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Promoting Long Term Athlete Development in Cross Country Skiing Through Competency-Based Coach Education: A Qualitative Study

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ABSTRACT

Coach education programs in Canada and abroad have recently been framed around Long Term Athlete Development (LTAD), a seven-stage model that is based on the physical, mental, emotional, and cognitive development of children and adolescents. To date, limited empirical research on LTAD exists. The primary objective of this study was to identify whether individuals who completed a coach education course acquired an understanding of LTAD and whether they integrated this knowledge into their coaching practice. The secondary purpose was to identify information that could be used to improve the coach education program as well as the effectiveness of youth sport coaching in cross-country skiing. Results indicated the course was an effective technique for delivering the core principles of LTAD to coaches with little or no prior knowledge of the concept. As well, coaches successfully integrated the principles of LTAD into their coaching practices. These results are discussed in regard to improving the effectiveness of youth sport coaching.

Key words: Children's Sport, Coach Education, Cross Country Skiing, Long Term Athlete Development

INTRODUCTION

Youth sport is where children have fun and learn important social and life skills [1, 2]. However, simply participating in sport does not ensure enjoyment and positive experiences for children. The environment has an important effect on youth enjoyment, and one person who affects the environment is the coach [2, 3]. While a considerable amount of research has examined aspects of youth sport coaching, research is sparse on coaches of children who participated in sport at a very young age (i.e., from 0-6 years [4, 5]).

In a review of the scientific literature on physical play and child development, researchers have noted that physical activity in early infancy has led to improved neuromuscular

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development, physical control and motor patterns, cognitive development, focus and attention, self-efficacy and well-being [6, 7]. For example, Shephard [7] studied Canadian school children aged 6-12 and found that children who received an additional 5 hours of physical education per week showed better academic performances compared to their peers. Similarly, Castelli et al. [6] examined 259 school children aged 5-11 and found that physical fitness, specifically aerobic capacity, led to improved achievement in mathematics and English. Consequently, these results demonstrated that physical activity and sport improved cognitive and motor skills of young children.

In order to build positive environments promoting cognitive and motor development for children in sport, aspiring coaches should seek education programs that teach strategies on how to coach effectively. In Canada, coaches learn through attendance at coach education programs run by the Coaching Association of Canada (CAC). Created in 1970, the CAC promotes quality coaching to enhance the experience of Canadian athletes (www.coach.ca). This organization provides the foundation of skills, knowledge, and attitudes to ensure effective coaching across all levels of the Canadian sport system [8]. In 1974, this association launched a certification program called the NCCP, which has undergone several revisions over the years [8].

The newest NCCP approach was launched in 2008 and is a knowledge- and course-based program that focuses on skill analysis, practice planning, injuries, nutrition, and tactical components of sport [8]. The new NCCP format is made up of three streams: community, competition, and instruction. This study will focus on coaches who participated in the community stream and who were new to the coaching milieu. The community stream is geared for coaches of children between 0 and 6 years of age who are participating in sport for the first time [9]. At this level, the role of the coach is to ensure a fun and safe environment and to teach the fundamental movement skills and abilities to the participants [9].

Research has found that athletes of coaches who participated in education programs showed greater self-concept and self-esteem, more positive relationships and better communication skills, as well as an improved ability to work with others [10, 11, 12]. For example, Newin et al. [10] trained youth hockey coaches and found that participation in their program led to improved communication skills by coaches and increased enjoyment, ability to work with others, and team cohesion of athletes. Sullivan and Gee [12] measured the coaching efficacy of 176 coaches before and after they participated in either a theoretical coaching course or a technical course. Coaches who participated in the theoretical course showed positive changes in motivation and character building efficacy, as measured by the Coaching Efficacy Scale, compared to those who participated in the technical courses. Thus, it can be concluded that training and education programs can change coaches' behaviors and improve youth sport experiences.

The NCCP is the largest coach education program in Canada and is framed around the Long Term Athlete Development (LTAD) plan [13, 14]. LTAD was developed by Canadian Istvan Balyi in the 1990s and was first described in a document called "Canadian Sport Policy" and further expanded in "Canadian Sport for Life" [14, 15]. It was originally developed to ensure children learned fundamental movement skills during the optimal physical development stages in order to promote athletic excellence [16]. LTAD approaches promote children's development by fostering five core competencies of problem solving, critical thinking, interaction, valuing, and leadership [15]. Balyi's LTAD model emphasizes the development of general motor and technical-tactical skills for young children, prior to the onset of peak height velocity (the major growth spurt during maturation) [17]. LTAD is a

training model that focuses on teaching children fundamental physical skills based on their developmental age and physical maturity level rather than chronological age [16]. More specifically, LTAD is a seven-stage model based on the physical, mental, emotional, and cognitive development of children (Table 1) [15]. One of the goals of the first three stages of LTAD (active start, FUNDamentals, and learning to train) is to encourage physical literacy, which is defined as “the development of fundamental movement skills and fundamental sport skills that permit a child to move confidently and with control, in a wide range of physical activity, rhythmic (dance) and sport situations” [13, p. 5]. It is believed that acquiring fundamental movement skills at a young age will help children develop lifelong participation in physical activity.

Currently, sport systems in Canada and the United Kingdom are required to have sport-specific LTAD plans to receive federal funding [16, 18]. For example, Cross Country Canada produced a document called “Cross Country Skiing: A Sport for Life”, while other sports produced similar sport-specific documents. This has contributed to the widespread implementation of LTAD among sport programs in these two countries. This has led to empirical [16, 18] and non-empirical [17, 19, 20] publications on this topic. For example, Lang and Light [16] investigated how the British swimming association adapted the LTAD model to their program and how the model was interpreted and implemented by their coaches. The researchers found that coaches’ agreed with the LTAD model of teaching technique at an early age as an essential building block for athlete development. However, participants showed concern with the program’s over-emphasis on volume of practice at the expense of fun and technique development. In addition, researchers found that coaches were critical of some competition rules which contradicted elements of LTAD, such as fast tracking athletes for short-term podium results and forcing young players to compete in endurance-based events.

In a similar study, Black and Holt [18] interviewed coaches and parents to evaluate their perspectives of a Canadian ski racing LTAD program. They found that coaches and parents valued the LTAD program because it offered the same coaching guidelines for coaches across Canada. However, some participants reported not fully applying the LTAD program in their practices, having difficulties staying up to date with the program, and still relying on their background experience and knowledge rather than the precepts of the model. Researchers concluded that LTAD has been used more as a planning tool than as a strict training program and that it was being implemented differently across ski racing clubs.

The limited research on LTAD investigated coaches’ and parents’ perceptions of how their sport organizations adapted and implemented LTAD. While this is a good first step to understanding the impact of LTAD on youth sport associations, youth sport coaches, and youth athletes, research is required to understand how coaches learn and apply the principles of LTAD. Coaches are a key component of youth sport because of their role in building the sport environment and their influence on athletes’ growth and development [2, 3]. Therefore, the primary objective of the present study was to assess whether the NCCP – Introduction to Community Coaching (ICC) course was teaching coaches the basic principles of LTAD. Additionally, this study examined whether coaches attending the ICC course incorporated elements of the LTAD model into their coaching practices. The secondary objective was to identify information that could be used to improve the NCCP – ICC course specific to LTAD and to improve the effectiveness of youth sport coaching in cross-country skiing. The information gained from this study stands to improve the education of youth sport coaches in Canada, both from theoretical and practical perspectives. To the best of our knowledge, this study was the first to specifically target the Active Start (age 0-6) age group. The results

Table 1. Outline of LTAD

Stage	Description
Active Start	FUN and part of daily life. Fitness and movement skills development. Focus on learning proper movement skills such as running, jumping, wheeling, twisting, kicking, throwing, and catching. Not sedentary for more than 60 minutes except when sleeping. Some organized physical activity. Exploration of risk and limits in safe environments. Active movement environment combined with well-structured gymnastics and swimming programs. Daily physical activity.
FUNDamentals	Overall movement skills. FUN and participation. General, overall development. Integrated mental, cognitive, and emotional development. ABC's of Athleticism: agility, balance, coordination, and speed. ABC's of Athletics: running, jumping, wheeling, and throwing. Medicine ball, Swiss ball, own body strength exercises. Introduce simple rules of ethics of sport. Screening for talent. No periodization, but well-structured programs. Daily physical activity.
Learning to Train	Overall sport skills development. Major skill learning stage: all basic sport skills should be learned before entering. Training to Train. Integrated mental, cognitive, and emotional development. Introduction to mental preparation. Medicine ball, Swiss ball, own body strength exercise. Introduce ancillary capacities. Talent Identification. Single or double periodization. Sport specific training 3 times week; participation in other sports 3 times a week.
Training to Train	Sport specific skill development. Major fitness development stage: aerobic and strength. The onset of Peak Height Velocity (PHV) and PHV are the reference points. Integrated mental, cognitive, and emotional development. Develop mental preparation. Introduce free weights. Develop ancillary capacities. Frequent musculoskeletal evaluations during PHV Selection. Single or double periodization. Sport specific training 6-9 times per week including complementary sports.
Training to Compete	Sport, event, position-specific physical conditioning. Sport, event, position-specific technical tactical preparation. Sport, event, position-specific technical and playing skills under competitive conditions. Integrated mental, cognitive, and emotional development. Advanced mental preparation. Optimize ancillary capacities. Specialization. Single, double, or triple periodization. Sport specific technical, tactical and fitness training 9-12 times per week.
Training to Win	Ages are sport specific based on international normative data. Maintenance or improvement of physical capacities. Further development of technical, tactical, and playing skills. Modelling all possible aspects of training and performance. Frequent prophylactic breaks. Maximize ancillary capacities. High Performance. Single, double, triple, or multiple periodization. Sport specific technical, tactical, and fitness training 9-15 times per week.
Active for Life	Minimum of 60 minutes moderate daily activity or 30 minutes of intense activity for adults. Transfer from one sport to another. Move from highly competitive sport to lifelong competitive sport through age group competition. Move from competitive sport to recreational activities. Move to sport careers or volunteering. There is a better opportunity to be. Active for Life if physical literacy is achieved before the Training to Train stage.

of this study provide one of the first empirical accounts of the transfer of LTAD knowledge through coach education.

METHODS

PARTICIPATORY ACTION RESEARCH (PAR)

PAR was used as the methodological framework for the present research study. PAR is an approach to research in which participants are actively involved in all phases of the research process [21]. Within the PAR framework, knowledge is generated through the participants' lived experiences [21], and the social and historical context in which they live [22]. The primary objectives of PAR are to conduct research that develops partnerships between participants and researchers, and creates knowledge that benefits the participant through action and social change [21, 22]. The benefit for the participant may be in the form of policy change or interventions specifically tailored to meet the participants' needs [22]. Papineau and Kiely [23] identified three main reasons for conducting participatory research: 1) to increase the practical utility of research results, 2) to enhance the inclusivity of the research process by including stakeholders with multiple perspectives, and 3) to include groups and/or persons who may have been excluded from the traditional research process. The information gathering process is a collaborative process in participatory research, encouraging sharing between participants and the research team to increase the relevance and practical application of the study findings [21, 24].

The historical background of PAR can be traced as far back as the 1940's with the work of Kurt Lewin, one of the founders of modern social psychology [25, 26]. Lewin [25] suggested that social problems could be addressed through a collective inquiry paradigm that is cyclical, reflective, and collaborative. In the 1960's, participatory research formally recognized participants as stakeholders in the research process [26]. Currently, participatory research is a methodology common to the fields of community development [27], education [28], and health research [29]. Specific to sport, PAR has primarily been used to study cross-cultural sport experiences [e.g., 30], but has not been used extensively in mainstream sport psychology [24]. Schinke et al. [30] examined the role of family members in promoting sport engagement among Canadian Aboriginal youth. PAR helped foster collaborations between the participants and the research team where the researchers attended community meetings and participated in traditional Aboriginal talking circles to promote openness and build trust between the researchers and participants [30]. In a similar manner, the lead investigator attended the Introduction to Community Coaching (ICC) coaching course with the participants in the present study to gain a complete understanding of the perspective and sport experiences of the participants. By attending the ICC coaching course, the researcher was able to engage the participants in the research process, develop a partnership to facilitate open communication between the participants and researchers, and identify solutions tailored to the needs of the community. Coaches were actively involved in the research process by creating activities which promoted LTAD in their community. Thus, in line with the description of PAR, knowledge was created through action and efforts for social change.

PARTICIPANTS

The participants included seven cross-country ski coaches (four female and three male) working with athletes 3 to 6 years-old. These coaches were recruited from a convenient sample in an NCCP certified ICC course at a ski club located outside of a major urban Canadian city. Six of the seven coaches who participated in the study had no experience coaching cross-country skiing. Two coaches had 10 years of coaching experience (one in

cross-country skiing, the other in gymnastics), but neither had ever worked with athletes under eight years old. The participants ranged in age from 35 to 60 years, and all were married. Every participant had at least one child involved in cross-country skiing. All of the participants had university degrees, and five had postgraduate education. According to the ICC course coordinator and experts in the sport, this population was typical for the sport of cross-country skiing in Canada.

PROCEDURE

Consent was obtained from the University Research Ethics Board to conduct this study. Each participant read and signed an informed consent document and completed a demographic questionnaire. The research team received permission from the CAC and Cross Country Canada (CCC) to conduct the study. The Cross Country Ski season lasts from mid-December until the end of March (or mid-April), depending on the weather and snowfall. The ICC course took place over the first weekend of December. At the end of the course, participants completed a 12-item demographic questionnaire that consisted of general information (e.g., age, gender), cross-country ski experience, and coaching experience.

CCC and the CAC created the two-day ICC course to teach entry level coaches how to be an effective coach and create age appropriate series of skill development sessions under the supervision of experienced recreational ski coaches. The course was led by two experienced facilitators with many years of experience as coach educators. The course covered both theoretical and practical aspects of coaching cross-country skiing. Theoretical topics included the LTAD model, values and ethics in coaching, skill development for children under six, clothing and equipment, designing an activity plan, and sport safety. Practical topics included learning games appropriate for young children, practicing safety procedures, and discussing how to modify their personal skiing experiences to working with very young athletes.

Four to six weeks following the coaching course, the participants completed a mid-season telephone interview that lasted approximately 30 minutes. End-of-season phone interviews were conducted with each participant, approximately six weeks following completion of the ski season. The end-of-season phone interviews lasted between 20-30 minutes. Both interviews were tape recorded and transcribed verbatim. Telephone interviews are an effective tool for gathering information in qualitative research studies when face-to-face interviews are not feasible [31].

INTERVIEW GUIDE

Qualitative interviews were used in this study to gain an in-depth understanding of the coaches' knowledge of the LTAD model, and their experience working with athletes under the age of six. For both the mid-season and end-of-season interviews, semi-structured interviews with open-ended questions were used and were guided by a pre-planned interview script [32]. As suggested by Rubin and Rubin [32], the interviewer used the main questions from the interview guide to direct the flow of the conversation, and used probes and follow-up questions to clarify or elaborate on their answers. The interview guide for the mid-season interview consisted of nine questions focused mainly on the coaches' perceptions and understanding of the LTAD model (e.g., In five sentences or less, can you describe what Long Term Athlete Development means to you?) and feedback on the coaching course (e.g., What part of the coaching course did you find most useful for you as a coach?). The interview guide for the end-of-season interview consisted of thirteen questions and focused on the coaches' experience over the course of the season (e.g., Do you think that your

coaching strategies changed over the course of the season?; Could you describe some challenges you faced over the season and how you handled these situations?) and whether they successfully integrated the concepts of LTAD into their coaching practices. To address this final topic, the interviewer listed the principles of LTAD for the Active Start age group (athletes under the age of six), and asked the coach to provide a personal example or anecdote for each one.

DATA ANALYSIS

Gilbourne and Richardson's [24] procedural framework for PAR analysis in sport was followed. The interview transcripts were the primary data source for this study, and the demographic questionnaires were used as a secondary source of information. The coaches were each assigned a unique label (C1-C7), so all identifying information was removed from the transcripts. The analysis of data began by dividing the text into *in vivo* restatements and by labeling the restatements into a theme [33]. Following this, restatements were then re-organized into two categories specified *a priori* by the research team: principles of LTAD and ICC course-related information [33]. Consistent with PAR research, this analysis involved a continuous cycle of iteration, analysis, assessment, reiteration, and reanalysis [21].

TRUSTWORTHINESS

Many of Lennie's [22] suggestions for increasing the trustworthiness and rigor of PAR were used in the current study. First, the research team employed community participation and engagement, also known as stakeholder analysis or prolonged engagement, to ensure relevant stakeholders were involved in the research process [22]. As well, the research team consulted with the national sporting organization (CCC), coaching regulatory body (CAC), and course facilitator prior to the workshop. Second, multi-level triangulation or the use of multiple data sources and collection techniques to understand complex phenomena was used in the current study. This involved using multiple data sources (coaches, CAC, CCC, course facilitator) at multiple time points, using multiple collection techniques (demographic questionnaires and qualitative interviews), and ongoing formal and informal critical reflection with the members of the research team and community stakeholders [22]. Third, participant review was used to improve the face and content validity of the data collected. Participants in this study were given the opportunity to verify the researcher's understanding of the information they provided and clarify or modify any portion of the interview through a review of the complete interview transcripts at mid and end-of-season. The process of participant review took place to increase the credibility and validity of the data [22].

RESULTS

The following section includes the results of the data analysis of the seven interviews. The data was divided into two categories, which were called *Principles of LTAD* and *ICC Course-Related Information*.

PRINCIPLES OF LTAD

This category describes coaches' understanding of the LTAD model. In addition to gaining LTAD knowledge, all of the coaches talked about how they incorporated the principles of LTAD into their coaching practices throughout the season. Prior to the ICC course, 5 out of 7 coaches had heard of LTAD from various sources (i.e., CCC website, university physical education courses), but their knowledge was limited. During the mid-season interviews, all of the coaches expressed a general understanding of the principles of the LTAD model as it

applied to working with very young athletes. As suggested by the LTAD model, the main focus in the Active Start age group is to develop physical literacy and promote positive sport experiences for all. One of the key components of LTAD is coaching based on developmental age, rather than chronological age. One coach highlighted this perspective by stating that “the coaching you do is more developmentally appropriate. One really needs to think developmentally, not by age groups” (C2).

Cross Country Canada identified six aspects of the LTAD model for the Active Start age group [15], and the coaches highlighted each of these six areas during the interviews.

FOCUS ON LEARNING FUNDAMENTAL MOVEMENT SKILLS AND LINKING THEM TOGETHER WITH SKI PLAY

All of the coaches demonstrated their understanding of the importance of teaching fundamental movement skills as a foundation for future skill development. Coaches highlighted the idea of teaching movement skills in a fun and indirect way. For example, teaching weight transfer through a game where the athletes were told to step over the orange volcano (orange colored cone) or teaching herringbone through the ‘dinosaur walk’. “It’s more about creating an environment and choosing activities that will foster a natural skill acquisition or the fundamentals that will lead to a natural skill acquisition” (C7). Another coach described a game called Human Bowling which taught three important ski skills: going down a hill at a controlled pace, hitting specific targets, and climbing back up the hill. By combining skill development with the bowling game, the athletes were having fun while learning ski skills:

...find a gentle hill that the kids can get a bit of speed going down and place the plastic bowling pins on the hill... and you say to the kids “go down the hill and knock as many over as you can”. And it worked really neat for two reasons. I mean they really loved going down and knocking them over but they were also able to get up on their own. And when you’re dealing with 4 year olds, that’s really pretty good (C5)

Coaches described using other games, such as “treasure hunts, where the kids went off on the trails to various locations to find treasures” (C2) or using the “skiers alphabet” to teach kids how to move around their skis “by saying make your skis look like the letter A or V” (C6). Throughout their lessons, all of the coaches tried to use games and ski play to teach fundamental movement skills.

DEVELOP FITNESS AND MOVEMENT SKILLS AS A FUN PART OF DAILY LIFE

An important aspect of the Active Start phase of the LTAD model is the importance of promoting fun and long-term sport involvement, rather than competition and technical skill development. Coaches discussed using games as a tool for movement skill development rather than using formal teaching: “The kids responded very well to playing games and learning the skills through a game and not knowing that they were actually developing a skill per se” (C5). “We did lots of games and little skill stations as we were skiing. We would come up to a little hill and if we were trying to teach herringbone we would pretend we were climbing the hill like bears” (C1). All of the coaches emphasized the importance of creating a fun sport environment to encourage sport participation:

. . . [LTAD] is about making it fun more than educational at this stage . . . the idea is just to get them out there and if they think it's fun when they leave the class they'll want to sign up next year. If they think that is fun, they'll sign up the year after that. (C4)

This idea was reinforced by another coach, who said, "Certainly next year I want them to *want to* put on their skis. It's not about endurance or perfecting their skills. I just want them to appreciate cross country skiing." (C3). In addition to teaching cross-country ski skills, coaches emphasized the importance of helping the athletes develop fitness skills and aerobic capacity to foster a love of physical exercise:

You [could] really see the fitness and fun level increasing in our last lesson when we went for our biggest ski. We actually skied a little loop that's maybe around a kilometer, and there were some hills in there and all the kids were having a great time just doing it because it was new and fun and they were all skiing really well and having fun . . . [the athlete's] fitness level seemed to have improved. (C6)

Despite the overall emphasis on informal teaching, the coaches demonstrated that their athletes' ski skills and endurance had improved over the course of the ski season.

ALLOW ATHLETES TO EXPLORE RISKS AND LIMITS IN SAFE ENVIRONMENTS

All of the coaches who were working with very young athletes highlighted the importance of making safety a top priority. Coaches described making decisions about safe temperatures and how to deal with athletes potentially getting separated from their group. Regarding safety in cold weather, one coach stated: "We'd start a session by asking each one of them to provide an element of how to keep warm [while skiing]" (C3). The coaches also wanted the athletes to develop their own safety awareness and decision-making skills by "letting them go down [the hill] by themselves and seeing how they make mistakes and teaching them how to go down safely and properly" (C4). Furthermore, one coach noted:

. . . there's this one little hill at the club where it's a huge challenge for many of them to do. I think it's mainly a psychological challenge because it's not a long hill but it's pretty steep and there's a corner at the bottom. And as soon as there's enough snow the kids start to ask "Can we do it? Can we do it?" . . . So we certainly encourage that sort of thing. . . If a particular kid finds something especially difficult we will work with him/her to overcome that challenge. (C2)

INTRODUCING THE SIMPLE RULES AND ETHICS OF CROSS COUNTRY SKIING

Although the athletes were very young, the coaches made an effort to educate the athletes on trail etiquette, ". . . how you pass people and how to be safe on the ski trails and follow the appropriate rules, we spoke about it" (C6). Another aspect of the rules and ethics of sport discussed by the coaches was fair play. The coaches tried to teach their athletes to cheer on their teammates, to lose graciously, and to congratulate others at the finish line.

HELP ATHLETES LEARN TO CROSS COUNTRY SKI IN A NATURAL ENVIRONMENT WITH LIMITED FORMAL INSTRUCTION

None of the coaches described using formal instruction as a tool to teach the athletes ski skills. Coaches reported teaching the athletes through demonstrations and quick lessons (1-3 minutes maximum) out on the trail, “. . . there’s no sense talking to them for 15 minutes and saying blah blah blah, it has to be short, quick, punctual, and give very simple examples” (C5). All used ski games, role-playing, quizzes, and small prizes (jelly beans, stickers) as tools to instruct the athletes. The children had very limited attention spans, and it was very cold outside to stand still and listen to a ski lesson. The coaches described the importance of making a formal lesson plan ahead of time to ensure they had enough games and fun ski drills planned to teach their athletes. Thus, while the ski instruction was informal and included little formal teaching, the coaches all made formal lesson plans: “Usually I would make a little plan after going through the binder and looking at the lesson plans. So I would make games suitable for the skills we were trying to teach on that day” (C1).

HELP ATHLETES DEVELOP THE ABC’S OF ATHLETICISM (AGILITY, BALANCE, AND COORDINATION)

One of the basic principles of the LTAD model with young athletes is to help them develop the ABC’s of athleticism (agility, balance, and coordination). One coach stated, “My athletes had huge improvements in [agility, balance, and coordination] over the course of the season. Just unbelievably big improvements in all of those areas” (C7). Another coach noticed improvements in the ABC’s through their ability to handle increasingly difficult ski trails. Coaches also commented on how the rate of progress and improvement varied from athlete to athlete, some improved a significant amount over the course of the season, while others only improved slightly: “Yes, they definitely all improved in these areas. Some kids are higher in one of the categories but another kid would balance it out [and] they all improved” (C1).

ICC COURSE-RELATED INFORMATION

While the previous category demonstrated the coaches’ understanding and implementation of the LTAD model, the current category contained information specific to the NCCP-ICC course and youth sport coaching in general. Overall, the coaches thought the course was extremely useful, taught them the principles of LTAD and how to work with athletes under the age of six. They provided positive feedback, as well as some suggestions for improvement. All of the coaches said that they would recommend the course to other coaches starting out in their club next season. Two indicated that coaches should not be allowed to coach without taking the ICC course.

All of the coaches felt the course did a good job of preparing them to work with very young athletes. While some of the coaches had worked with youth before, or were parents of young children, they appreciated the course covering topics that were not specifically coaching-related, such as “. . . [being] prepared for someone peeing in their snow pants or someone getting lost” (C6), and “learning what the kids were able to do, not necessarily physically, but on a mental level, how much they could concentrate, and how long you could keep their attention in a certain activity” (C5).

The coaches also identified that learning how to create lesson plans and the value of making a back-up plan were aspects of the course that contributed to their coaching success, “. . . I liked the preparation part, like what to bring, what to expect, when you head in because it’s too windy etc.” (C1). Another coach stated: “[One thing] I took from the course was the

importance of having a lesson plan. You know, from start to finish, every 5 minute segment planned and alternatives for things that aren't going well or aren't possible" (C7). Although learning how to create lesson plans is a topic included in many coach education courses, the coaches emphasized the importance of having plans and back-up plans due to the young age and short attention span of the athletes.

In addition to the classroom-based learning, the coaches appreciated the age-appropriate ski games that were taught to them. The ICC course covered real-life scenarios to prepare the coaches for working with athletes under the age of six:

And also the scenarios we went through, where it was like "well what are YOU gonna do if you have a crisis on the trail"? I didn't think of that myself. I've never had any injury or crisis while skiing so it didn't really occur to me that I needed to be prepared for all of these eventualities. In that sense, it was very valuable for me. (C4)

Although all of the coaches enjoyed the LTAD focus of the course, specifically the emphasis on fun and the acquisition of fundamental movement skills, coaches would have preferred more technical knowledge to properly teach athletes ski skills. Half of the coaches were novice cross-country skiers and they would have liked some step-by-step skill instructions or skill progressions:

I would have liked more specific [skiing] skills. I don't know if that was one of the goals of that particular course, and I guess I could read it in the books. But how do you really show your kids how to get up? We didn't go through things like that step by step. And you know when they're going down the hill and they're sitting back too far, these are three things you need to do to correct it. The technical parts of the skills we're supposed to be teaching. Maybe a bit more on that stuff would've been helpful. (C2)

Another coach highlighted the need for further instruction on technique development, and described how it would have helped her as a coach throughout the ski season "because at the coaching course we [did not] actually talk so much about techniques" (C7).

An additional area of improvement coaches identified was dealing with parents:

The other thing that struck me during the season were the parents that were concerned about the program. It wasn't even the program that they were concerned about, but their individual child's performance . . . Another module that I think perhaps could be added is role playing in general about how to give feedback both to athletes and parents. (C3)

Although the athletes participating in the ski program were all under the age of six, coaches reported having to explain to a number of parents that the program was about fun and skill development, not podium finishes: "There were parents who were having concerns about having some kids in the program who were holding back their own kids who were 'really good' and should be excelling, yet haven't come in top 3. Parents need to realize that we are not focused on results at this phase." (C1). Another coach identified a situation in which a parent telephoned him and asked, "Why is the other class moving faster than yours as I don't feel my kid is moving around enough?" (C5). Through e-mail, telephone, and face-to-face

meetings, the coaches reported explaining the objective of the ski program to the parents, but would have liked the ICC course to provide specific training or advice on what to say to parents who were overly competitive.

DISCUSSION

The primary purpose of the current study was to evaluate whether coaches who completed the new NCCP community coaching course acquired an understanding of the LTAD model and whether they integrated the principles of the Active Start phase of the LTAD model for cross country skiing into their coaching practices. The secondary purpose of the study was to identify information that could be used to improve the ICC course specific to LTAD and to improve the effectiveness of youth sport coaching in cross-country skiing. Through the analysis of the mid- and end-of-season interviews, it was apparent that all of the participants identified the key components of the model and integrated them into their coaching practices. As well, the coaches provided both positive and constructive course-related feedback.

Consistent with the definition of LTAD [cf. 13], coaches conceptualized LTAD as a training model that focused on promoting physical literacy, stressing fun, and teaching fundamental movement skills appropriate for the athletes' developmental level. Support for the LTAD model found in this study differs from the results of two published empirical studies in the coaching literature. For example, Black and Holt [18] did not find widespread acceptance and implementation of LTAD among the coaches in their study. Similarly, Lang and Light [16] reported that coaches were disappointed that the LTAD model focused on practice volume rather than technical development. The positive feedback on the LTAD model from the participants in the current study appears to contrast with these two empirical accounts. This is likely attributed to some of the contextual differences between those studies and the current one.

First, it is possible that the coaches in the present study were more receptive to learning the LTAD model and were more ready to embrace the principles contained within this model because they were all novice coaches with limited coaching experience. Both of the previous studies included experienced or elite coaches who had years of experience and accumulated knowledge. Black and Holt [18] reported that some of their coaches felt that the tactical and technical elements of the LTAD plan were too simple to appeal to experienced coaches. Perhaps an experienced coach is less likely to 'buy-in' to a developmental model if they have already achieved success with their personal coaching strategies. Second, the coaches who were interviewed in the two previous studies were coaching competitive athletes. Perhaps their skepticism about LTAD was related to a lack of compatibility between certain aspects of the model and highly competitive youth sport environments. Previous research has focused on the FUNDamentals, Learning to Train, and Training to Train stages of the LTAD model, while this study focused exclusively on the Active Start group. Many of the concerns highlighted in previous research such as difficulty assessing athletes' skill level and limited coach buy-in [18] or emphasis on practice volume and fast tracking athletes for podium results [16] did not apply to the recreational ski environment that existed in this study. Coaches working in the Active Start age group focused on athletes having fun as opposed to worrying about competition results or talent identification. As suggested by the LTAD model (Table 1), coaches working with athletes greater than six years old should begin to screen for talent in the FUNDamentals stage, and continue talent identification, sport skill development, and assessment through the Learning to Train and Training to Train Stages. Further research is required to understand how coaches working in competitive sport environments can use the LTAD model.

Despite the positive feedback on the LTAD model and ICC course in the present study, coaches identified two specific course-related areas for improvement: skill instruction and dealing with parents. With respect to skill instruction, the novice coaches in the current study wanted more technical instruction skills to teach to their young athletes who generally had no prior skiing experience. Moreover, many of these novice coaches were also novice skiers and felt they would have benefitted from learning basic ski skills. The course consisted mainly of on-snow games and tips for working with athletes under the age of six as opposed to technical ski skills.

Another suggestion for improving the ICC course was related to additional training on interacting with parents. Parents play an important role in youth sport, so much so that Smoll, Cumming, and Smith [34] referred to the coach-parent-athlete relationship as the “athletic triangle”. The interactions between members of this triangle have a strong influence on young athletes’ sport experience. Although all of the coaches in the present study were parents, they still wanted information on how to effectively deal and interact with parents. At the end of the ski season, coaches felt that parents were overly concerned with their child’s individual sport performance, which is inconsistent with the goals and objectives of the LTAD model at this phase. A similar disconnect between coaches and parents was reported by Lang and Light [16] and Black and Holt [18]. Lang and Light [16] reported parents focusing on higher volumes of training and early specialization in detriment to the FUNDamental principles of LTAD participation. Also, Black and Holt [18] indicated parents had limited knowledge of the LTAD plan used by coaches in their study. Perhaps the ICC course could include a specific module on how to explain the LTAD model to parents by providing coaches with resources (e.g., handouts or pamphlets) to give to parents of young athletes to help them better understand the objectives of sport participation at this phase. It is interesting to note that although the ski environment in the present study was recreational, and some of the athletes were as young as 3 years old, parents were still concerned with their child’s performance relative to other children in the same group.

Physical activity and sport involvement for children under the age of six has been linked to positive developmental outcomes [35]. Among this age group, physical activity is associated with improved motor development, endurance, strength, cognition, and emotional regulation [35]. Additionally, sport participation for young children has been linked to the development of life skills, such as leadership, communication, and self-management [36]. It is important to ensure that children not only begin participating in physical activity at a young age, but also continue to participate throughout childhood and adolescence [6]. Coaches must be properly educated on how to foster a sport environment that promotes positive youth development and continued sport involvement. The results of the present study demonstrates that the ICC course was able to teach coaches how to foster a healthy sport environment, promote positive youth sport experiences and long term athlete development. It also indicates that coach training and education programs are a possible means of changing coaches’ behaviors and promoting psychosocial outcomes among young athletes [10-12]. From a theoretical perspective, the present study contributes to our understanding of the Active Start phase of the LTAD model. The results of this study demonstrate the practical utility of using a theoretically-based, competency-focused coach education course to teach coaches how to work with very young athletes. Moreover, to the best of our knowledge, the present study is the first to specifically examine coaches working with very young athletes in the Active Start age group.

As with any research study there are limitations that must be identified. This study included a small sample of coaches who were members of an organized and well-established

ski club. Future research is required to assess the influence of the ICC course on a larger and potentially more diverse group of participants, as all of the coaches in the present study were educated, older than most novice coaches, and had children participating in the sport [cf. 37]. Moreover, the two coach educators, who were facilitating the ICC course were very experienced facilitators with years of training, as teachers and ski coaches. Future research is required to identify the influence of the coach educator on coaches' perceptions of the material presented in the coaching course. As well, since the athletes in this study were very young, we were not able to assess the athletes' perspective on their coaches' behaviors. The topic of young athletes' perceptions of the LTAD model requires further research, perhaps using quantitative measures.

CONCLUSION

The results of this study indicated that the ICC course was an effective medium for delivering the core principles of LTAD to coaches with little or no prior knowledge of the concept. The coaches were able to describe many of the core principles of LTAD during their end-of-season interviews, including how they integrated these principles into their coaching practices. This could be attributed to the theoretical and practical lessons included in the course. Coaches trained through the ICC course stand to improve the effectiveness of youth sport coaching in cross country skiing and promote long term athlete development in very young athletes. As there are few published studies on LTAD, there are many future directions for this line of research. Further research is required to understand whether the ICC course influences coaching behavior in the long term (over the course of more than one season), or whether coaches who have previous coaching experience would change their practices as a result of the course. The present study is one of the first to focus specifically on coaches of very young athletes, and the results demonstrate that these athletes have unique needs that must be met with specialized coach education. The current results stand to augment a limited body of research within the empirical sport psychology literature, and through the use of PAR methodology, this study makes practical recommendations that will serve athletes, coaches, and coach educators for many years to come.

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