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# Watching is not doing: Understanding self-directed learning with video for physical skill development

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Much of the development of a physical skill occurs outside formal instruction, and practitioners often turn to resources such as video to guide their own learning. Yet how practitioners move from watching a technique to performing it, and where that process breaks down, has received little attention. This paper examines self-directed embodied learning in Brazilian jiu-jitsu, a grappling sport where technique is learned through physical practice against a resisting partner. Through semi-structured interviews with ten experienced practitioners, analysed using reflexive thematic analysis, we contribute an empirical account of self-directed embodied learning with video, and a conceptual model of how video study and partnered practice relate. Practitioners used video in three roles: as instruction, as a record of real performance, and as material for self-review—but they consistently set a boundary around it. Video conveys what a technique looks like, not what it feels like, and making a technique usable requires practice against a resisting partner that video does not provide. Interpreted through self-regulated learning theory, these findings imply three requirements for technology in embodied skill domains: support self-review, adapt to the individual, and accept that some parts of learning can only happen with a partner on the mat.

*Keywords:* Self-directed learning, self-regulated learning, video-based learning, embodied skill development, embodied learning, extended reality, reflexive thematic analysis

## Introduction

Much of the work of developing a physical skill happens away from a coach; in practice, the learner directs alone (Toering et al., 2009). Video is a common resource practitioners draw on: practitioners watch it to learn a technique from a model and to review their own performance (Boyer et al., 2009; Dowrick, 2012). But watching a movement and being able to perform it are not the same: observation supports some parts of learning, but not others, and physical practice is needed to acquire the movement itself (Maslovat et al., 2010; Ong et al., 2012). This raises the question of *how* learners move from watching to performing on their own—what they take from video, where it falls short, and what they do about it. This paper examines that question as a problem of self-directed embodied learning, with Brazilian jiu-jitsu (BJJ) as a case.

*Self-directed learning*, in which learners take charge of their own development, is a well-established concept, and researchers have examined in detail the process by which learners regulate that development—planning, monitoring, and evaluating their own practice—including in sport (McCardle et al., 2019; Zimmerman, 2002). Video is one resource learners draw on: in a review of 18 studies, Han et al. (2022) found that watching demonstrations supports motor-skill acquisition in physical education. Technology designed to support this self-regulatory process can improve engagement and outcomes (Pacitti et al., 2024), particularly when learning environments are personalised to strengthen learner autonomy (McLoughlin & Lee, 2009).

BJJ is a demanding case of this kind of learning: a grappling combat sport learned over years of practice against a resisting opponent (Andreato et al., 2017; Sugden, 2021). Two constraints make practice outside class particularly consequential: (1) live training is physiologically demanding (Campos et al., 2022) and carries a substantial injury burden (Stegerhoek et al., 2025); and (2) mat time competes with the demands of work and daily life (Sugden, 2021). Practitioners therefore rely heavily on independent study of video to develop skills (Spencer, 2014). Yet research on BJJ has focused on its physiology and its social and psychological dimensions (Andreato et al., 2017; Sugden, 2021), not how practitioners learn technique on their own.

Emerging technologies such as extended reality (XR) are attracting interest for skill training in sport (Kittel et al., 2024) and are already being explored in adjacent education settings, including clinical simulation (Cochrane et al., 2024; Collins et al., 2024), but designing them well depends on first understanding the practices they are meant to support. Using BJJ as a case of an embodied skill learned through partnered practice, we ask: *How do experienced BJJ practitioners use and experience video-based resources for self-directed technique learning, and what limitations and unmet needs do they perceive?* Through semi-structured interviews with ten experienced practitioners, analysed using reflexive thematic analysis, we contribute an empirical account of their self-directed learning practices, a conceptual model of self-directed embodied learning drawn from that account, and implications for the design of technology to support such learning.

## Background

Learning a physical skill depends substantially on the practice the learner carries out alone, away from instruction. Knowles (1975) described this kind of self-initiated study as self-directed learning—a process in which individuals diagnose their needs, set goals, identify resources, and evaluate their outcomes. In sport, more skilled athletes practise more deliberately than less skilled ones (Coughlan et al., 2014; Ericsson et al., 1993) and regulate their own practice more effectively, which distinguishes elite from non-elite performers (Toering et al., 2009). Yet while self-directed and self-regulated learning have been applied to sport, this research has largely described and measured self-regulatory processes and compared skill groups (McCardle et al., 2019).

Zimmerman (2002) models self-regulated learning as three cyclical phases: learners set goals and plan before practising (forethought), monitor themselves while practising (performance), and, in the self-reflection phase, evaluate the result against a standard and respond to it. This last phase includes both self-evaluation, judging one's performance, and self-reaction, which can be adaptive, adjusting one’s approach, or defensive, avoiding the performance to protect one's self-image (Zimmerman, 2002). Reviewing one’s own performance sits in this phase, and observing oneself can itself improve performance (Zimmerman, 2002). In sport, self-regulated learning has been studied across a range of approaches; a review identified 34 studies spanning descriptions of self-regulatory processes, skill-group comparisons, interventions, and measurement (McCardle et al., 2019); most drew on Zimmerman's model to describe self-regulatory processes or compare skill groups, rather than examining how practitioners direct their own learning in practice.

Video supports skill learning in two roles: first, a learner watches a skilled model to acquire or refine a movement; second, a learner records and watches their own performance to evaluate and correct it (Boyer et al., 2009; Dowrick, 2012). Observational learning of this kind improves motor skill learning: a systematic review of 18 studies found that watching demonstrations helped learners acquire motor skills in physical education (Han et al., 2022). Video feedback is an established practice in sport performance analysis, but researchers have focused primarily on measuring performance, with less attention to how athletes use it in self-directed practice (Pearson et al., 2025).

However, observation in video has limits: several motor-learning studies comparing observation with physical practice have found that the two support different aspects of learning (Hodges et al., 2011; Maslovat et al., 2010; Ong et al., 2012). Maslovat et al. (2010) compared physical practice, observation, and no practice on a new coordination skill. Observation improved participants’ ability to recognise the movement pattern, but not their ability to perform it physically; physical practice improved both. Hodges et al. (2011) observed a similar split in a task in which participants aimed at targets using an altered cursor: those who only watched did not develop the movement adjustments that those who physically practised did. A follow-up study strengthened the observation condition with imagery and movement estimation, and still showed that without some physical practice, the underlying change in movement control did not occur (Ong et al., 2012). A related principle, representative learning design, holds that practice transfers to real performance to the extent that it enables the learner to perceive and act as they would in the real task (Pinder et al., 2011).

BJJ is a grappling combat sport in which practitioners learn techniques and apply them against a resisting opponent (Andreato et al., 2017), and its popularity has grown alongside that of mixed martial arts (Sugden,

2021). The closest prior work on how BJJ techniques are learned through video is Spencer (2014), an autoethnographic study drawing on the author's own years of practice and on analysis of technique videos and viewer comments on YouTube. Spencer found that instructional content once confined to individual gyms is now globally available, and that online and in-person communities of practice have become intertwined. He also observed that watching videos does not replace physical drilling and sparring against live opponents (Spencer, 2014). We extend Spencer's account to the individual learner, examining how practitioners use video for self-directed learning, where it falls short, and how they review their own performance.

This leaves a gap that matters for design. Self-directed practice is central to developing a physical skill; video is a common means by which practitioners pursue it, and observation supports some parts of learning but not others. Emerging immersive technologies such as extended reality (XR) offer richer alternatives to flat video and are attracting interest for sports skill training (Kittel et al., 2024). But designing such technology depends on understanding how practitioners currently learn, and for grappling, that account does not yet exist. We address this gap through interviews with ten experienced BJJ practitioners.

## Method

We adopt a constructionist epistemology, treating knowledge of how BJJ is learned as constructed through practitioners' interpretations of their experience rather than as a fixed property to be uncovered (Crotty, 1998). Within this interpretivist perspective, we used semi-structured interviews, which were analysed using reflexive thematic analysis (Braun & Clarke, 2006, 2019). Consistent with this method, we treat the researcher's position as part of the analytic lens: the first author is an experienced BJJ practitioner with a working familiarity with ecological approaches to skill acquisition, a background that reflexive thematic analysis treats as a resource provided it is declared and held in view (Braun & Clarke, 2019).

We interviewed ten experienced practitioners (Table 1). Eligibility required a rank of purple belt or above and at least five years of training, so that participants could speak in depth about how technique is learned through self-directed practice. All participants used instructional video as part of their training, a common practice among experienced practitioners in the BJJ community. Participants were all male, aged 20 to 36, with five to 21 years of training across purple, brown, and black belts, and included both practitioners and coaches; nine trained in Melbourne, Australia, and one in Kobe, Japan. We recruited them through the first author's networks in the BJJ community and through social media, using a screening questionnaire to confirm eligibility. We judged sample adequacy through information power rather than data saturation (Malterud et al., 2016): the study's aim is narrow, the sample is specific and experienced, the analysis draws on an established method, and participants were fluent in the vocabulary the BJJ community uses to discuss skill, all of which support a focused sample.

Table 1
*Participant demographics, belt rank, training experience, and role (N = 10).*

| Code | Age | Belt | Years | Role | Location |
|---|---|---|---|---|---|
| P01 | 24 | Black | 11 | Practitioner | Melbourne |
| P02 | 32 | Brown | 11 | Practitioner | Melbourne |
| P03 | 22 | Purple | 5 | Practitioner | Melbourne |
| P04 | 20 | Brown | 9 | Coach (secondary) | Melbourne |
| P05 | 26 | Purple | 7 | Coach (secondary) | Melbourne |
| P06 | 35 | Black | 16 | Coach (primary) | Kobe, Japan |
| P07 | 34 | Brown | 13 | Practitioner | Melbourne |
| P08 | 31 | Black | 21 | Coach (primary) | Melbourne |
| P09 | 33 | Black | 15 | Coach (primary) | Melbourne |
| P10 | 36 | Black | 18 | Coach (primary) | Melbourne |

We conducted one individual semi-structured interview with each participant, approximately one hour each, remotely via Microsoft Teams, and audio-recorded it with consent for transcription. The interviews followed a schedule of 11 open questions covering the participant's training and coaching background and their out-of-

class study; how they use instructional video to learn and review technique, including the step from watching to performing; and the broader role of video, including competition footage, review of their own training, and what video does and does not do well relative to learning at the gym. The study was approved by the RMIT University Human Research Ethics Committee (reference 2026-29909-31987), and all participants provided informed consent before participating.

We analysed the ten transcripts using reflexive thematic analysis (Braun & Clarke, 2006, 2019), which constructs patterns of meaning across qualitative data while keeping the researcher's interpretive role explicit. We coded in NVivo, giving each code an operational definition, then consolidated the codebook across successive passes before constructing themes on a digital whiteboard—plotting codes spatially, drawing candidate groupings, and treating each as a position to test, refine, or reject rather than a fixed category. We distributed the coaching-related codes across the substantive themes rather than making them a separate theme, since the study concerns self-directed learning.

## Findings

The analysis constructed 10 themes, of which eight are foregrounded here, selected for their bearing on the research question. Table 2 summarises the eight themes and their sub-themes. The sections below group them under three headings, following the order in which they build on one another rather than their numbering.

Table 2
*Themes constructed from practitioner interviews, with sub-themes (eight of 10 foregrounded).*

| # | Theme | Sub-themes |
|---|---|---|
| 1 | Seeing a technique is not the same as being able to do it | — |
| 2 | Partnered practice turns seeing into doing | adding resistance; resisting partner; practice as carrier |
| 3 | Each practitioner’s body and learning style shape what works | which techniques; how they study |
| 4 | Practitioners need both broad concepts and fine detail | range; both required; knowing which |
| 5 | Video supports practice but cannot replace it | instructionals; competition footage; self-footage |
| 6 | What a practitioner needs changes as they develop | developmental stage; coaching responses |
| 7 | Life circumstances shape when and how practitioners study | time; life-situation |
| 8 | Practitioners deliberately match device to purpose | — |

For context, three forms of partnered practice recur throughout and are referred to by the terms that participants use. Drilling is the cooperative repetition of a technique with a compliant partner who offers little or no resistance, used to groove the movement. Situational sparring starts from a set position and allows graded, partial resistance, so the technique can be attempted against a partner who works back within limits. Live rolling is a free practice in which both partners resist and attack without constraint. Drilling followed by rolling is the customary structure of a BJJ class (Spencer, 2014).

We present the themes in three sections that follow the process they describe: the gap between watching and doing, how practitioners use video, and the individual and situational factors that shape what is productive.

### The gap between watching and doing

Participants consistently distinguished what a technique looks like from what it feels like (Theme 1). What a practitioner can see—the shape of a position, where a limb goes, how a body is arranged—comes across on screen. What they can only feel—the resistance of a grip, the weight of pressure, the give of an opponent reacting—does not.

“there's so much in the sport that you can’t see, stuff you have to feel, like their resistance” (P08).

Video shows what a technique looks like but not how it feels, and the line between the two runs through a single move: a passer's posture and the source of pressure read on screen, while the tension in a grip does not. Video can show part of a technique faithfully and still leave out what only registers through the body.

"I know what the position looks like, I know where the end game is—if I don't drill that and know how to move my body to do it, it's not really the same as just visually knowing what it is" (P01).

Knowing what a technique looks like is a different state from being able to perform it; the distinction concerns turning something seen into something the body can do. Closing that gap is what the next theme describes (Theme 2). Participants did not treat the forms of practice as separate activities, but as points on a single scale of resistance they move along deliberately: less resistance to learn a movement, more to test it.

"Start with basically no resistance until I have the move down, then gradually add resistance and solve problems as we go" (P03).

Drilling and rolling are not separate activities but the same practice at different levels of resistance, moved between on purpose. What remains constant across that scale is the live partner, whose reactions are the target against which the skill is practised.

"So you can study all the technique you want, but you need the right reactions" (P01).

Because every partner reacts differently, the technique is learned by working through those responses—it is those reactions, not the movement rehearsed in isolation, that the practice exists to handle. Study can prepare a technique, but it is not usable on its own.

### How practitioners use video

Participants use video extensively, but always alongside partnered practice rather than in place of it. Three types recur, each filling a role the others cannot (Theme 5). Instructionals function as the sport's textbook: a structured, returnable reference for broad concepts, brought to the gym when working out a technique.

"I think instructionals are great as textbooks. Kind of like in uni—we're prescribed a recommended text" (P10).

They supply structure to work from, not a technique delivered whole. Competition footage supplies what a demonstration omits: under pressure, competitors default to their baseline reactions, so the footage shows the responses a technique must actually handle.

"Comp footage is probably the best because it's reaction under stress, reaction under duress" (P10).

A practitioner's own footage fills a role no other video can—a view of their own performance—correcting the gap between what they think they are doing and what they actually do.

"You can't see what you're doing in this sport. Sometimes your perception of what you're doing versus what you're actually doing is two wildly different things" (P02).

Self-review was the video use practitioners valued most highly, yet the barriers are consistent. Capture and retrieval take setup that is often too much; review competes with training time that heavy weekly practice already fills; and watching oneself fail is uncomfortable.

"I don't have a tripod that I put my little phone on. It's just too much" (P02).

"If you're training five days a week, two hours a day—no one's going to have time to review six hours of rolling footage" (P04).

"Mustering up the ability to push past the second-hand embarrassment of watching a bad exchange... this is just data" (P10).

The effort of capture, scarce time, and the discomfort of self-observation sit between the recognised value of self-review and the act of doing it. Practitioners also treat the device they watch on as part of how they use video, matching it to the task (Theme 8): a larger screen for focused study, a phone for quick reference and filming. Practitioners choose the medium to suit the purpose rather than treating it as a neutral window onto the content.

### Individual and situational factors

Several factors shape what a given practitioner takes from video and practice: their body and learning style, the stage they have reached, the kind of knowledge they are seeking, and the circumstances in which they train. Each filters the same material differently. The first is the individual themselves. The same technique and the same way of studying it did not work the same for everyone (Theme 3): a build unlike one's own often does not transfer.

"The best advice I'll ever give anyone is—find your quirk" (P09).

The advice that follows is to find the technique that fits a practitioner well enough to become their strength. Cognitive style filters study the same way, with practitioners who cannot sit through an instructional turning to live matches instead.

"Most of our friends have borderline ADHD, and we cannot sit through an instructional" (P10).

What suits one practitioner does not suit another; it tracks body and cognitive style rather than the content itself. Stage of development is a further filter (Theme 6). The same material becomes workable only in stages—a technique incomprehensible at one belt is understood only several ranks later, and a beginner cannot yet read a live roll well enough to learn much from watching one.

"I remember trying to learn a heel hook when I was a yellow belt, but I couldn't understand it. But I didn't really start doing heel hooks till blue belt, and didn't really truly understand until purple" (P01).

What a practitioner can take from a technique, a video, or a coach depends on the stage they have reached. What they need from video also depends on the kind of knowledge they are after (Theme 4): participants described BJJ knowledge as spanning a range, from broad concepts to fine technical detail, with both needed and neither sufficient alone, and knowing which end to draw on is itself a skill that comes with experience. Finally, whether a practitioner can study is bounded by their circumstances (Theme 7). Time is the most immediate constraint, shaping how study happens.

"I don't really have the time to just chill out and watch a DVD for 20 or 30 minutes. So it's more like short segments during transit on the train, or while I'm brushing my teeth" (P06).

Wider circumstances set what is possible: one participant moved to a country with no coach, relying on online resources for his training, and another noted that an injury that would stop a striking sport still leaves room in BJJ to work positions that do not load it. Time, access, and what the body allows set the bounds within which any study has to fit.

## Discussion

Based on our findings, practitioners use video in three distinct roles: instructional as structured teaching to build from, competition footage as a record of real performance under pressure, and their own footage as review material (Theme 5). They value and use it extensively, but the central finding is a boundary that runs within each technique: video conveys what a technique looks like, not what it feels like, and only practice

against a live, resisting partner carries a technique across it (Themes 1, 2). The rest of their practice is organised around this boundary—video prepares a technique for the mat and reviews what happened there, and Figure 1 presents this as a model of self-directed embodied learning. Two unmet needs follow. The video use practitioners rate most highly—reviewing their own footage—is also the one they do least, held back by the effort of capture, scarce time, and the discomfort of watching themselves fail (Theme 5). And what practitioners can take from any video depends on who they are and where they are in their development: their body and cognitive style filter which techniques and study modes work, and their stage filters what they can yet make sense of (Themes 3,6).

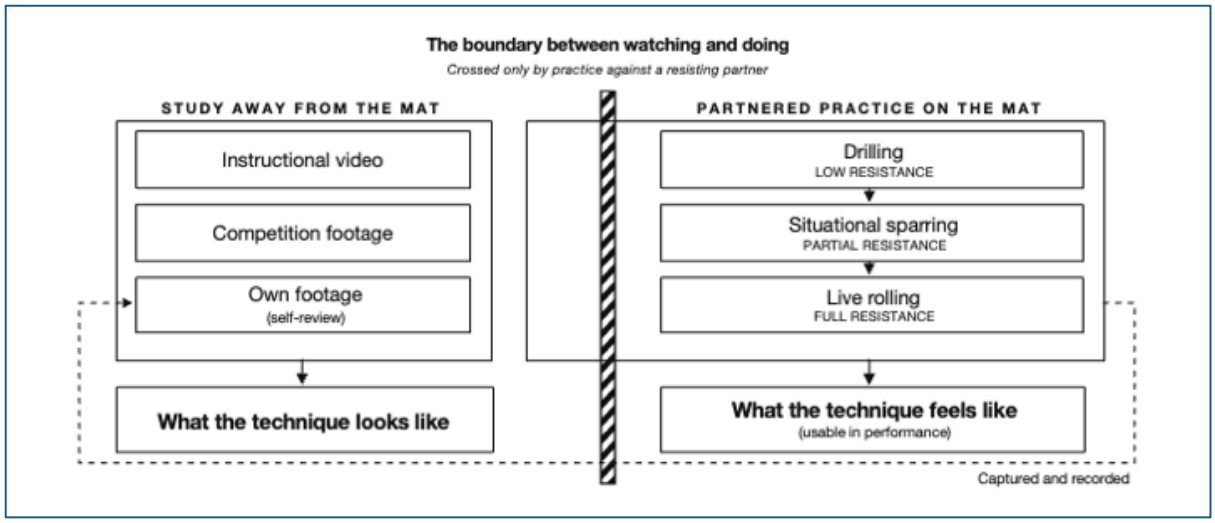



*Figure 1.* A model of self-directed embodied learning, drawn from the accounts of BJJ practitioners.

The way these practitioners described their study matches what Knowles (1975) defined as self-directed learning: they took the initiative in deciding what to work on, which resources to use, and how to study, without a coach directing that work. The practices they reported also correspond to the phases Zimmerman (2002) describes as self-regulated learning—planning what to study, monitoring their practice, and reviewing their performance against a standard. Interpreted through this frame, the findings carry three implications for the design of technology to support self-directed learning in embodied skill domains.

### Self-review is the self-reflection phase, and its friction is a design problem

Reviewing one's own footage corresponds to the self-reflection phase of self-regulated learning, in which a learner compares their performance against a standard and responds to it (Zimmerman, 2002). Our findings show this is the video practitioners valued most and the one they did least well. Of the barriers, two are practical: the effort of capture and scarce time. The third is not. The discomfort of watching oneself fail was something one participant pushed past only by reframing a bad exchange as "just data." This discomfort matches what Zimmerman (2002) calls a defensive self-reaction: avoiding the performance to protect one's self-image. The self-reflection phase depends on the learner overcoming that reaction. Self-review fails not because practitioners undervalue it, but because nothing supports them through the friction of doing it.

Left to the learner, self-review is unstructured and easily avoided, and unstructured self-observation tends to be superficial; treated as an instructional-design element that structures attention and manages cognitive load, it becomes more effective (Tannoubi et al., 2026). How observation is structured shapes what it does for learning (Ste-Marie et al., 2012), and embedding self-regulatory activity by design, rather than leaving the learner to initiate it, improves engagement and outcomes (Pacitti et al., 2024). The implication is that technology should reduce the friction and structure the reflection, so that the phase practitioners value but avoid actually takes place.

### Personalisation is intrinsic to self-directed learning

What the practitioners described about how they select and study techniques shows personalisation as a condition of the learning, not an addition to it. Body and attributes filter which techniques are worth keeping, cognitive style filters how they can productively study, and stage of development filters what they can yet make sense of. This aligns with the emphasis in self-directed learning on the learner directing their own path and with work in learning design that treats personalisation and learner control as central to supporting self-regulation (McLoughlin & Lee, 2009). Where that literature argues for personalisation as a design principle, our findings show it is already how these learners operate: they personalise by necessity, discarding what does not fit their bodies, their ways of studying, or their stages. A resource that presents the same material in the same way to everyone does not fit how they learn. Technology to support self-directed learning in this domain must adapt to the individual and their stage—not as an added feature, but because matching the learner is part of what makes the material usable.

### Watching is not enough; practice is required

The limit the practitioners described sets this domain apart from the settings in which self-directed and self-regulated learning are usually studied. Their central point was that video conveys what a technique looks like but not what it feels like, and that becoming able to perform it requires practice against a resisting partner (Themes 1,2). This aligns with motor-learning research showing that observation improves recognition, but not execution, and that physical practice is needed for the motor component to develop (Hodges et al., 2011; Maslovat et al., 2010; Ong et al., 2012). Self-directed and self-regulated learning largely account for cognitive and metacognitive regulation—how a learner plans, monitors, and evaluates their study (Zimmerman, 2002). What the practitioners described adds a constraint that those accounts do not address: even when the regulation is sound, no mediated resource transmits the felt component of the movement. The findings suggest a ceiling on what mediated learning can deliver in embodied skill domains.

These three implications converge on a single direction: technology that structures self-review, adapts to the individual, and sits alongside partnered practice rather than replacing it. Immersive technologies such as XR are candidates—their richer, interactive presentation could support the structured self-review and personalisation the first two implications call for (Cochrane et al., 2024; Collins et al., 2024). But making practice richer or more immersive is not the same as preserving what makes it work (Pinder et al., 2011): the resisting partner. While BJJ is the case in which these implications were identified, they follow from features it shares with any tertiary context where students learn physical skills through practice. A physiotherapy student learning manual therapy can watch a mobilisation technique on video, but the pressure, angle, and tissue resistance register only through the hands—the same watching-to-doing gap the practitioners in this study described. The same applies to nursing students practising clinical procedures and paramedicine trainees in simulation (Cochrane et al., 2024). In each case, the design challenge is the same: support self-review, adapt to the individual, and design technology that sits alongside physical practice rather than replaces it.

### Limitations and Future Work

The sample was specific by design, but also narrow: all participants were male, aged 20 to 36, and all but one trained in a single city. This bounds the transferability of the account—practitioners who differ in gender, age, or training culture may use and experience video differently. The study also reports practitioners' own descriptions of how they learn, rather than observed behaviour, and these descriptions may not fully match their actual practice. These limitations point to what comes next.

The next phase of this programme of research is a co-design workshop in which experienced practitioners engage with current XR capabilities—including 360-degree video, volumetric capture, and mixed-reality workspaces—through a head-mounted display and then generate design directions through storyboarding grounded in their own training experience. The workshop addresses the gaps this study identified—the friction of self-review, the single-angle constraint of flat video, and the watching-to-doing gap—by directly involving practitioners in the design process, ensuring that any technology developed reflects the needs of its users.

## Conclusion

This paper contributes an empirical account of how experienced practitioners use video for self-directed technique learning. Much of learning a physical skill happens away from a coach, and video is central to it—but watching a movement and being able to perform it are not the same; Figure 1 illustrates where that boundary runs and what crosses it. The self-review they value most is the self-review they do least, held back by friction that is designable away. For learning technologists working in embodied skill domains, the design challenge is not to replace partnered practice but to support the self-directed study that surrounds it: lower the friction of self-review, adapt to the individual and their stage, and accept that some parts of learning can only happen with a partner on the mat. While these implications were identified through BJJ, they extend to any physical skill learned through a mix of study and partnered practice.

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## *The Future is Connection:*

*Collaboration, Creativity and Compassion in a Digital Society*

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