online discussion forums, online word cloud tools, digital whiteboards, pre-recorded lectures, pre-recorded seminars and video calls. These facilitated asynchronous, independent learning of course material (different time–different space) as well as providing opportunities for guided interaction where students viewed the same pre-recorded seminar and then interacted over video calls (same time–different space). There was an open discussion forum (the ‘Co-production Café’), two dedicated discussions for the group assignment and reflective assignment, and a Frequent Feedback survey at the end of each independent learning activity and synchronous live event. This survey provided an opportunity for continuous, asynchronous dialogue with students on their learning needs. Students could also report feedback directly in the asynchronous Co-production Café discussion forum, which allowed students to ask any questions about co-production or assignments.

The use of surveys and discussion forums alone would not have been sufficient without the opportunity for synchronous, high-fidelity dialogue. At the start of each live session, any thoughts raised by students or the patients were reviewed, and it was agreed whether to discuss these together at the start of each session or at the end of the session, or if these were to be discussed asynchronously within the Co-production Café. Using the Frequent Feedback survey and Co-production Café provided an opportunity for interaction, enabled continuous monitoring of experiential learning in the course and identified opportunities for quality improvement, thus enabling students to act as and when needed to improve their learning journey.

In addition to being welcomed to use any medium to present their tools, student groups were encouraged to use any digital platforms on which they wished to interact. During the previous seven cohorts, the digital tools employed had included an online learning management system (LMS); digital whiteboards, online collaborative whiteboard platforms that allow teams to work together remotely and visually; video conferencing applications; digital messaging groups, communication tools that allow the formation of groups; and collaborative online word-processing documents. Through the implementation of these digital tools, students and patients had digitally co-produced twenty-five distinct co-production toolkits, which have been designed to address a range of issues and contexts, ranging from ‘communication by proxy’ in clinical settings to parent participation in designing services for children with intellectual disabilities. The digital format of the guides allowed for dissemination and potential impact beyond the course timescales. Through their social

interaction in a digital setting, students were able to apply their learning to real-world issues, consider multiple perspectives, and propose practical solutions. This practical application not only enhanced their understanding but also fostered a sense of agency and ownership over their learning and the co-production process. Furthermore, patient representatives reported a feeling of authentic co-production with students despite the digital setting.

Blended Co-Production: A Research Context

This second case study highlights experiences of blended co-production (face-to-face and digital) in the context of research. A realist synthesis exploring mechanisms in co-production led to the development of an initial programme theory called the Engagement, Alignment and Agreement Framework (Masterson et al., 2024). This framework identified six mechanisms (Intention, Assets, Dialogue, Documentation, Interpretation and Understanding) that interact in a given context. A realist evaluation took place between May 2023 and May 2025 to pilot this framework in context in order to refine the programme theory. A group of six citizens and two facilitators with a shared interest in co-production came together with a purposefully open aim of simply agreeing on ways of working together and exploring opportunities through dialogue. The two co-authors of this chapter acted as facilitators of this dialogic process.

The first workshop was entirely face-to-face (same time—same space, high human interaction). One of the activities during the first workshop was to agree on ways of working. To achieve this, a list of values identified from a separate project was presented. Each person presented two examples of values that they felt were important. Following that, the group agreed on the guiding values (in so doing, these became guiding principles), which would be reflected upon at the start and closing of each future workshop. At the end of this first workshop, digital photos of all documentation (sticky notes and clip charts) were taken and added to a digital whiteboard. All documentation was reviewed by the facilitators, and reflective notes were added to the shared digital whiteboard. All agreed that documentation and transparent communication were important and that the digital component made this possible. The digital whiteboard contained planning for all workshops, digital copies of all analogue material, interpretation of this material and subsequent reflection by all involved. In addition to transparency, this approach allowed reflection on the guiding principles of co-production and evaluation of the collaborative process. The agreement to use the digital whiteboard was an important element in the upcoming process as it both ensured transparency and provided an opportunity for diverse ways of working.

Due to challenges in availability, the second workshop was held on two occasions and followed a blended approach. On each occasion, four people were in the room, and two people attended via video call (same time–blended space, high social fidelity). Some of the citizens could only participate on one occasion, some were able to contribute asynchronously in between sessions and others attended both events. Those who could not attend were asked to follow the process through the documentation on the digital whiteboard and add their reflections to the process by adding digital sticky notes (different time–same space, low social fidelity). To facilitate the blended social interaction during the workshop, a 360-degree camera was placed in the centre of the room, high-quality microphones and speakers were tested prior to the meeting and one of the facilitators focused on the digital interaction, which included, for example, uploading analogue material to the digital board in real time (blended time–blended space, medium social fidelity).

Partway through the project, one group member left and two new members joined the group. As it was possible to present prior digital documentation and for participants to reflect, comment and contribute to past dialogue, the additions to the collaborative group were smooth and welcoming. As a result of the blended social interaction, the group members were able to choose different ways of interacting with the collaborative process. For example, one participant always participated face-to-face, and another mostly engaged through the digital board and seldom had the opportunity to attend face-to-face workshops. To facilitate blended social interaction between these two ways of working, digital content was projected onto a screen to make the digital documentation accessible during face-to-face workshops (same time–blended space, high social fidelity). All analogue notes were digitised, which allowed for transparent documentation and comments from those unable to attend a workshop (blended time–blended space, medium social fidelity) and were added to the digital whiteboard to continue asynchronous interaction (different time–same space, low social fidelity). The time between workshops proved to be important for applying and reflecting on the latest interaction in the citizens' own context away from the project (different time–different space, low human interaction, low social fidelity).

Despite the blended social interaction approach, the human interaction during face-to-face sessions was perceived by facilitators as high. Those who were present through digital tools such as video calls reflected on the high social fidelity and felt that they were 'in the room' and an equal contributor. The trust and commitment that had developed in the group through the initial 'same time–same space' opportunities (high human interaction, high social fidelity) made it possible to continue collaboration using digital tools for the 'same time–different space' video calls (high social fidelity), and 'different time–different space' and 'different time–same space' social interaction (low human

interaction, low social fidelity). This allowed for the continuation of the collaborative process even after the planned period for co-production concluded.

DISCUSSION

The blended social interaction and learning framework has been useful for analysing and reflecting on the different physical and digital spaces, digital tools and ways of working. Below, we reflect on the use of digital tools and the considerations during the facilitation of digital and blended co-production. It is hoped that consideration of this framework and the lessons learned will help those interested in digital co-production to facilitate high human interaction and high social fidelity during blended co-production processes.

Digital Tools for Blended Co-Production

Through careful planning to create a conducive environment for digital co-production, digital tools can facilitate dialogue, documentation, interpretation of documentation, clarification of understanding and the cultivation of shared understanding. The use of digital tools can address power imbalances traditionally experienced in face-to-face interaction while also providing space for contemplation and reflection on the input of all participants.

Online digital platforms offer various communication tools, such as discussion boards, video calls and shared documents, and their use has been beneficial in both case studies. During the co-production process, documentation of dialogue can be easily shared with team members and, once complete, can be quickly disseminated. However, navigating these tools and finding the most appropriate channels for collaboration can be overwhelming for those who are new to digital co-production. Effectively expressing ideas, providing constructive feedback, and engaging in asynchronous and synchronous communication may require a learning curve. For large groups (see case 1), written communication, combined with video for interaction, is shown to be the primary mode of communication in digital co-production, but this may not be suitable for all participants or contexts. Some individuals may struggle to express their ideas effectively through writing, leading to miscommunication or the suppression of valuable contributions. It is important to recognise and address potential barriers and provide alternative means of expression if necessary. Therefore, dialogue is required to agree on ways of working in the early stages of engagement.

More broadly, real-time digital collaboration may require preparation and management to ensure there is sufficient face-to-face interaction. The bandwidth and computer processing required to use both video conferencing and interactive whiteboards raise questions of inclusivity. In the cases studied,

these issues led the majority of engagement groups to rely on video conferencing, shared word-processing files, whiteboards and instant messaging groups, as this combination provides an opportunity for real-time collaboration and asynchronous interaction. These tools allow multiple users to work on a document simultaneously, which promotes teamwork and seamless real-time collaboration. Linking back to Meijer (2012), digital opportunities allow for the possibility of much larger collaborations, which would otherwise not be feasible in live interaction. Software such as online word-processing documents can be accessed from any device with an internet connection. This accessibility enables team members to work together from different locations and time zones, making it convenient for remote teams or individuals with busy schedules.

It also eliminates the need for file transfers or compatibility issues since the documents are stored in the cloud. Access to documentation can streamline communication to ensure that everyone in the team is involved and able to access dialogue documentation, with the necessary access to contribute and provide input. Collaborative documents provide built-in comment features that enable users to leave feedback, ask questions, or provide suggestions directly within the document. This facilitates effective communication, encourages discussions, and allows for iterative improvements. Commenting and feedback features ensure that all contributors' voices are heard and considered during the co-production process. Naturally, the need for internet access does need to be considered, especially in isolated areas and deprived communities.

Of the tools explored in this chapter, the most versatile tool for achieving interactive dialogue and documentation has been the collaborative digital whiteboard platforms. These are designed to replicate the experience of working on a physical whiteboard, enabling the group to brainstorm, organise ideas and collaborate in real-time, regardless of their geographical location. The blank digital canvas provides a space where users can create, share and collaborate on various types of content, such as diagrams, mind maps and sticky notes. Members can draw, write, type and annotate directly onto the digital whiteboard, allowing for a wide range of visual thinking and communication strategies. Documentation played a key role in facilitating digital co-production. Introducing the digital whiteboard facilitated shared documentation, in which every member could contribute and share responsibility. However, our experience is that there is a learning curve to using these tools, which can stifle the very interaction they intend to create. Further, the digital tools currently available limit face-to-face interaction, which was reported to create a barrier to social interaction. Therefore, preparation is key to overcoming these challenges and ensuring all participants feel comfortable using these tools.

Overall, digital tools for co-production can provide a collaborative and efficient environment where team members can work together in real time, share

ideas, provide feedback and track progress. These tools enhance productivity, streamline the engagement process, offer transparency and foster effective teamwork, regardless of geographical or time constraints. However, linked with this is an obvious challenge since co-production through digital tools can lack the richness and immediacy of face-to-face interaction. Non-verbal cues, body language and facial expressions are easily lost during online collaboration. Digital co-production currently lacks the nuances that we experience with face-to-face interaction. The virtual environment may, therefore, lack the same level of energy, enthusiasm and synergy that can be generated during face-to-face co-production sessions. Therefore, it cannot be expected that a group will establish rapport as swiftly as they would in a face-to-face meeting. As such, it is important to protect those opportunities for synchronous interaction and related activities wherever possible by using asynchronous engagement opportunities. Activities that can be prepared or conducted without interaction can be delivered at alternative moments, such as before or after live interaction.

While there are numerous benefits to using digital tools, there is a risk that they can exclude those who are not comfortable with technology or have access to suitable equipment and infrastructure. Online collaboration relies heavily on stable internet connections and access to the digital tools being used. For example, digital co-production requires digital dialogue, and this can, therefore, exclude those without access to high-speed internet. Technical issues such as slow internet speeds, platform glitches or compatibility problems can disrupt the co-production process and cause frustration. Unequal access to reliable technology and internet connectivity among team members can create disparities and hinder effective collaboration. Therefore, it is the context, wishes and preferences of the group that should inform the digital tools rather than the other way around. Just as collaborative activities should be informed by the values that guide our co-production (Bragge, 2022), so too should digital tools and ways of working.

Facilitating Blended Co-Production

From the experiences of a fully digital social and a blended social interaction approach, the challenges in creating lively, asynchronous interaction should be recognised.

The experiences from the two cases suggest that it is highly recommended that at least two persons share the role of facilitating, as it enables consideration of both technical issues and social interactions. It is also an opportunity to share leadership and engage all participants in the way they prefer since the formal facilitator cannot keep control over everything that happens in a flexible and agile social interaction process. The facilitator's role is more about creating the resources needed for physical meetings and providing technical

support, having individual communication with each person to make sure everyone feels part of the process, and making documentation available. In this way, the facilitators had to work on all dimensions within the blended social interaction and learning framework.

Facilitation is important for traditional face-to-face co-production, but this is even more so in a digital context. It is important for the facilitator to be a 'guide on the side', facilitating the interactive experience and establishing personal and purposeful relationships to encourage shared responsibility for the co-production process. Effectively expressing ideas, providing constructive feedback, and engaging in asynchronous and synchronous communication may require a learning curve. This needs to be incorporated into the digital co-production process. Allam et al. (2021) highlight the challenge of 'digital fatigue'. Also, there is the challenge of having dialogue over a broader range of activities; for example, agreeing on whether to communicate by email (low social fidelity) or via a video call (high social fidelity). Langley et al. (2021) provide further examples of 'digital-analogue' (blended) approaches such as door-to-door interaction or the use of radio.

Though they may be more apparent in face-to-face interaction, conflicting views are just as likely to occur in digital co-production. An additional challenge with digital co-production is that misinterpretations or misunderstandings may arise due to the absence of visual and auditory cues, potentially impacting the quality and outcomes of the co-production process. This can take the form of conflicting edits, accidental deletions or overwriting content, leading to inconsistencies or loss of important dialogue. Without coordination and a communication plan, it can be difficult to track and manage dialogue and documentation effectively. As such, an agreed plan is recommended on how documentation is analysed to ensure that expressed voices are not lost. This documentation plan can also address concerns about data privacy and data handling, such as clear guidelines and protocols for data security measures.

This need for additional planning also leads us to another challenge relating to impeded spontaneity and creativity. Creating an environment for effective social interaction and coordination is crucial for successful blended co-production. For example, the provision of online and asynchronous discussion rooms promotes interaction, which, in turn, leads to learning and engagement (Bickle and Rucker, 2021). In this regard, the facilitators' roles differed between the two cases. In the educational context, the facilitator acted in line with Garrison's (2007) description as a 'guide on the side'. In the second case study, the facilitators created a conducive environment in advance and were then able to engage as participants. This was made possible by the flexibility of the digital co-production as all participants shared engagement and power, with transparency achieved through the use of digital tools.

CONCLUSION

The key transferable lesson is to consider the benefits as well as overcoming the challenges of digital co-production. Accepting what we lose in relation to face-to-face contact allows us to embrace the unique assets within digital co-production. We cannot achieve the same level of engagement in a digital setting, nor should we try, as there are unique benefits and opportunities to consider. Future research should examine how digital tools enhance social interaction and blended co-production with these benefits and risks in mind:

Benefits

- Improves accessibility and inclusivity
- Meaningful dialogue
- Transparent and accessible documentation
- New and creative ways to interact
- Opportunities for continual reflection
- Opportunities for continued collaboration

Risks

- Can exclude those who are not comfortable with technology or lack access to the internet
- Planning requires time
- Challenging to create lively, asynchronous interaction
- Impeded spontaneity and creativity
- Data management and storage considerations
- Digital fatigue

By carefully creating a conducive environment for digital co-production, digital tools can be used to facilitate dialogue, interpretation of documentation, clarification of understanding and cultivation of shared understanding. The use of digital tools can address power imbalances traditionally experienced in face-to-face interactions while providing space for contemplation and reflection on the input of all participants. Aligning with conclusions from Allam et al. (2021), the recommendations for creating a conducive environment are not a suggestion for ‘getting it perfect’ but rather for creating a conducive environment to ensure the flexibility for interaction, dialogue and learning to shape the digital or blended co-production process and ways of working, together.

An Overview of the Lessons Learned

- Digital co-production requires consideration of social interaction and dialogue.
- The role of documentation in digital co-production is important and multifaceted.
- Documentation of dialogue is a key benefit of digital and blended co-production.
- Digital tools for interaction and sharing documentation are key for fruitful digital and blended co-production.
- Digital tools may provide space for contemplation and reflection on the input of all participants.
- Digital documentation of dialogue can be easily shared with team members, and once complete it can be quickly disseminated.
- Digital tools such as a digital whiteboard facilitate shared responsibility for documentation, promoting transparency and accessibility.
- Accessibility enables team members to work together from different locations and time zones, making it convenient for remote teams or individuals with busy schedules.
- Digital documentation allows newcomers and members alike to reflect, comment and contribute to past dialogue.
- Digital tools might require a learning curve for both participants and facilitators.
- There is a risk that digital tools can exclude those who are not comfortable with technology or have access to suitable equipment and infrastructure.
- Some individuals may struggle to express their ideas effectively through digital tools, leading to miscommunication or the suppression of valuable contributions.
- The group's agreed values and principles for co-production guide the use of digital tools.
- The flexibility of digital and blended co-production provides diverse engagement opportunities and ways to overcome power imbalances.
- Facilitation becomes an even more challenging task as the process might blend different approaches and become increasingly complex.
- Misinterpretations or misunderstandings may arise due to the absence of visual and auditory cues, potentially impacting the quality and outcomes of the co-production process.
- Asynchronous engagement can help to prepare and enhance opportunities for synchronous interaction and related activities.
- Engaging in asynchronous and synchronous interaction may require a learning curve for both participants and facilitators.
- The benefits are worth the extra time required to overcome challenges.

Blended co-production is likely to be the standard approach for the future, with the terms ‘digital co-production’, ‘hybrid co-production’ and ‘blended co-production’ soon becoming an unnecessary distinction. Creating a conducive environment for co-production requires consideration of how the physical and digital space can interact so that synergies can be achieved. The power of digital tools in fostering inclusive collaboration, enabling contemplation, capturing reflection and ensuring a shared understanding cannot be understated. Blended co-production opens more doors than it closes and offers a wider range of possibilities for co-production concerning dialogue, documentation, transparency and reflection. The lessons learned from the case studies can shed light on the benefits, challenges and recommendations for using digital tools in co-production processes. The blended social interaction and learning framework presented in this chapter can be further explored and applied to help make better-informed decisions about how to facilitate fully digital, blended and face-to-face co-production.

ACKNOWLEDGEMENTS

The first case study is from an online course held at the Department of Quality Improvement and Leadership at Jönköping University. Special thanks to the patient and public contributors for being part of co-creating the course and the many group assignments with students. Special thanks also to the co-researchers in the second case study, which was part of Samskapa, a co-production research program (Kjellström et al., 2019) funded by Forte, the Swedish Research Council for Health, Working Life and Welfare under grant agreement no. 2018-01431.

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