Action Research and Coach Learning in Endurance Running

ROYDEN RADOWITS
University of Alberta

The purpose of this action research project was to learn how I, an endurance running coach, could better design practices that promoted athlete decision-making that was more representative of the processes used in competition. This project utilized a two cycle AR process that consisted of three practices each during a Canadian collegiate team's indoor track and field season. The findings demonstrate both the interconnectedness of the different types of coaching knowledge, while exploring how AR can be used to improve a coach's knowledge in an integrated manner.

Keywords: Action Research, Coach Learning, Representative Learning Design

Within endurance running, a crucial skill for athletes to develop is their ability to make decisions about how they will adapt their rhythms/postures/paces to contend with changing race demands. However, current hegemonic principles of practice design within endurance running might be limiting an athlete's ability to learn these decision-making skills (Mills & Denison, 2013). Therefore, to enhance my development as a coach, the purpose of this action research (AR) project was to learn how to better implement practices that represented the look and feel of racing. Specifically, this project sought to promote the development of coaching knowledge within endurance running as it relates to the way in which practices can better mimic the decisions athletes make in racing.

In this paper I will begin by outlining how AR can be used to support coach education/learning. I will then problematize current practices within endurance running before discussing how an ecological dynamics approach, underpinned by a Foucauldian-informed philosophy, could be used to promote practice environments centered around athlete learning and decision-making. Since this AR project is focused on my experiences coaching a varsity endurance track group through an indoor track season, the results section will discuss how I have learned and developed as a coach – specifically related to

the themes of session representativeness, communication, and a reflection around allowing athletes to write their own story.

REVIEW OF LITERATURE

An effective coach, as defined by Côté and Gilbert (2009), is someone who can consistently apply and integrate "professional, interpersonal, and intrapersonal knowledge" (p. 316) within their specific context to improve a myriad of athlete outcomes. Respectively, these forms of coaching knowledge encompasses one's (a) sport-specific knowledge, sport science knowledge, and pedagogical knowledge, (b) ability to connect and communicate with their athletes, and (c) reflect to better learn from their own practices. Since professional knowledge forms the "how to" of coaching, it is situated predominately within formal coach education, often at the cost of interpersonal and intrapersonal knowledge (Nelson et al., 2006). Moreover, the mechanistic delivery of formal coach education has been further critiqued for potentially being indoctrinating and for leading to a lack of deep/meaningful learning (Stodter & Cushion, 2014, 2019). Therefore, for holistic coach development it is important to consider additional forms of learning.

Since coaching is highly contextual and can be described as "grounded in the minutiae of practice" (Jones & Hemmestad, 2021, p. 10), the focus for coaches is on how interpersonal knowledge is used to develop and express everyday relationships. Moreover, within their practice coaches need to be reflexive around their values, judgments, and behaviour to better improve future decisions and action (Jones & Hemmestad, 2021). Since one's interactions with individuals and reflexivity are context specific, both learning and understanding can be viewed as being emergent from one's action and practice (Jones & Hemmestad, 2021). As such, informal learning opportunities, such as practice (Nelson et al., 2006), are highly valuable for coaches. However, while informal learning is valuable it is not without its limitations. Specifically, on their own coaches may lack the declarative knowledge and/or reflexive orientation to effectively learn from informal opportunities (Stoszkowski & Collins, 2016), and the hierarchization of knowledge and power within mentorships can lead to a process of indoctrination (Zehntner & McMahon, 2019). Comparatively, in response to these critiques, AR has been touted as a better way of facilitating coach learning as it empowers coaches to implement more tailored solutions within their program (Chapron & Morgan, 2020; Mallett et al., 2008), while also engaging their ability to be reflexive (Hall

& Gray, 2016). Therefore, in this paper, AR will be used as tool to enhance my own coaching development in the sport of endurance running.

As discussed by Mills and Denison (2013), a commonly held belief among endurance running coaches is that to best prepare athletes for competition they need to tightly control their practice environment while adhering to a set of physiological and biomechanical principles. This is often achieved by (1) using controlled and fixed spaces (e.g., same loop/trail), (2) control and regulation of time (e.g., set amount of recovery), (3) through linear, objectives assessments (i.e., predictor/benchmark workouts), and (4) combining techniques (i.e., fitting individuals in within a group). While the control and regulation of these practice elements is guided by the goal of creating efficient practices, when done consistently over time it may limit opportunities for athletes to make decisions about their own training and consequentially undermine their ability to make decisions in races leading to underperformance (Denison, 2007; Mills & Denison, 2013). Therefore, as suggested by Denison and Mills (2014), and Konoval and colleagues (2019, 2021), endurance running coaches should supplement their existing practices with less disciplinary techniques to better promote athlete autonomy and decision-making. For example, coaches could rely on uncommon training distances (i.e., 429 meters instead of 400), remove theirs and their athletes' watches, allow for athlete selected recovery, provide options within a workout, and/or limit objective benchmark sessions, to name a few.

In summary, it is important for coaches to understand how their practices can unintentionally influence an athlete's development surrounding decision-making and an awareness of their internal processes (Konoval et al., 2019). Therefore, when seeking to manipulate "the tension that exists between structure and agency" (Jones & Thomas, 2015, p. 73) coaches can further encourage athlete thinking and learning by manipulating the complexity and representativeness of their practice environments. As such, a potential complimentary framework to the aforementioned practices could be through the perspective of ecological dynamics and a constraints-led approach (CLA). Briefly, ecological dynamics is a theory of motor learning that views humans as being composed of multiple interacting systems that through the interaction of one's environment self-organize into functional movement patterns (Davids et al., 2013). This means that both movement and decision-making are emergent processes that are adapted to fit changing task, environmental, and individual constraints (Davids et al., 2013). Therefore, the goal of practice is to educate an athlete's intentions to enable them to better perceive, identify, and utilize affordances (opportunities for action) in their environment (Davids et al., 2013).

In extension, a CLA provides coaches with a bridge that connects the theoretical concepts of ecological dynamics with practical application (Renshaw et al., 2019). Specifically, with a CLA a coach is tasked with designing practice environments that encourage athlete learning through the manipulation of performer, task, and environmental constraints in a way that is representative of competition (Renshaw et al., 2019). One of the underpinning principles of a CLA, representative learning design (RLD), urges coaches to manipulate constraints in practice that are representative of competition to help facilitate better transfer of decision-making and movement solutions (Davids et al., 2013). Further, as discussed by Headrick and colleagues (2015), coaches need to also recognize the impact an athlete's emotions can have on their "cognitions, perceptions and actions" (p. 85). As such, they recommended that coaches imbed emotions into practice through the use of practice scenarios that mimic the experience of competition.

Considering the role of emotions within practice scenarios, McCosker and colleagues (2019) found that while elite long jumpers' performances were directed at either the goal of a maximal or submaximal jump, these goals were situated within the performance context of either perform, respond, or manage. A perform context was seen as the point in a competition in which coaches enabled an athlete to self-regulate "with regards to the strategic intention" (p. 6) and write their own competitive story. Respond was then the situation in which there is "a change in the competition demands" that requires athletes to respond and make a decision about how to "keep their story from going off-script" (p. 8). Finally, manage is the situation in which an athlete's performance has gone off track and they are required to "cope with" (p. 9) and manage their emotional response to continue action towards the performance goal.

While these performance scenarios were identified in the long jump, this AR project will look to adapt them to endurance running. Specifically, since the performance goals can be adjusted to either running for a specific time or placement, perform would be the context in which an athlete can self-regulate towards one of these goals. Respond is then the context in which an athlete either has to react and respond to a move made by another athlete or make a decision around changing their rhythm/pace after running a slow split during a race. Finally, manage is the context in which an athlete's race is not going to plan and they have to manage their internal processes (i.e., rhythm, posture, fatigue, emotions, and cognitions). Therefore, the purpose of this AR project is to use the practice scenarios identified by McCosker and colleagues (2019) to help guide my application and understanding for the principle of RLD with the athletes I coach.

RESEARCH METHODS

AR is a cyclical processes of "planning, acting, monitoring and reflecting" (Mallett et al., 2008, p. 6) with the specific aim of improving one's actions/practices within their specific context (Gilbourne & Richardson, 2005; McNiff & Whitehead, 2010; Nogeste, 2008). With respect to this project, I was interested in improving my ability to implement practices that were more representative of the decisions endurance runners make in racing. During this project I was an assistant coach for a Canadian university men's and women's cross-country team and endurance track group consisting of 38 athletes with event specialization ranging from 600m to the half-marathon. Since this project was part of my master's degree in coaching studies all sessions implemented were coordinated with the head coach of cross-country as he was ultimately responsible for the planning/scheduling of the season and training.

Once one is familiar with their context and the relevant literature, the first few steps with AR are to plan, implement, and monitor the actions taken (Gilbourne & Richardson, 2005; McNiff & Whitehead, 2010; Nogeste, 2008). While a full breakdown of practice dates and details can be found in Appendix A, the first cycle of this AR project began at the start of the indoor track and field season with the second cycle occurring towards the end. Since AR is focused on the development of the researcher, data collection is centered on how the researcher's learning is influencing others (McNiff & Whitehead, 2010). As such, to understand how the sessions I was implementing was impacting athlete learning, data was generated through observations supported by field notes. Specifically, my observations focused on the ways athletes would interact with others during practice, whether they were moving with the same intention as the practice goals, the questions they asked, and their changes in postures/rhythms/paces.

Following the first cycle, the next steps of my AR project involved reflecting on the actions and learnings of the researcher before amending and re-implementing actions (Gilbourne & Richardson, 2005; McNiff & Whitehead, 2010; Nogeste, 2008). Overall, my reflective process began by organizing my field notes under the headings of "structure and organization of practice", "description of activities/time/space", "athlete reactions and responses", "successes", "setbacks", and "personal observations/comments". Once organized I was able to identify and set various issues related to my coaching that could them be amended and/or solved moving into the subsequent cycle (Gilbert & Trudel, 2001). Altogether, the changes I made could be summarized as changes to the set up (i.e., communicating session details), personal changes (i.e., interactions with athletes), and session specific changes (i.e., progressions of sessions based on representativeness). Following the second cycle I then reorganized my field notes under the same five

aforementioned headings and compared topics from cycle two to cycle one. From there I created three themes that focused on my learning as a coach related to implementing more representative practices based on various performance scenarios. In the following section these themes are then connected to the literature on the development of coach knowledge, learning, and RLD.

RESULTS AND DISCUSSION

To reiterate, the purpose of this AR project was to learn how I could better design practices that were more representative of the decision-making processes endurance runners use in competition. To do this I adapted and implemented six practices based on the performance contexts of perform, respond, and manage (McCosker et al., 2019). From my field notes I created three themes that each represented my development pertaining to a different aspect of coaching knowledge. Specifically, my learning as it related to professional knowledge will be discussed through the themes of session representativeness, interpersonal knowledge through communication, and intrapersonal knowledge through the idea of whose story is it. Together, these three themes build off of my experiences implementing new (for me) sessions, and how those experiences have contributed to my developing coaching praxis.

Session Representativeness

Under this theme I discusses my learning/development as a coach related to the implementation of sessions based on the performance contexts adapted from McCosker and colleagues (2019). Specifically, the focus is on the contexts of perform and respond and the changes I made between cycles to improve the representativeness of athlete decision-making. While both cycles contain a session focused on the context of manage, for a variety of reasons this was the performance context I struggled with the most to adapt to endurance running. As such, my learnings related to this context goes beyond the scope of this paper and are not included in this theme.

Perform

Briefly, the context of perform focuses on the point in competition when an athlete is "free to write [their] story" with respect to their performance goal (McCosker et al., 2019, p. 6). To encourage athletes to write their story session two involved a blend of off-track threshold/tempo work followed by a range of self-determined track/rhythm work. Prior to the track portion, the athletes were tasked with visualizing an ideal race,

before cueing them to use self-determined reps/recovery to create the rhythms/postures of that visualized race. While the session was successful in getting the athletes to meaningfully engage with their own rhythms, postures, and sessions, there were two aspects I wanted to adjust moving forward. First, since the visualization activity occurred mid-session, the athletes moved through it rather quickly making it "hard to tell if they really did visualize a race" (Field Notes, 2021/12/07). Second, some athletes disliked the session as they found it difficult to hit their splits as the they typically relied on their teammates to get the most out of themselves.

Although the utility of working out as a group is an engrained aspect of endurance running culture (Konoval et al., 2019; Mills & Denison, 2013), this could be problematic as athletes may internalize a relative rank in practice and consequentially in competition (Denison & Mills, 2014). Additionally, during more autonomous workouts athletes with a greater 'rank' (seniority/speed) may influence others into believing there is a correct and incorrect way to perform a session (Konoval et al., 2021). However, while an intention of session two was to disrupt the potential impact of rank/hierarchy, when considering the representativeness of a session it is important to remember that within a race athletes need to be able to write their story with others around. As such, for the next perform session the changes I made were focused on improving engagement in the visualization activity, and "performing" with others around.

Briefly, this next session involved the athletes writing out their visualized race and session the night before and then sharing that with their teammates at practice. They were then asked to make small compromises to connect their sessions with a partner while following what they originally wrote. While the goal of the visualization activity was to increase their engagement with the rhythm/pace work, I found that having them write it out allowed me to better "understand what the athletes were trying to accomplish with the session and how that translated" to a race (Field notes, 2022/03/08). This then facilitated better communication between the athletes and myself, ensuring that our intentions were aligned – something that is fundamental to a CLA (Renshaw et al., 2019). Moreover, while I was initially concerned that combining sessions would have athletes defer their decision-making (Konoval et al., 2021), the way the groups aligned their sessions naturally flowed together while still enabling them to "work on skills individual to their race strategy" (Field notes, 2022/03/08). Further noting how "they all did similar things but went about it in different ways and made decisions about how they were going to continue writing their own story" (Field notes, 2022/03/08).

Respond

The context of respond focuses on a point in competition when an athlete needs to make a decision about how they will "prevent their story from going off-script" (McCosker et al., 2019, p. 8). Adapted to endurance running, session one sought to mimic a race where the athletes hear a slow split and have to make a decision about how they will close the workout to achieve their goal time. While most of the athletes verbally responded to this situation with the mantra of "let's just close" (Field Notes, 2021/11/26), there were three adjustments I wanted to make for the second cycle. First, when told they were 'slow' the athletes were able to make a decision about how they would respond during a rest period, rather than within a rep, which created an affordance not available in competition. Second, locating this response in the last third of the session felt "timely" and "fabricated" (Field Notes, 2021/11/26). Finally, since the focus was on a time standard the athletes became "immediately obsessed with the time and tracking of splits" (Field Notes, 2021/11/26), detracting from their engagement in other aspects of the session.

Fundamental to RLD is the concept of action fidelity, which is the degree to which a movement solution developed in practice transfers to competition (Renshaw et al., 2019). Effectively, high action fidelity requires coaches to ensure that the actions and decisions of athletes are similar between competition and practice (Davids et al., 2013). Therefore, in contrast to session one, races require athletes to make decisions in the moment while fatigued to respond to both splits and others by changing/adapting their rhythms/postures/paces. As such, to improve action fidelity and representativeness Davids and colleagues (2013) recommended the use of practice tasks that are highly variable, sample information from a variety of functional sources, are emergent over time, and allow for individual variability. Given that, to improve representativeness of the second respond session my plan was to introduce more variability, add in additional sources of functional information, promote individuality, and create emergent decision-making.

Succinctly, the second respond session tasked the athletes with running reps of varying lengths, while creating and responding to moves made by their teammates. Additionally, the athletes also had to ensure the second set was faster than the first. When considering how this session changed the athletes' decision-making process to be more representative of competition, I noted:

> This session did a good job with that. [Set] 1 really focused on responding to moves made by other, while [set] 2 allowed for decisions to be made about responding based on the clock. This then as the session [progressed] created some variations in how the session played out. For example, [athlete a] put themselves

out there early in set 2 and then [slowed down], whereas [athlete b] was more
reserved and then closed. (Field Notes, 2022/02/04)

Overall, while I felt this session better represented the decisions athletes make in
competition, towards the end of set two, I noticed a shift in the athletes' intentions as
they were more focused on managing/coping with fatigue and were having to
"approach it one rep at a time, and if need be one lap at a time" (Field notes,
2022/02/04).

Communication

> While this AR project was centered around improving my ability as a coach to
create sessions based on performance scenarios, throughout this project I developed a
deeper understanding for the interconnectivity of interpersonal and pedagogical
knowledge with the outcomes of a session. Specifically, this theme both examines the
way I improved my approach to communicate session details, while also exploring the
challenges experienced with debriefing sessions.

Session Set-Up

> Throughout the first AR cycle I was continually challenged to adapt my ways of
communicating in order to create practice environments that were safe and efficient. For
example, in session one I primarily relied on verbal communication to deliver session
details/logistics. However, once I mentioned that there was a "time standard", I noticed
that "I had lost their attention" (Field Notes, 2021/11/26), and consequentially, even
though I repeatedly mentioned their lane assignments, I still had instances of athletes
going the wrong way or using a lane designated for another group – creating a safety
issue. Additionally, mid-way through the first cycle we experienced another wave of the
COVID-19 pandemic, which to ensure the safety of coaches and athletes, made us
modify the delivery of practice. As such, session three relied on a lengthier write-up in
the pre-session email that included all relevant information. While this worked for the
situation, feedback from the athlete leadership group noted "that the session [email]
might be too lengthy for people to read" (Field Notes, 2022/01/04). Taken together,
these experiences created a need to find a more balanced approach with communication.
Since athletes not paying attention to key session details (lanes, direction, etc.) presented
a safety concern, from session two onwards I used a portable whiteboard as a visual tool
to communicate session details. Overall, this small change became an important tool to
communicate with athletes, noting its utility "in communicating key details such as lanes,
session flow, and key details", such as sets, reps, and rest (Field Notes, 2021/12/13).

Within the literature reviewed on practice design, there was lack of recommendations/strategies pertaining to ways of communicating that actively engage athletes. While Renshaw and colleagues (2019), noted the significance of communication in preparing the practice environment, and urged coaches to "plan what to say at key moments of the session" (p. 96), in my experience what was planned differed from reality. Specifically, while I planned what I wanted to say, athlete uptake was different than what I expected. Therefore, it is important to revisit the idea that coaching is highly contextual and is "grounded in the minutiae of practice" (Jones & Hemmestad, 2021, p. 10). While I planned what I was going to say, this planning did not guarantee effectiveness. As such, it is important for coaches to develop tacit knowledge, or "knowledge gained primarily from experience" (Nash & Collins, 2006, p. 470), within their specific context, especially as it relates to effective communication strategies. For myself, this involved finding a balance between
using emails, whiteboards, and verbal communication to best engage athletes.

Session Debrief

As discussed by Konoval and colleagues (2021), when implementing practices that differ from the traditional, dominant styles of practices within the sport, it is important that coaches communicate and educate the athletes to help them understand and accept the purpose. Moreover, when considering the pedagogical practice of scaffolding, Jones and Thomas (2015), encouraged coaches to engage athlete thinking by designing environments that allow athletes to make choices and take risks, while using questions to guide learning. Therefore, following practices while I attempted to debrief with the athletes in-person I also provided them with a set of optional, self-guided reflection questions to write about in their training logs (something that as an assistant coach I did not have access to). Briefly, these questions were aimed at reminding them of what the goal was, recognizing different decisions they made throughout, and guiding them to make individualized plans heading into their next race.

During the first AR cycle I noticed that during the post-practice debrief the athletes "weren't the most focused on the things I was saying" (Field Notes, 2021/12/04) and had limited engagement in the discussion. Therefore, since I felt that the task of debriefing was better achieved through the reflective questions, in the second cycle, I made the adjustment to send the questions out following practice (rather than before), and included a brief write up about the session intention. However, as noted in my field notes, this made the debriefs feel disconnected and left me without athlete feedback:

Athletes are tired post session and it's important to allow them to get their cooldown done so they can get home and start recovering from the session. But

one thing about that is I don't have the ability to get feedback from the athletes. I get the "session was good" or "it was challenging", but I don't really get feedback about whether the session intention was achieved by the athletes or if in the case of the session today if it was too difficult. (Field Notes, 2022/02/04)

Within endurance running an assessment of whether the goal of a practice has been achieved is usually done by some form of quantitative metric (i.e., heart rate, pace, lactate, RPE etc.). However, since the intention of each session was on improving athlete decision-making, I felt the best way to assess this was through verbal athlete feedback about what they were learning, something I was unable to get. In hindsight, while I attempted to move away from the traditional metrics used in endurance running, I merely tried to replace them with a different but singular way of assessing learning. Therefore, in addition to seeking their feedback, to better improve my understanding of their learning and development, I could have utilized the various prompts from Renshaw and colleagues (2019) of "we will know if we have been successful if: we can see, the data shows, the coach says, the performer feels" (p. 87), to allow for other markers of success.

Whose Story Is It?

The overarching goal of this AR project was to learn how to better design practices that promoted athlete decision-making in ways that were more representative of competition. Specifically, these scenario-based practices sought to challenge athletes to think about how they would write their own competitive story, respond to emergent situations, and/or manage their emotional responses when situations went awry. While each practice focused on a specific performance scenario, they all centered around enabling the athletes to be autonomous in their decision-making. However, throughout this project I had to learn to confront my own thoughts and feeling when athletes made decisions that differed from what I wanted them to do.

During the first perform session (session two), an athlete approached me following the visualization activity and "was very focused on 1500m pace being 5 minutes", while wanting to do a session that they used to do with their club "that was 200's off of 45s rest" (Field Notes, 2021/12/07). While I tried to guide them towards using the visualization activity to think about how the different rhythms and posture of that 1500m race would feel, and how they should aim to create those feelings, I noticed that they ended up doing 200m repeats off 45s rest. Since the goal was to have athletes think about their rhythms/postures/efforts beyond a pre-determined pace that is constrained by designated reps and rest, following this I questioned whether I needed to "add more constraints to have it not be a session she's done before", "take away the

watch", or change practice environments (Field Notes, 2021/12/07), so that they would be more compliant to what I wanted.

In this reaction was aimed at trying to get the athlete to think more about rhythms and effort, it established a pattern of thinking about how I could control their decisions to be what I would have done. This became most noticeable in session three when I was elated by one group's decisions and annoyed by another's. I was annoyed by how one group was organizing rest based on time, noting how "it was 5min and very much based on the watch" (Field Notes, 2022/01/04). Additionally, with that group I noticed how once they completed the minimum amount of work, they started to do their own separate individual sessions, which I thought was them "falling back on what's comfortable" (Field Notes, 2022/01/04). Conversely, when another group responded to the open-endedness of the session by being what I deemed as more "creative", I noted how much more "exciting" or "awesome" it was (Field Notes, 2022/01/04).

In his reflective case study, Denison (2007), recalled how conversations and different coaching practices became a way of controlling/directing his athlete's race towards how he (the coach) wanted it to be run, rather than how the athlete should have. Given my recent competitive experience at this level, through cycle one I found it difficult to not impose my beliefs around what I thought the best decisions to make were, however my perceptions were based around my capabilities and not necessarily of each individual athlete. As such, after the reflection process my reaction to these sessions became something I was more aware of and wanted to "check" during the planning of the second cycle, as I had to remember that because each athlete had different capabilities the way they perceived affordances would also be different. Therefore, during the second cycle I needed to learn to better trust the athletes to know what was best for them and continue to ask myself the question of "whose story is it". Additionally, to better encourage individual decision-making throughout the second cycle I aimed to create practice environments that presented athletes with more sources of "rich and functional information" (Davids et al., 2013, p. 29) that they could take advantage of. Overall, the awareness of these thoughts helped to make me more open and accepting of different athlete decisions through cycle two. For example, in session four when one of the athletes would purposefully get "dropped" on one rep, only to allow the next to feel better (something I did not intend to happen), I noted how I thought this was "interesting to see someone consider tactics in the entirety of the session and not just in a rep" (Field Notes, 2022/02/04).

CONCLUSION

Revisiting the definition of coaching effectiveness from Côté and Gilbert (2009), it is important for coaches to apply and integrate "professional, interpersonal, and intrapersonal knowledge" (p. 316) to positively influence athlete outcomes within their specific context. While this AR project sought to develop my professional knowledge pertaining to RLD through the application of the performance scenarios identified by McCosker and colleagues (2019), the key takeaway of this experience was the interconnectivity of the different types of coaching knowledge. Specifically, as I moved through the two AR cycles it became apparent that my ability to architect learning environments for athletes was contingent upon the consistent integration and application of these knowledges.

Together, the performance contexts of perform, respond, and manage, helped bridge the gap between my then understanding of practice design with the various principles of ecological dynamics, namely RLD. Regarding the context of perform, the practices implemented enabled the athletes to engage with rhythms and skills that were meaningful to their own race strategies, while allowing for more alignment between the intentions of myself and the athletes. Moreover, with the context of respond, I found that having athletes respond to a teammate's surge within a rep, as opposed to a split, created greater (from my perspective) action fidelity. However, when carrying these practices forward into my coaching praxis there is one key change I would make that differs from the original framework which was derived from the long jump. While a long jumper may experience each of the contexts throughout a competition, the serial nature of the event affords both the coach and athlete time to recognize/identify the specific context. Conversely, I found that the continual nature of endurance running tended to blend the edges of each performance context. For example, session four sought to challenge athletes to respond to their teammate's surges and paces. However, throughout this session athletes moved through each of three contexts in a non-linear/individual way. Specifically, they were challenged to perform by making their own surges, and to respond by reacting to their teammates. Eventually many of the athletes felt overwhelmed and doubted their ability to finish the session as written, consequentially having to manage their internal dialogue. Therefore, moving forward I would look to integrate the performance contexts into the same sessions to allow the athletes to learn to move between the skills used in each.

Beyond the development of my professional knowledge as it related to practice design, it is important to remember that coaching effectiveness is also contingent upon the integration/application of interpersonal and intrapersonal knowledge in the current

context (Côté & Gilbert, 2009). Throughout the cyclical process of AR, I became aware of how my communication with athletes was detracting from the overall outcome of each session. Moreover, the emphasis on reflection enabled me to recognize how certain thoughts had the potential to limit opportunities for athletes to make their own decisions and write their own story. As such, the emphasis on reflexivity throughout this process not only helped me improve the way I designed practices but also how I communicated important session logistics/details. Taken together, not only is AR useful in developing the different aspects of coaching knowledge separately, but it also allows for the development of professional, interpersonal, and intrapersonal knowledge in an integrated and applied way.

Since the development of coaching knowledge is contextual, it is important to note that this project looked to apply the principles of ecological dynamics in practice sessions that were specific to endurance running for indoor track and field. As such, future research could explore the application of these practice principles in other aspects of the sport – outdoor track and field, cross-country, and road racing. Moreover, this project focused on my own learning as a coach as it related to implementing practice designs based on the performance contexts of perform, respond, and manage. Therefore, future research could also look to explore from an athlete's perspective how these practices may or may not influence their decision-making processes, and whether they transfer these skills to a competitive environment. Finally, since this project involved the coaching of different athletes throughout both AR cycles, future research could focus more on demarcating some of the differences between sub-event groups (i.e., middle versus long distance), with the aim of exploring the different challenges a coach might face in, for example, implementing a session for an 800m athlete versus a marathoner.

Within endurance running, the current hegemonic methods for practice design are dominated by physiological understandings of energy systems (Mills & Denison, 2013). While the aim of this study was to supplement my current understanding of practice design, the results of this AR project demonstrate that considerations for athlete decision-making can be easily implemented in endurance running practices. Therefore, future coach education courses/program, such as the National Coaching Certification Program (NCCP) used in Canada, could attempt to first teach developing coaches some of the issues with reductionistic sessions, such as their limited impact on athlete learning, while also exploring some potential ways to enhance coaching practices. Relative to this study, learning facilitators could lead group discussions on RLD and strategies for increasing the action fidelity of the practice environment.

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APPENDIX

Table A1: Schedule of AR Practice Dates

AR Cycle	Practice Date	Performance Context	Athletes Involved	Session Details
Cycle One	November 26th	Respond	Men's & Women's 1500/300m Groups	3x(5x400m) with response to time
	December 7th	Perform	Men's & Women's 1500/300m Groups	Individualized blend of off track and on track work guided by visualization
	January 4th	Manage	Entire Team	Self/Group determined track session of 4-6km of work
Cycle Two	February 4th	Respond	Men's 1500/3000m Group	1000/800/600/400/400m// 400/400/600/800/1000m with response to time and teammates
	February 25th	Manage	Men's 1500/3000m Group	1600m// 1/1/2/1/1/2lap(s) with specific tasks assigned to each athlete
	March 7th	Perform	Men's Cross-Country/Half-Marathon Group	Individualized blend of off track and on track work guided by visualization