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Cross-country Ski Coaches and the Long-Term Athlete Development Model: Exploring Attributes of Adoption in Three Clubs

Adoption du modèle de Développement à long terme de l'athlète par les entraîneurs de trois clubs de ski de fond

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Abstract

The Canadian Long Term Athlete Development (LTAD) model is athlete-centered and coach-driven with the support of administration, sport science, and sponsors. Due to scarcity of referred research conducted on the adoption of the LTAD model by Canadian coaches, this project investigates how the structure of three different cross-country ski (XCS) clubs influenced the way that coaches perceived the attributes of the LTAD model and how this affected their decision to adopt the model. Results are presented in case studies of three XCS clubs (from the perspectives of 13 coaches) using Rogers' (2003) Diffusion of Innovations theoretical framework to structure the narrative-interview guide, codes, and thematic analysis. Results indicate that the club structures (e.g., size, focus, and objectives) influence coaches' adoption of the LTAD model. Club mandates, coach education opportunities, and parental knowledge of the LTAD are discussed as useful mechanisms to increase LTAD adoption.

Résumé

Le modèle canadien de Développement à long terme de l'athlète (DLTA) est centré sur l'athlète, dirigé par l'entraîneur et soutenu par l'administration, les sciences du sport et les commanditaires. Puisque très peu d'études publiées dans des revues arbitrées se sont intéressées à l'adoption du modèle de DLTA par les entraîneurs canadiens, les auteurs de cette étude ont cherché à savoir comment la structure de trois clubs de ski de fond influence leur perception de leurs entraîneurs de ce modèle et leur décision d'adopter ou non le modèle de DLTA. Organisés en études de cas, les résultats présentent les points de vue de 13 entraîneurs travaillant dans l'un ou l'autre des trois clubs de ski de fond étudiés. Les chercheurs ont eu recours au cadre théorique de diffusion de l'innovation de Rogers (2003) pour structurer le guide de l'entrevue

narrative, les codes et l'analyse thématique. Les résultats ont confirmé l'existence d'un lien entre la structure du club (p. ex., grosseur, orientation, objectifs) et la tendance des entraîneurs à adopter ou non le modèle du DLTA. L'article précise également que le mandat du club, la formation offerte aux entraîneurs et la familiarité des parents avec le modèle de DLTA constituent des mécanismes utiles qui favorisent l'adoption du modèle de DLTA.

Introduction

Due to Sport Canada's goals of enhanced participation, excellence, capacity, and interaction in all aspects of Canadian sport (Canadian Heritage, 2007), the Long-Term Athlete Development (LTAD) model has become the backbone of a Canadian sport movement. The LTAD model is a development model "based on the physical, mental, emotional, and cognitive development of children and adolescents" (CSC, 2006, p. 7). The model is made up of seven unique stages of development (Active Start, FUNdamental, Learn to Train, Train to Train, Train to Compete, Train to Win, and Active for Life) that span from children's first introduction to unstructured play to the identification and support of healthy development and growth for Canadians throughout their lives in both recreational and competitive sport (CSC, 2006). Over the past ten years, most Canadian sport organizations have adopted and modified the LTAD model to their sport specific needs. In fact, "federally-funded Canadian sports are required to have a LTAD plan" (Black & Holt, 2009, p. 1). However, due to the scarcity of referred research conducted on the adoption of the LTAD model by Canadian coaches, there is a lack of understanding regarding what is happening in their coaching practices. Thus the aim of this study is to address this gap by investigating how the structure of three different cross-country ski (XCS) clubs influenced the way that coaches perceived the attributes of the LTAD model and how this affected their decision to adopt the model.

Long-Term Athlete Development Model

The LTAD model is one model of athlete development that exists within coaching literature. Other models of athletic and sport development take on different forms each with their own unique set of outcomes and goals. Examples of this are seen in the work of Alfermann and Stambulova (2007) and Durand-Bush and Salmela (2001). In the citation network analyses done by Bruner, Erickson, Wilson, and Côté (2010), they found that most research focused on *talent-development* and *transitional models* of athlete development in sport. The LTAD model includes concepts borrowed from both talent development models (e.g., deliberate practice, social influences, environmental factors) and transitional sport models (e.g., life-long participation, role transition, recreational sport). This created a hybrid model with two main objectives: elite performance and life-long participation in sport and/or physical activity. The LTAD model represented a unique and innovative model within the body of coaching science by encouraging both early participation in sport, elite performance, and lifelong physical activity (CSC, 2006). Côté and colleagues (2002, 2007) proposed four possible benefits to meaningful participation in youth sport; (1) physical health, (2) psychosocial development, (3) motor skill acquisition, and (4) increased physical activity as an adult. However, for youth to experience meaningful participation in sport and physical activity, coaches must have sufficient training and knowledge to properly engage and develop their athletes. The LTAD is designed to educate coaches about principles of LTAD in order to create meaningful sport experiences for the youth that they coach.

While there is a scarcity of refereed research on Canada's LTAD model as perceived by coaches, one study conducted by Black and Holt (2009) evaluated the perceptions of coaches and parents on the implementation of a LTAD-based competitive alpine ski program in Alberta. They found that the LTAD-based program could allow coaches to: (1) have consistent language, (2) update their knowledge, and (3) more easily plan training sessions. Nonetheless, there were few positive comments from coaches, and parents had little knowledge of the LTAD or its general principles.
A study by Banack, Bloom, and Falçao (in press) found that coaches were generally more positive about the LTAD model. These coaches focused on the Active Start (0-6 years old) stage of the LTAD model, which focused on athletes having fun and learning physical literacy. Furthermore, Banack and colleagues found that introductory modules of the NCCP, such as the Introduction to Community Coaching (ICC) course, provided coaches with a basic understanding of the LTAD model. Although National Sport Organizations (NSO), sport clubs, and sport associations distribute sport specific LTAD models and resources, the National Coaching Certification Program (NCCP) is the largest contributor to coaches' knowledge of the model. The NCCP was developed to distribute a standardized coaching curriculum, including coaching skills, training techniques and coaching knowledge to as many coaches as possible (Gowan, 1992; Trudel & Gilbert, 2006). Currently the NCCP is a competency-based program that embodies many of the principles of the LTAD model. Some clubs, large enough in size to fill enrollment for courses, request NCCP courses on-site for their coaches.
Another study by Beaudoin, Callary, and Trudeau (2012) found that coaches implemented the LTAD model in two main ways: First, coaches used information from specific stages of the LTAD model. Second, some coaches used the model as a planning strategy because they saw it as a global vision of how athletes should develop in sport. In each case, barriers acted as challenges for the coaches to implement the LTAD model fully and so the authors suggested that coaches, athletes, parents, and others involved in sport become more educated on using the LTAD model as a philosophy for athlete development from cradle to grave (Beaudoin et al., 2012). Neither Beaudoin et al. (2012), Banack et al. (in press), nor Black and Holt (2009) described how the coaches' work environment influenced their adoption of the LTAD model.

Theoretical Framework

It is possible to understand the LTAD model as a new innovation in sport coaching education since its inception in 2005. Rogers' (2003) *Diffusion of Innovations* is a theoretical framework that provides a way of understanding the adoption of an innovation within a social context. An innovation can include, but is not limited to, tools, processes, technologies, and in this case ways of thinking or models of behaviour (Rogers, 2003). Rogers provides a framework in which it is possible to systematically understand the way that a population first comes to gain knowledge of an innovation, is persuaded to adopt the innovation into their practice, makes the decision to adopt or reject the innovation, implements the innovation, and confirms whether or not to continue its adoption or discontinuance (Figure 1).
In exploring the persuasion stage of the innovation-decision process, Rogers (2003) included five perceived attributes of an innovation that lead individuals to either adopt or reject an innovation. They include: relative advantage, which Rogers defined as the "degree to which an innovation is perceived as being better than the idea it supersedes" (p. 229); compatibility, defined as "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (p. 240); complexity, defined as "the degree to which an innovation is perceived as relatively difficult to understand and use" (p. 257);

trialability, a word used by Rogers and defined as "the degree to which an innovation may be experimented with on a limited basis" (p. 258); and observability, another word used by Rogers and defined as "the degree to which the results of an innovation are visible to others" (p. 258). Any one or combination of these attributes that an individual perceives as part of an innovation could influence the adoption of the innovation.

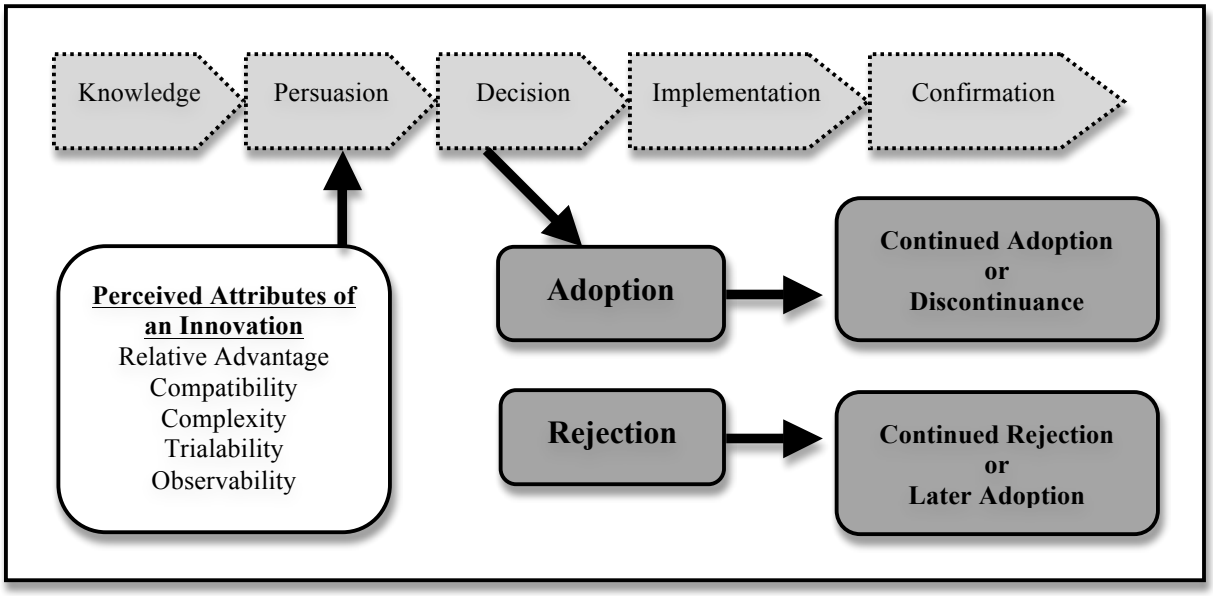

Figure 1. Rogers' (2003) Innovation-Decision Process

The characteristics of the potential adopters (in this case, the coaches) are also important in understanding the adoption of an innovation (in this case, the LTAD model) (Rogers, 2003). For instance, early adopters are usually more integrated into their local social system, are role models, and must make shrewd decisions about the innovation; while late adopters are more skeptical, cautious, and may be more isolated (Rogers, 2003).

Rogers (2003) has also suggested that the structure of a social system can influence an individual's perception of the attributes of an innovation at multiple stages of the adoption process. Therefore, depending on the structure of the work environment, in this case the club structure in which the coaches work, this could alter their perceptions of the attributes of the innovation. For example, Rogers has suggested that individuals in an urban environment are more likely to be earlier adopters of an innovation compared to individuals living in a rural environment. Furthermore, policies in a work place designed to encourage the trial of a new idea help the adoption of the innovation (Rogers, 2003). No research has been found connecting a sport club's unique structure or the characteristics of its coaches to the perceived attributes of an innovation.

Objective of the Study

Although most NSOs have recognized the LTAD model (Black & Holt, 2009), it is unclear how individual coaches working within clubs of different sizes and structures adopt the LTAD model. Therefore, there is merit to exploring how coaches perceive and adopt or reject the model. The purpose of this study was to better understand the adoption of Sport Canada's LTAD model by

Canadian sport coaches in different clubs. Specifically, the aim of this project was to discover how the structure of three different and distinct cross-country ski (XCS) clubs influenced the way that coaches perceived the attributes of the LTAD model and how this affected their decision to adopt the model.

Methodology

A multiple case study design was used to structure the data in order to explore how club coaches perceived and adopted the LTAD model. According to Stake (2006) and Yin (2003), the use of multiple cases allows for the replication of themes within and across cases and leads to better-informed conclusions. The multiple case study approach made it possible to explore how coaches in different clubs were influenced by the structures of their clubs to perceive positive and negative attributes of the LTAD model. In this study, each case was made up of four to five coaches all from the same club (n = 13 coaches). Initially, head coaches from seven XCS clubs were contacted using the information available on their websites. From this initial contact, a list of coaches from three clubs was produced. These three clubs were chosen based on response rate and because they represented different sized XCS clubs within Canada. Six coaches (two from each of the three clubs) responded to initial emails and interviews were conducted with these participants. Subsequent participants were found through snowball-sampling methods (Haber & Singh, 2009) whereby contact information for other coaches within each of the three clubs was gathered during the interviews with the initial six coaches. This method allowed for a richer understanding of each case through multiple interviews with different coaches from each club.

Several selection criteria were put in place for participants to be included within the sample group. These criteria ensured that coaches would have the knowledge and experience to answer most questions included in the interview guide. Coaches had to have coached at least one year before the 2007 XCS season and at least one year after this season. This date was chosen to ensure that participants had experience coaching before and after the creation and dispersal of the LTAD model by Cross-Country Canada (CCC), which occurred in the 2007 season. Additionally, coaches must have attended at least one NCCP module under the new competency-based framework. A majority of XCS coaches (n=11) interviewed had completed the ICC course, which provides a "basic understanding of the LTAD" (Banack et al., in press, p.12). Coaches were interviewed who noted that they knew the LTAD model. The final criterion was for coaches to be active coaching members of a XCS club. Coaches not meeting the above criteria were not included within this case study.

Participants and Clubs' Characteristics

As presented in Table 1, XCS coaches (n=13) were interviewed from three different XCS clubs located in the provinces of Ontario and Quebec. Each case was made up of four or five coaches from a single club, thus we had a multiple-case study of coaches from three XCS clubs. Participants ranged in age from 25 to 64 years, were made up of males (n = 9) and females (n = 4) with various amounts of coaching experience and who had received coach education through the NCCP. Rogers (2003) noted that the nature of the social system in which people live would influence the rate of adoption of an innovation. The three clubs were considered different because of their different social systems: differing number of people making up their club membership, different emphasis on coach education, different club focus, and different club environment (Table 1). XCS clubs are responsible for educating their coaches on the LTAD, but do not share a standardized method for the dispersal of this knowledge. Therefore, the support

provided by the clubs differed from coach education facilitated on-site, to coach education opportunities being supported by the club but offered off-site, to the club only providing coaches with information on where they could get coach education.

Table 1
Summary of Club Characteristics

Characteristic	Club A	Club B	Club C
# of coaches interviewed from each club	*n* = 5 (2F, 3M) Average age 37	*n* = 4 (2F, 2M) Average age 43	*n* = 4 (4M) Average age 43
Coaching experience of participants (in years)	7 to 22 Average 12	7 to 17 Average 11	7 to 30 Average 15
# of Members involved in the club	>1000	<400	400-1000
Club's coach education	Facilitated, on-site	Supported, off-site	Info provided, off-site
Club focus	Competition	Instruction	Community centered
Club environment	Metropolis area	Sub-urban	Sub-urban

Note. All coaches interviewed from club A had competitive athletic backgrounds; three out of the four coaches interviewed from club B had mainly recreational athletic backgrounds; and club C coaches had a mix of competitive and recreational athletic backgrounds.

Data Collection

A narrative interview guide was developed to interview participants[i]. Thus, during data collection, participants were encouraged to tell a story rather than answer a standardized set of questions about their experience with the LTAD model. Elliott (2005) explained that narrative interviews help participants organize a "sequence of events into a whole so that each event can be understood through its relation to that whole" (p. 3). The interview guide was divided into three sections representing the beginning, middle and end of a story (Elliot, 2005). In the first section, questions regarded the coach's history. Questions included, "Tell me about yourself as an athlete and as a coach; what is your background in sport; and how did you get started in coaching?" In the second section, questions regarded the determinants of LTAD model adoption. Questions included, "Tell me about your experience with Sport Canada's model for long-term athlete development and how you first perceived the LTAD model in your ski club." In the third section, questions regarded the coaches' perceived barriers to the LTAD model adoption. Questions included, "what are some barriers you see in implementing the LTAD model."

Each section was structured using a main question and then supported by a series of probe questions that deepened our understanding of the coach's experience. Probe questions (e.g., what do you enjoy most about coaching?) took the form of checklists that were disregarded when the participant responded to them naturally. Interviews lasted between 45 and 75 minutes, were digitally recorded, and were transcribed verbatim by the lead researcher. Participants were given an opportunity to member check their transcripts and confirm the responses they provided, according to the protocols of Lincoln and Guba (1985).

Data Analysis

Transcriptions were organised using QSR NVivo8 qualitative research software that helped to structure and understand the data. This research study analyzed data using thematic conceptual matrices (Miles & Huberman, 1994) to identify common themes. Miles and Huberman (1994) suggested that these types of matrices allow researchers to organize data using conceptual or theoretical themes. Furthermore, as Braun & Clarke (2006) explained, thematic analysis is a method for identifying, analyzing and reporting patterns or themes within data. Initial coding structures were designed with Rogers' (2003) five perceived attributes of an innovation as a foundation, which gave insight into what types of themes to look for. This analysis also looked at each part of the narrative and how it influenced the whole story (Elliot, 2005). By analyzing from a part/whole perspective, we gained a more holistic understanding of the attributes affecting a coach's adoption as part of the innovation-decision process.

Next, the coded interviews were grouped into their respective cases (Club A, Club B, and Club C). The coded interviews of coaches in Club A were examined to identify themes and patterns made up of attributes of the model that these coaches perceived similarly. This process was repeated for the interviews of coaches in Club B and then Club C. The themes were included when they were perceived by a majority of coaches (3-5) in a single club. This process allowed for the emergence of case-specific themes.

Themes were further categorized as positive (+) or negative (-). In most instances a positive perception of an attribute increased the adoption of an innovation, while a negative perception of an attribute caused the community to reject the innovation (Rogers, 2003). For instance, if the innovation was relatively advantageous, then it was considered positive, whereas if it was relatively disadvantageous, then it was considered a negative attribute. One exception to this rule occurred when exploring an innovation's complexity. If it was more complex (positive), this increased its rejection by a community. The thematic conceptual matrix (Miles and Huberman, 1994) used helped to organize these themes using Rogers' (2003) attributes that were coded as either positive (+) or negative (-) (Table 2).

Results

Results of this study indicate that coaches perceive certain attributes of the model as positive or negative, that this affects their adoption of certain aspects of the model more readily, and that the unique characteristics of their club can influence this adoption. The results are divided into three sections examining the data of the coaches in each case study to demonstrate how the structure of the club can influence the coaches' perceptions of the attributes of the LTAD model.

Club A

Club A was classified as a large club with a competitive focus. Club A held regular meetings of the club executives who mandated the decision to adopt the LTAD model into their club's structure. One coach explained that a five-year plan was put in place by the executive and then supported by coaches and parents within the club. The coaches noted that the LTAD model was compatible at their large club because they could more easily adopt the model due to easy access to resources such as other coaches, athletes, parents, funding, and facilities. Club A's coaches had adopted the LTAD model and were using club mentoring, parental surveys, and coach education to support the adopted principles of LTAD model. One coach explained that "the main goal of the LTAD model is to be active for life, and really that is a great message" (Coach 4, Club A).

Table 2
Case Specific Themes Identified Through Thematic Analysis

Attribute	Case Specific Themes	Club A	Club B	Club C
Relative Advantage	(+) Facilitated (on-site) coach education, consistency in programming, communication tool, retention, flexibility of the model	■		
	(+) Increase participation from the bottom-up			■
	(-) Time commitment	■	■	■
	(+) LTAD model matching with personal values	■		
Compatibility	(-) Optimal windows of trainability	■		
	(-) Does not address special populations		■	■
	(-) Connotations of the name 'LTAD'		■	
Complexity	(-) Coach education makes LTAD easier to understand	■	■	
Observability	(+) Word of mouth through coaches	■	■	
	(+) Measurable improvements	■		
	(+) Results from other clubs		■	■

Coaches in club A discussed certain themes that included: The model matched their personal values; their coach education helped them to understand the LTAD model; they could learn about and teach the LTAD model through communicating with other coaches and parents; they had better consistency in planning and training when using the LTAD model's developmental stages; and they could see measurable improvements in athletes and coach retention rates and performances since using the LTAD model. Negative themes included a lack of time to teach the LTAD model to parents and a lack of compatibility with regards to the model's "windows of trainability."

The LTAD model was compatible with the coaches' values, as can be seen in the quotation from Coach 3 (Club A) who said, "it jived with my own personal beliefs enough that my fundamental value system didn't have to change at all." The coaches identified that the LTAD is an organized set of existing ideas, and that the amalgamation of FUNdamentals, lifelong sport, cross training[ii], and developmental stages are advantageous to the XCS environment. These elements had a common link to the belief that sport should be fun and enjoyable for all. Furthermore, the LTAD

model's later stages of development were based on competition and fit well with the club's competitive focus.

These coaches regularly updated their coaching knowledge through on-site coach education facilitated by an NCCP-certified coach. Likely due to their high level of participation in coach education, most coaches from this club found that the LTAD was generally not difficult to understand. One coach said, "as I get into further coaching education I realize that there is a lot of information out there for coaches to plan and consider, but it makes the LTAD model easier to understand" (Coach 4, Club A).

Club A's coaches also noted that there were a variety of ways that the model was used for communication including goal setting, developmental stage selection, and athletic burnout. One coach explained that

> you are able to sit down…and explain to athletes and parents what the LTAD model is, and what the goal of us working together is. It is not necessarily that the athlete peak at 15 years old, and not necessarily that the athlete will be the fastest skier at nationals, but to have the athlete get as far as he or she wants to go or can go in sport with this long-term vision in mind. (Coach 9, Club A)

Club A coaches used the LTAD model's standardized language from one training group to another and agreed that it was a major asset to an athlete's understanding and progression. The consistency of training may have influenced the visible retention rate of athletes, coaches, and parent volunteers that coaches from Club A experienced. One coach jokingly expressed that "they cannot get rid of athletes" (Coach 3, Club A) and so they hired a second full-time coach. The coaches also viewed their increasing numbers as an observable sign that using the model was successful in retaining coaches and athletes. One coach said that, "other clubs were asking us about the LTAD model because it was clear that there was a positive movement here " (Coach 9, Club A).

Developmental stage was also linked to making sport enjoyable. Coaches identified that fitting athletes into proper stages of development allowed them to progress at the appropriate rate each season, and they were more engaged in each training session as a result. Coaches clarified that this type of grouping decreased athletic burnout and helped parents understand where their child fit within the model and why. This grouping was made possible because of the large number of athletes in the club. One coach said:

> We have a huge range of athletes, and we have got fairly big groups, so we have the ability to group them age appropriately, skill appropriately, and once that all fits, size appropriately. So you take all of those pieces and you put groups together, and when you lump them like that, the groups make sense and you have backing for why the groups happen. (Coach 4, Club A)

Another coach explained that using the development stages to group athletes "helps the parents understand where their child is in terms of moving through the program" (Coach 3, Club A).

Coaches in Club A also observed and measured steady improvements in their athletes' performances over a season. One coach said, "seeing that progression is really nice for athletes, coaches, parents, and pretty much anyone involved" (Coach 1, Club A). This steady improvement seemed to have an impact on the continued adoption of the LTAD model by coaches at the club and the strong support they received from parent volunteers.

The continued attempt to increase parent knowledge of the model at annual meetings was experienced by coaches in club A. Coaches explained that parents' understanding of the model was of crucial importance, but teaching the model to the parents became a burden on their time.

This added to the time commitment required to effectively adopt the LTAD model into their coaching practice. Time required to adopt the innovation was coded as an incompatible attribute of the model.

Another negative theme that arose from coaches in Club A regarded the LTAD model's concept of athletes' "optimal windows of trainability." Coaches felt this concept was difficult to accept due to a lack of scientific data. As one coach offered: "There is a little bit of contention over how accurate the windows of trainability are; the argument is that Balyi (the LTAD model's creator and researcher) only sourced his own studies when he wrote that" (Coach 3, Club A). At a competitive club, it was difficult to simply accept the nature of this information in using it to advance the progression of their athletes.

For Club A, the competitive focus, the on-site coach education, and large number of athletes, parents, and coaches in general allowed the club to adopt the LTAD model because it was compatible with their values and focus, it was not considered too complex, and it led to observable improvements. However, it also required a time commitment to teach all the members of the club and was not necessarily blindly accepted.

Club B

Club B had a small number of members with a Learn-to-Ski (L2S) philosophy, in which participants were instructed in XCS and encouraged to engage in lifelong recreational outcomes rather than competitive goals. One coach said,

> the bread and butter at our club is learning how to ski; we don't focus on competition at all. I don't think a lot of parents care about competition; they are just there to have their kids learn how to ski, and learn to love skiing so they can go on family ski trips on the weekends. (Coach 8, Club B)

Coaches from Club B had recently started using the model and were still in the process of adopting many of the LTAD principles. The coaches in Club B who were interviewed had decided to adopt the model but this was not experienced club-wide. The coaches in Club B noted positive themes: The "active for life" stage in the LTAD model was compatible with their philosophy; and they could further learn about the model from observing results at Club A. However, negative themes included a lack of understanding of how to use the LTAD model with special populations; incompatibility with the terminology in the LTAD model; a lack of time commitment needed to learn and use the model; and a lack of depth in understanding the model due to limited access to coach education opportunities

Club B coaches noted that the LTAD model's stage of "active for life" was compatible with their beliefs regarding lifelong physical activity. A coach noted the importance of being active for life by engaging in multiple sport participation. This coach stated:

> You don't necessarily want to encourage the athletes and/or parents to participate in one sport to the detriment or decline of others…What I came around to realizing is that if a child decides to follow another sport path in the end, that is still a success, in as much as they are continuing to follow an active lifestyle. (Coach 12, Club B)

Club B coaches saw the change in Club A's performance and its retention in numbers since the adoption of the LTAD model. They were encouraged by this observable difference, but also noted that Club A coaches focused on different aspects of the model as a highly competitive club. One coach explained that, "it is so different to see the focus of other clubs as far as racing versus recreational versus adventure skiing. We are all very different in what we focus on, and how this model can be used" (Coach 8, Club B).

Coaches from Club B had a negative impression of some attributes of the LTAD model that were consistently related to the recreational nature of the club, and the importance the club placed on a small number of special populations of skiers (e.g., L2S, late-comers to sport, and Para-Nordic skiers). This club did not have the ability to create as many groups as Club A because of its smaller size. Therefore, it created a program to address latecomers to XCS who did not fit into a single developmental group. A coach explained that:

> because there is this logical progression in the model that starts when kids are quite young, it can happen that older kids are not as actively recruited or brought into the stream. And when they are recruited and brought in they don't quite fit anywhere." (Coach 7, Club B)

A strong view held by coaches in Club B was the dislike of the model's name in relation to one of its main goals. In other words, the name implies that this model is for an "athlete", and downplays the recreational sport participant. One coach shared that she

> felt a little bit intimidated by the name...both the 'long-term' aspect, which suggests progression from very young until old which might sound and feel a bit exclusive to those joining last minute, or later in life; I mean that isn't long-term if you start at my (mature) age. And the word 'athlete' because clearly I am not an athlete, and have never considered myself an athlete, so to be coaching in a program that follows a model based on athlete development makes me feel under qualified. It also raises some concerns with parents over whether their child is in too much of a competitive atmosphere. (Coach 7, Club B)

Club B's coaches expressed the need for all coaches in the XCS community to "stop referring to it as LTAD, and start referring to it as Sport for Life. It would gain much more acceptance" (Coach 12, Club B).

Finally, similar to coaches in Club A, the coaches in Club B noted that the time commitment required to adopt the LTAD model was a negatively compatible attribute. Without putting in the time to learn about the model, it was not necessarily intuitively useable. One coach explained that coaches "have to be willing, and have the time to commit to learning about the model" (Coach 7, Club B).

While Club B coaches were encouraged to update their knowledge, they were not offered the same on-site opportunities for coach education as were the coaches in Club A. This lack of access to coaching education opportunities seemed to be because of a lack of facilities and not because of a lower importance placed upon coach education. Nonetheless, many coaches found concepts of the LTAD model difficult to understand, and inferred that parents have even more difficulty with these concepts. The difficulty in coach understanding was linked to the amount of coach education they had taken.

For Club B, the instructional and non-competitive focus of the club, the lack of organized on-site coach education, and the small number of members meant that while the LTAD model could be attractive due to its "active for life" stage and observable impact on different club structures, in general, it was not compatible nor was it easy to understand.

Club C

Club C had an entirely different focus as a XCS club. Club C's coaches described themselves as a large, community-centered club based on inclusion through learn to ski programs, adventure skiing, and biathlon. One coach described it as "still in its infancy" (Coach 5, Club C). Club C held regular meetings of the club executives who mandated the decision to adopt the LTAD

model into their club's structure. However, coaches from Club C, having only recently adopted the model, had not yet adopted many of the LTAD principles. The coaches in Club C noted positive themes including: increasing participation from the bottom up; individualizing athlete development plans; and observing the influence of the LTAD model on Club A. Club C coaches also discussed negative themes, including how the LTAD did not address special populations and how the coaches did not fully understand the model due to a lack of time for coach education opportunities.

As a club with a large member base, intent on increasing the number of participants, the main relative advantage seen by Club C's coaches was the potential of the LTAD model to help increase the number of skiers at the introductory levels through learning physical literacy in a fun environment thus "maintaining a recreational base that can support the upper tiers of the sport" (Coach 5, Club C). This idea encouraged a lifelong vision of the Canadian sport system by supporting increased lower-level sport programs.

Despite the large membership, the coach to athlete ratio at Club C was low and paid full-time coaches helped to ensure that this ratio stayed low. The coaches noted that the LTAD model was also compatible with planning for individualized training for athletes in the low coach to athlete ratio: "The LTAD model also works in an environment with a lower coach-to-athlete ratio in terms of having the ability to individualize athlete programs" (Coach 5, Club C). Another coach added that "the need for coaches dedicated to athlete development is crucial, and it really helps to have a full-time paid coach that can spend the time on developing individual plans for athletes that are developing either more quickly or slower than others" (Coach 2, Club C). Indeed, coaches identified the need for a full-time paid staff member in order to address individualized developmental programs; however, they explained that this requires monetary resources that are not always available.

Similar to Club B, Club C's coaches saw the growth and results from Club A and believed that this growth was, in part, resulting from the new training groups modeled on LTAD's stages of development; "It was through my friends over at Club A that I started seeing the change in size at Club A, and how they were setting up some of their programs and getting a positive response" (Coach 13, Club C). These coaches observed the positive influence of the model for athletes' development.

Club C's coaches, along with coaches from Club B, held the opinion that special populations were not addressed in the LTAD model. In other words, the coaches from Club C believed that their adventure programs filled a void within the model for those skiers who did not want to compete in a traditional environment, but wanted to continue to train. Furthermore, coaches believed their club focus on community involvement instead of competition helped to alleviate the stress caused by the disjoint between the current competition model developed by Cross-Country Canada and how the LTAD model is shaping cross-country skiing in Canada. One coach clarified that

> the LTAD model is great, but one of the big hiccups right now is that our competitive models don't line up with LTAD. I can use LTAD principles, stages, and theory, but in the end our competitive model doesn't mimic those directives. (Coach 5, Club C)

Many coaches in club C found concepts of the LTAD difficult to understand. This was linked to the lack of coach education opportunities that coaches in Club C perceived, and therefore, a lack of time the coaches had in learning about the model. One coach explained how coach education greatly helped to clarify the model: "initially it was a tad difficult; however, after taking more

coach education, it became clearer as to what they were saying, and how the LTAD model was designed to work" (Coach 2, Club C).

Due to the large number of parents involved in Club C, parental understanding of the model created a further time constraint on coaches as they needed to educate parents on the model. Coaches appreciated the information the model provided to parents in terms of athlete development; however, they indicated that it was difficult to have the majority of parents fully understand the more technical aspects of the model and explaining it led to more work for the coaches. One coach told us:

> Because parents are not well versed in LTAD, I need to reword the aspects of LTAD to something they are familiar with, but it really is difficult for them to understand especially for those parents who can't get their heads around the unique development of their child. (Coach 2, Club C)

For Club C, the large club size, including paid coaches and low athlete to coach ratios helped coaches perceive the LTAD model as relatively advantageous, despite the time commitment needed to teach the parents about the model. The community-centered focus of the club helped to fill a gap perceived in the model in order to allow special populations of athletes to train according to the stages of development in the model without needing to compete. However, the lack of coach education opportunities made the model appear complex and difficult to fully integrate into their club.

Discussion and Conclusion

LTAD was designed as a lifelong model for athletic development (CSC, 2006). Each principle of the model was included to work hand in hand, as a holistic model, and "acknowledges that physical education, school sports, competitive sports, and recreational activities are mutually interdependent" (CSC, 2006, p. 15). Due to this all-inclusive focus on physical activity, the coaches in all three clubs adopted the LTAD model, irrespective of the number of members in the club, the focus of the club, or the coach education opportunities provided by the club.

Coaches in different clubs experienced the innovation-decision process differently. Larger clubs (A & C) had mandated the decision to adopt the LTAD model into their club's structure. In contrast, in the small club (Club B), the individual coaches made this decision based on their perception of the model. The support from the executives in the clubs helped coaches in Clubs A and C compared to the coaches in Club B. The resources and coaching education opportunities further increased parental volunteers and coach development in Club A. The large number of members in Club A that used the LTAD model helped members use a consistent language and athlete development progression. This consistency in language corroborates Black and Holt's (2009) study, which found it to be a perceived strength of LTAD-based programs. Black and Holt also saw the consistency of skill progression from one group to another as a strength of these programs. It is recommended that the board of directors and executives in clubs stress the importance of the LTAD model in order for the model to be adopted into clubs. Furthermore, having the critical mass to adopt the innovation helps with earlier adoption (Rogers, 2003). Thus, larger clubs with backing from their executives have the advantage to quickly adopt the model into their structure.

Although each club's coaches adopted the model in some capacity, their perceptions of the attributes of the model differed. For example, Club C's adventure programs, in which athletes trained using the development stages of the model but did not compete, allowed the coaches of

Club C to "reinvent" the model to suit their needs. The coaches in Beaudoin et al.'s (2012) study also reinvented the model to implement it despite certain barriers. Rogers (2003) suggests that reinvention is more likely in complex innovations that are difficult to understand, when an innovation may have several applications, or when an organization takes local pride in making the innovation their own. Furthermore, reinvention leads to a faster rate of adoption (Rogers, 2003). In this case, the reinvention created in Club C helped coaches use the model, despite limited coach education opportunities to learn about it, to help their special population of athletes.

The coaches in Club A, who were provided with on-site coach education courses, were those coaches that perceived the LTAD model to be less complex and easy to understand compared to coaches in Clubs B and C. For all the coaches, as they updated their knowledge and participated in NCCP courses, their understanding of the LTAD and comfort level during adoption improved, similar to coaches in Banack and colleagues' (in press) study. Thus, we suggest that it is important to introduce the LTAD model to coaches in more formalized venues for learning, as opposed to simply learning about the model through coach-to-coach interaction. According to Rogers (2003), cosmopolite interpersonal channels of communication for diffusing innovations (such as conferences or courses for the LTAD model) are important for early adopters, while later adopters use localite channels of communication to learn about the innovation (such as face-to-face coaching interactions and experiences). Therefore, we suggest that once a club's coaches have fully learned about the model through coach education courses, they may engage in learning more about the model through their peer interactions.

In all three cases under investigation, taking time to teach parents about the LTAD model was a negative attribute of the model. Parents often had the most difficulty understanding its concepts. Black and Holt (2009) found that parents' knowledge of the LTAD model and program for alpine ski athletes depended on the coaches' communication regarding the LTAD model. Beaudoin and colleagues (2012) recommended that parents be taught about the LTAD model. Results from the current study show that parental understanding was addressed at the large Clubs A and C through annual meetings where parents were provided with information regarding the LTAD model. Coaches in Club B, while dealing with fewer parents due to smaller numbers of athletes, still had difficulty teaching parents about the model, perhaps since there were no meetings set up to inform parents about the model. Therefore, we suggest that meetings designed to inform parents of the LTAD model be implemented throughout all clubs that use the model to help ease this time burden placed on coaches and help parents understand the lifelong perspective for sport involvement.

Research has shown that early experiences in sport impact a person's involvement in sport and physical activity later in life; therefore, those who enjoy sport as young children are more likely to engage in sport as adults (Perkins, Jacobs, Barber, & Eccles, 2004; Thompson, Humbert, & Mirwald, 2003). Club C coaches found the model compatible because they noted the importance of building a large base of XCS athletes by learning physical literacy through the FUNdamentals stage in the LTAD model and having a lifelong vision of sport. One of the main goals and objectives of FUNdamentals is that sport should be about "FUN and participation" (CSC, 2006, p. 9), and that basic skills should be "introduced through fun and games" (p. 20). These objectives impact an athlete's initial love of sport, and influence their participation over a lifetime (Côté & Fraser-Thomas, 2007).

Despite positive and negative perceptions of the compatibility, relative advantage, complexity, and observability of the adoption of the LTAD model, there were no strong indicators that

trialability influenced the coaches in any club to perceive the LTAD model as positive or negative, and therefore it was not included in the table and results. Furthermore, observability for coaches in Clubs B and C related to the differences observed in athletes in Club A. Rogers (2003) noted that trialability and observability have the least effect on an individual's decision to adopt an innovation and adopters often have difficulty perceiving these attributes. Therefore, when teaching the model and helping coaches adopt it, specific attention should be paid to the way that coaches perceive the compatibility, relative advantage, and complexity of the LTAD model. This would enable coaches to experiment with some principles of the LTAD model, allowing the trialability to occur.

To conclude, this study examined how the structure of three different and distinct cross-country ski (XCS) clubs influenced the way that coaches perceived the attributes of the LTAD model and how this affected their decision to adopt the model. Results indicate that XCS coaches in larger clubs with paid coaches who spent time developing their programs according to the LTAD model (as in Club C) or who had executives that provided resources to implement the LTAD model (as in Club A) were able to more easily adopt the LTAD model than a smaller and less organized club (as in Club B). Coaches from Club A, who had on-site coach education courses, found the model less complex; whereas Clubs B and C, who did not have coach education opportunities as readily available, had trouble fully understanding the model. Finally, Club A, whose focus was training competitive athletes, found it easier to adopt the stages of athlete development compared to Club B, whose focus was more on instruction. Club C managed to reinvent the model to suit the needs of their athletes, whereby athletes trained according to the stages of development, but did not compete. All three clubs had difficulty with the time commitment involved in learning about and disseminating information to parents regarding the LTAD model. While these results cannot be generalized across all clubs, they do provide interesting food-for-thought on the ways in which the LTAD model may or may not be adopted more readily into the sport system due to the different structures in clubs.

Each club's coaches adopted the model in some capacity, and it can be concluded that the adoption was more positive than negative. More research needs to be done to assess the implementation of LTAD in XCS clubs, how coaches implement the LTAD within their daily coaching practices, and the consistency of LTAD's implementation within Canada. Furthermore, research should assess the confirmation stage of the adoption process, specifically, how clubs evaluate the results of the model's implementation within their club structure. Research examining the influence of a club's structure (e.g., size, focus, and objectives) to coaches' adoption of the LTAD model should also continue in skiing as well as other types of sports (e.g., team versus individual). Research in these areas will provide coaching science with a more complete understanding of the adoption of the LTAD model in Canada.

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[i] The affiliated University of the research team obtained the ethical approval and the participants signed the informed consent form at the beginning the interview.

[ii] Through multiple sport participation