

Original Research

Can a Community of Practice Improve Physical Therapists' Self-Perceived Practice in Developmental Coordination Disorder?

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Background. Communities of practice (CoPs) are useful knowledge translation (KT) strategies, but little is known about their impact on physical therapists' self-perceived practice.

Purpose. The impact of a CoP on physical therapists' self-perceived practice was evaluated, and factors influencing changes in self-perceived knowledge, skills, and practice related to developmental coordination disorder (DCD) were explored.

Design. An explanatory sequential mixed-methods design was used, guided by the Theory of Reasoned Action and Theory of Planned Behavior.

Methods. Physical therapists participated in a DCD physical therapist CoP, which included 2 full-day, face-to-face workshops, with access to a 5-month online forum between the workshops, and completed questionnaires at 3 time-points: before the first workshop, before accessing the online forum, and following the second workshop. Measures completed before and after the CoP included closed-ended questions providing global scores on therapists' self-perceived knowledge, skills, and practice. Physical therapists' socio-demographic characteristics, information-seeking style, use of the online forum, and behavioral change goals were also collected. Paired t-tests, ANCOVAs, and linear regression models were used to analyze the data.

Results. Forty-one physical therapists completed all questionnaires. Their self-perceived knowledge, skills, and practice change scores were significantly higher (+0.47, +1.23, and +2.61, respectively; $P < .001$) at the end of the CoP compared with the beginning. Few of the factors explored significantly influenced therapists' self-reported change scores.

Limitations. No observational data on practice change was collected. The small sample may have limited the ability to identify factors influencing self-perceived practice changes.

Conclusions. The CoP increased physical therapists' self-perceived knowledge, skills, and practice. More research is needed to explore CoP impact on physical therapist practices and how behavioral changes influence patient outcomes.



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Incorporating research evidence into practice is an expectation of physical therapists.¹ Knowledge translation (KT) strategies can facilitate the uptake of research into practice,² especially when these activities are practical, multi-modal, interactive, and easily accessible.^{3,4} Communities of practice (CoPs), defined as groups of individuals having a common interest and interacting together,⁵ have demonstrated promise in changing clinical behaviors and facilitating best practice implementation.^{6,7}

The Web can be a useful platform to support KT activities, decreasing geographical barriers, fostering knowledge sharing and communication, and promoting resource distribution.^{6,8,9} In online CoPs, a small "core group"⁵ of clinical leaders participate actively and act as facilitators, using their content and resource expertise, assisting social processes, and creating and maintaining a safe and engaging environment.^{10,11} They act as knowledge brokers, developing links between researchers, policymakers, and practitioners.³

CoPs can foster the development of new clinical tools and resource sharing, promote cost savings, and aid improvements in organizational performance.^{6-8,12} However, the evidence on CoP effectiveness is still weak in health care,⁶ and little is known about physical therapists' involvement in CoPs. To date, studies have described CoP use and impact on clinical processes,^{12,13} and clinicians' expectations.¹⁴

Evaluations of online CoP impact the use of conceptual frameworks to link interventions and expected outcomes,^{15,16} and exploration of the factors influencing CoP ability to increase physical therapists' knowledge, skills, and practice should be conducted. For example, socio-demographic factors have been found to influence therapists' implementation of evidence-based practice, with younger therapists having more positive perceptions of evidence-based practice.¹⁷⁻¹⁹ However, the association between age and involvement in CoPs remains unknown. Likewise, how clinicians seek and interpret research evidence may influence its uptake,^{1,20}

but conclusions have yet to be reached. Exposure to a KT intervention could also influence behavioral changes. The intensity of online CoP use has been found to positively influence health care team practices in a hospital setting.²¹ Unfortunately, no studies have explored the relationship between online CoPs and rehabilitation practices.

Finally, evidence suggests that CoPs impact factors that influence adoption of evidence-based practice, such as organizational culture, time management, and team collaboration.^{1,6,21,22} Evaluating a CoP's ability to decrease barriers and increase facilitators to research uptake for a specific health condition would provide valuable information when implementing specific practice behaviors.

To further our understanding of CoPs, we used a quality improvement process to optimize the management of developmental coordination disorder (DCD) by physical therapists. DCD is a chronic condition affecting children's ability to learn and perform everyday self-care and academic tasks due to poor coordination.²³ Physical therapists have a role to play with these children, but unfortunately a knowledge-to-practice gap still exists, with a clinical focus on impairment-targeted rather than function-related interventions.²⁴

This study was initiated by physical therapist clinical practice leaders and managers from a pediatric rehabilitation center, recognized for providing continuing professional education in Québec, Canada. We were contacted to provide training to PTs regarding DCD management, including goal setting and evidence-based intervention approaches. We previously presented these best practices in an online module that we developed and evaluated.^{24,25} Our results highlighted that therapists require support to implement DCD best practices.^{24,25} We proposed a quality improvement study to support and study a broader KT strategy for implementing DCD best practices and to further our understanding of CoP use and impact.

Our primary aim was to evaluate the short-term impact of a CoP on physical

therapists' self-perceived DCD knowledge, skills, and practice. Our secondary aims were to 1) explore factors influencing changes in these outcomes, and 2) describe CoP impact on factors that influence physical therapists' ability to implement DCD best practice. We hypothesized that the CoP would increase therapists' self-perceived DCD knowledge, skills, and practice, all of which would be unaffected by sociodemographic factors, but influenced by therapists' information-seeking style and online forum utilization. We also postulated that the individual behavioral change goals self-selected by each therapist, and their perceptions related to that goal, would influence change in their self-perceived practice scores, but not in their knowledge and skills scores. Finally, we proposed that the CoP would positively impact factors identified by therapists as influencing their ability to implement DCD best practices.

Method

Ethics and Ethical Issues

This study was approved by the ethics committee of the research center of Sherbrooke University Health Care Centre. At the start of the project, a contract was signed between the researchers and clinical partners to clarify roles. The rehabilitation center was responsible for participant recruitment. However, it was made clear that physical therapists' participation in the study was not required to partake in CoP activities. Researchers were responsible for offering 2 workshops, with content developed by the researchers in consultation with the clinical partners.

Study Design

We used an explanatory sequential mixed-methods design. Qualitative data complemented quantitative data for analysis and interpretation.²⁶ As per mixed-methods designs, a pragmatic epistemological position was adopted by the researchers, using insights provided by both quantitative and qualitative research to identify practical solutions to study this complex issue.²⁷ Quantitative and qualitative results collected at study commencement informed both CoP implementation and final data collection. Figure 1

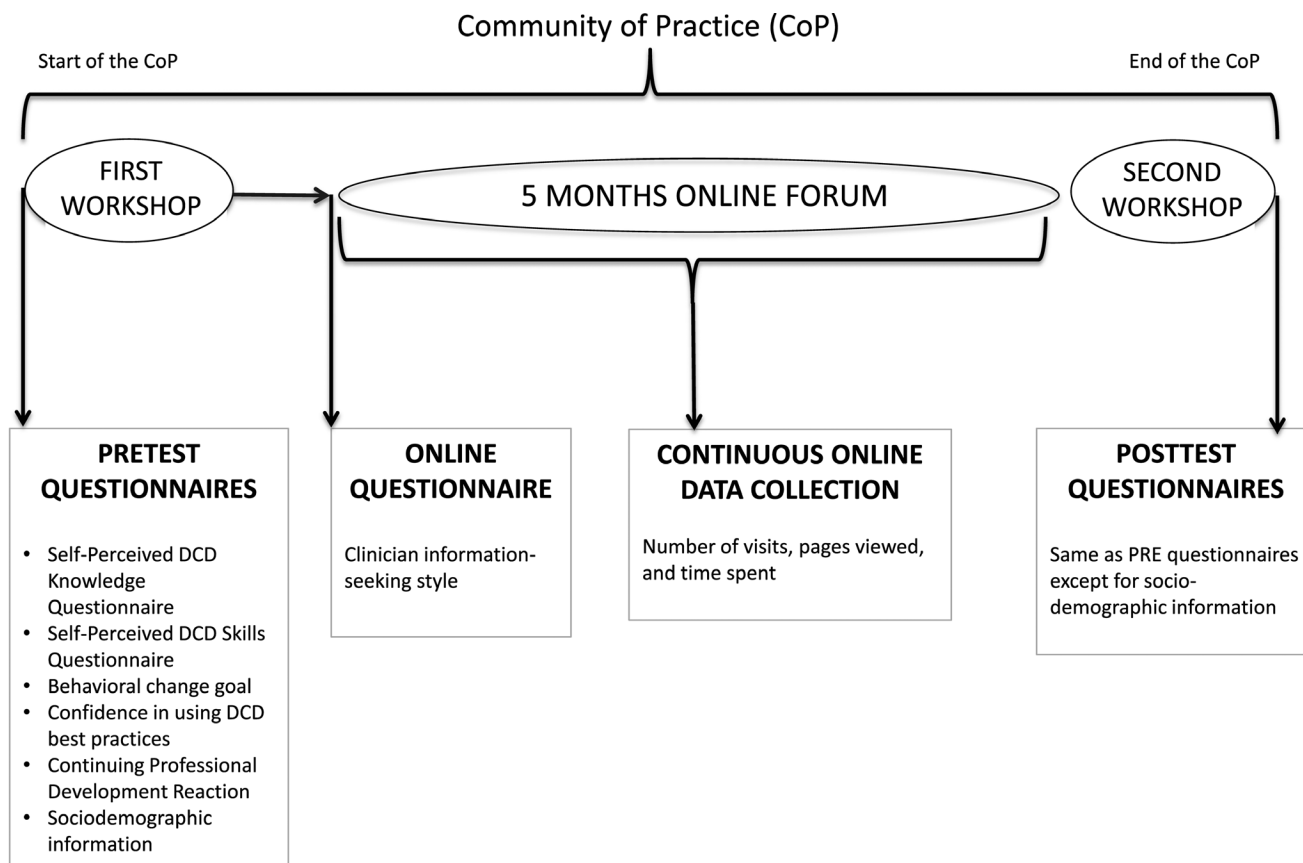


Figure 1.

Data collection tools based on the theoretical framework (adapted from Filiatrault and Richard²⁸). DCD = developmental coordination disorder. Text boxes with arrows represent concepts from the Theory of Reasoned Action/Theory of Planned Behavior framework. Data collection tools are italicized.

illustrates the timeline of the CoP (starting and ending with the first and second workshops) and the timeline of data collection, with participants being asked to complete questionnaires at the beginning of the first workshop, when they registered on the online forum, and at the end of the second workshop.

Community of Practice

The CoP consisted of 2 full-day, face-to-face workshops, with access to a 5-month online forum between the workshops. Two physical therapist DCD clinical (LR) and health service (CC) researchers facilitated the first workshop, focused primarily on the definition, identification, evaluation, and best management practices described in the DCD literature. Facilitated small-group activities encouraged participants to connect, share current/ideal practic-

es for children with DCD, and reflect on factors influencing their ability to implement best practices. Following this full-day session, an online forum was made available to physical therapist attendees, who had to sign in and complete an online questionnaire before accessing the online forum.

The online forum content and structure mirrored an online evidence-based physical therapist DCD module (http://elearning.canchild.ca/dcd_pt_workshop/index.html). The forum included sections on: What Is DCD?, Recognizing DCD, Goal Setting, Evidence-Based Intervention, and DCD Management, with 3 additional sections: News, Resources, and Other. Physical therapists were invited to post both general and child-specific questions, provided that no personal child identifiers were dis-

closed. Therapists were encouraged to respond to questions posted by their colleagues, and to share resource documents. The principal investigator (CC), a research coordinator (JB), and 4 physical therapist knowledge brokers who had experience working with children with DCD facilitated the online forum. One broker acted in the role of research assistant for the study (KH), while the other 3 were clinicians working in pediatric rehabilitation centers. The roles played by the knowledge brokers are described in detail elsewhere.²⁸

Following participation in the online forum, physical therapists were invited to the second face-to-face workshop (facilitated by CC). Therapists' needs, self-identified through the forum, guided the workshop agenda. This second workshop focused primarily on applying

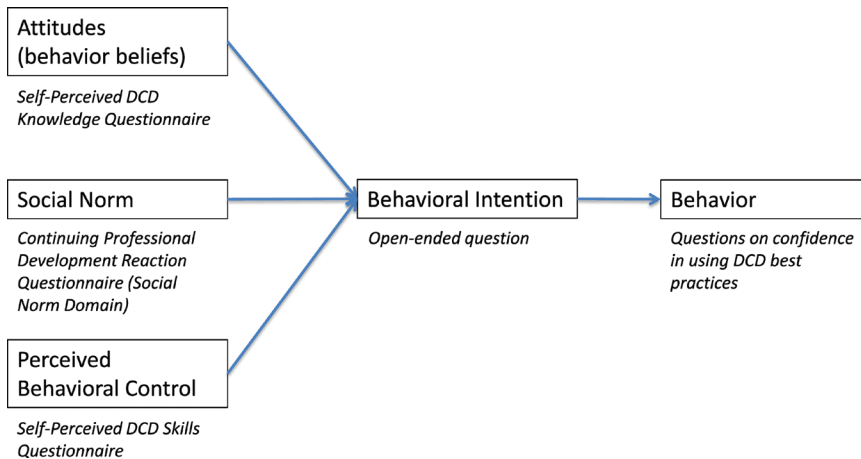


Figure 2. Study process. DCD = developmental coordination disorder.

intervention best practices and sharing clinical resources, and included a 2-hour session on DCD cognitive interventions, offered by a qualified occupational therapist.

Theoretical Framework

The Theory of Reasoned Action and the Theory of Planned Behavior, often presented as a combined framework,⁸ guided CoP implementation and integrated data collection. This theoretical framework suggests that attitudes and beliefs, social norms, and perceived control influence behavioral intentions and change.⁸ Figure 2 illustrates the theoretical construct relationships and the data collected related to these concepts. Our study goals included:

- 1) Changing physical therapists' self-perceived DCD knowledge and skills, presumed to influence attitudes, beliefs, and perceived control. Information was shared on the CoP about current DCD knowledge to influence therapists' attitudes and beliefs regarding specific practices, and discussions and resources were shared to help therapists develop the skills required to implement these practices.
- 2) Creating a community for sharing physical therapist DCD best practices to influence social norms. The CoP was structured to foster interactions and provide opportunities for net-

working, highlighting current/ideal DCD practices among clinical leaders.

- 3) Identifying therapists' behavioral intentions to support behavioral change and implementation of DCD best practices. Before engaging with the CoP, each therapist identified 1 DCD behavioral change goal. Results guided activities and discussion throughout the CoP to support therapists in implementing the required behaviors needed to achieve their goals.

Participants and Recruitment

Our rehabilitation center partners sent a study invitation to all provincial pediatric rehabilitation centers, and individual physical therapists with an interest in pediatric rehabilitation. To be included in the study, therapists had to participate in both workshops and the online forum. At the first workshop, study details were presented. Therapists wishing to participate were asked to provide consent and complete questionnaires prior to starting the workshop.

Of the 65 physical therapists who participated in the first workshop, 59 (91%) agreed to participate in the study. Of these, 41 (69%) also participated in the second workshop and the online forum, and constituted the final participant group. No statistical differences ($P < 0.05$) in self-perceived knowledge and skills were found between the final

group of therapists and the therapists who only completed the pre-questionnaires. However, therapists in the study group had fewer years of experience working with children and were less confident in using DCD best practices compared with therapists who completed only the pre-questionnaires.

Table 1 presents study participant characteristics. Only 2 therapists reported never working with children suspected of having DCD, or for whom a formal diagnosis of DCD had been confirmed. For the 39 other therapists, the average estimated percentage of children with DCD on their caseload was 17% (SD 17.85). Of these 39 therapists, 14 (36%) estimated seeing at least 1 child with DCD per week, 10 (26%) saw 1 child with DCD per month, and 15 (39%) worked with children with DCD occasionally. Most clinicians (68%) were classified as having a pragmatic information-seeking style (ie, predominantly considering the impact of evidence on their day-to-day practice before deciding whether or not to change their specific behaviors). The 2 most common behavior change goals identified by participants were increasing children and family involvement in the identification of intervention goals, and increasing the utilization of task-oriented, cognitive, and motor learning best practice intervention approaches. For other goals identified by participants, see Table 1.

Outcome Measures

To determine CoP impact, and informed by our theoretical framework, we evaluated physical therapists':

- 1) Self-perceived DCD knowledge by administering the *Self-Perceived DCD Knowledge Questionnaire*^{24,25} before and after CoP participation. This questionnaire asks therapists to rate themselves on 18 items, such as "I know the typical clinical manifestations of DCD," using a 7-point Likert scale where 1 = "very much in disagreement" and 7 = "very much in agreement." A total mean score for self-perceived knowledge was then calculated.
- 2) Self-perceived DCD skills by administering the *Self-Perceived DCD Skills Questionnaire*^{24,25} before and

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Table 1.

Participant Sociodemographic Characteristics ($n = 41$)^a

Demographic Characteristics and Background Information	Mean (SD) or Frequency (%)
Age	38.28 years old (9.34)
Sex (Female)	41 PTs (100%)
Number of years working as a PT	15.15 (9%)
Number of years working as a PT with children	10.52 (8%)
Work setting ^b	
School	1 PT (2%)
Centre of local services	1 PT (2%)
Private practice	7 PTs (17%)
Rehabilitation center	33 PTs (81%)
Long-term care	2 PTs (5%)
Other	1 PT (2%)
Regions ^b	
Montreal	3 PTs (7%)
Québec City	16 PTs (39%)
Other	24 PTs (59%)
Currently working with...	
Children with a formal diagnosis of DCD	30 PTs (73%)
Children suspected to have DCD (but no formal diagnosis)	38 PTs (93%)
Clinicians' information-seeking style (Green et al ³⁴)	
Pragmatic	28 PTs (68%)
Seeker	5 PTs (12%)
Receptive	8 PTs (20%)
Traditionalist	0 (0%)
Categories of behavioral change goals	
Increasing education/raising awareness	6 PTs (15%)
Improving goal setting	10 PTs (24%)
Improving assessments and use of evaluation tools	9 PTs (22%)
Increasing the use of best practice approaches for intervention	10 PTs (24%)
Increasing understanding of DCD/ General professional development	6 PTs (15%)

^aPT = physical therapist; DCD = developmental coordination disorder.

^bParticipants were instructed to select all work settings and regions that applied.

after CoP participation. This questionnaire contains 20 questions evaluating participants' self-perceived DCD skills (eg, "How competent do you feel using cognitive approaches?") on a 7-point Likert scale where 1 = "something to improve" and 7 = "I have mastered this skill." A total mean score for skills was calculated.

3) Individual behavioral intentions were identified by having each participant identify 1 *behavioral change goal* before starting the CoP.

4) Social norms and other factors influencing participants' ability to implement their behavioral intentions were evaluated before and

after CoP participation with the *Continuing Professional Development Reaction Questionnaire*. This validated questionnaire is based on socio-cognitive theories of behavior change, and was developed to predict the likelihood of clinicians adopting a specific behavior. It documents the impact of continuing education activities on factors known to influence individuals' intentions and behaviors.²⁹ Cronbach's coefficients for the 12 items included in this questionnaire varied from 0.77 to 0.85. The 12 questions were organized in 5 domains (listed in Tab. 3) known to influence behavioral change. Eleven questions were rated on a 7-point Likert scale, with 1 question employing a 5-point scale. Responses to each question were transformed into percentages, and subscores were based on mean percentages for all the items included in each domain. Physical therapists were asked to respond to this questionnaire in relation to their identified behavioral change goal.

5) Self-perceived practice was assessed before and after CoP participation by therapists' responses regarding their overall level of *confidence in using DCD best practices*. A question in the post-questionnaire was also used to evaluate therapists' level of *confidence in improvements related to their behavioral change goal*. Both responses were rated on a 10-point Likert scale, with 1 = "not confident at all" and 10 = "extremely confident."

Pre- and post-instruments evaluating self-perceived DCD knowledge, skills, and behaviors are available in the eAppendix (in French, available at academic.oup.com/ptj). Authors can be contacted for more information.

To explore the impact of various factors on the change scores described above, we collected data regarding:

- 1) Physical therapist socio-demographic factors.
- 2) *Online forum use*, including the number of times therapists

participated and the number of pages viewed.

- 3) *Clinician information-seeking style*, identified via a French translation of the typology questionnaire by Green et al,^{8,24} which classifies clinicians into 4 mutually-exclusive categories: 1) “seekers,” who look for information/evidence, and modify their practice when evidence indicates they should do so, 2) “receptives,” who primarily rely on practice leaders to decide whether or not to adopt a practice, 3) “traditionalists,” who tend to trust experience and authority over research evidence, and 4) “pragmatists,” who predominantly consider the impact of evidence on their day-to-day practice. Clinicians were required to respond to 17 items using a 5-point Likert scale ranging from 1 = “strongly disagree” to 5 = “strongly agree.” Their responses were subsequently associated with 1 of the 4 described categories.
- 4) *Categories of behavioral change goals*, identified by each physical therapist before embarking on the CoP. We explored whether the 5 goal categories that emerged influenced score changes.
- 5) Pre-scores on the Continuing Professional Development Reaction Questionnaire.²⁹

Finally, to describe the CoP's impact on factors influencing PTs' ability to implement best practice, 2 strategies were used. First, to identify factors perceived by PTs as influencing their DCD practices, the pre-questionnaires completed prior to starting the CoP included 2 short open-ended questions about factors that positively or negatively influenced PTs' ability to implement DCD best practices. Responses were grouped into 16 factors. In the post-questionnaire, participants were asked to rate the CoP's impact on these 16 factors, using a 7-point Likert scale ranging from 1 = “very negative” to 7 = “very positive.” A score below 4 for any given factor suggested that the CoP had a negative impact on the factor, and was deemed a barrier to the use of DCD best practices. Any score above

4 suggested that the CoP positively influenced the factor and facilitated the use of DCD best practices. A positive impact of the CoP would be confirmed if the lowest boundaries of the 95% confidence intervals were greater than 4, which represented a neutral influence. Second, to describe the CoP's impact on factors that have been documented in the behavioral change literature as influencing practice, we compared PTs' pre- and post-scores on the 5 domains of the Continuing Professional Development Reaction Questionnaire.²⁹ Before completing the final questionnaire, participants were given a copy of their initial behavioral change goals to ensure that they responded with the same goal in mind.

Data Analysis

A thematic approach³⁰ was used to identify the predominant categories of behavioral change goals selected by PTs before CoP participation. Specifically, responses were read and reread by 2 study team members (KH and CC) to identify meaningful segments in PTs' written responses. These segments were then coded (KH), using an inductive strategy, with no predetermined structure. All codes assigned to participants' response segments were then reviewed (CC). Both team members then discussed codes until consensus was reached, and grouped them into 5 goal categories. A similar process was used to code and analyze participants' responses regarding factors influencing their ability to implement best practices. Following coding and discussions, factors were grouped into 16 categories.

SPSS software (Version 22) was used for all quantitative analyses. To describe participants, including clinicians' information-seeking style, CoP use, and behavioral change goals, means/standard deviations or frequencies/percentages were calculated.

To evaluate CoP impact on self-perceived knowledge, skills, and practice, a normal distribution of data was confirmed through normality tests. Paired *t*-tests were then conducted for these outcomes, with the exception of PTs' individual behavioral change goal, where means/standard deviations were calculated.

ANCOVAs (for categorical outcomes) and linear regression models (for continuous outcomes) were performed to explore potential factors influencing changes in self-perceived knowledge, skills, and practice scores. Post-scores were set as the dependent variable, and pre-scores were introduced as covariates. In cases where more than 1 factor was found to be significant, a multivariate linear regression model introducing all significant factors was performed to better qualify any potential associations.

To explore CoP impact on factors influencing PTs' ability to implement best practice, means/standard deviations were computed for factors initially identified by PTs (pre-questionnaire). To explore CoP impact on behavioral change factors documented in the literature, paired *t*-tests were performed on the 5 Continuing Professional Development Reaction Questionnaire domains.²⁹

Results

CoP Impact on PTs' Self-Perceived Knowledge, Skills, and Practice

As highlighted in Table 2, we found a significant increase in self-perceived knowledge and skills, and in PTs' perceived confidence in using DCD best practices following CoP involvement. Our results also suggest that participants were confident that the behavioral change goal they initially selected had improved.

Factors Impacting Self-Perceived Knowledge, Skills, and Practice Change Scores

Factors explored as having a potential impact on self-perceived knowledge and skills change scores included: 1) sociodemographic characteristics, information-seeking style, and behavioral change goal categories (Tab. 1); 2) the pre-scores on the Continuing Professional Development Reaction Questionnaire (Tab. 3); and 3) online forum use. Online forum utilization indicated that a total of 290 visits and 4808 page views were generated by the 41 PTs, representing a cumulative total of 80 hours spent on the online forum during the 5 months.

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Table 2.

Changes in PTs' DCD Self-Perceived Knowledge, Skills, and Practice ($n = 41$)

Self-perceived	Pre-score (mean (SD))	Post-score (mean (SD))	Differential score	Significance
Knowledge (/7)	5.37 (0.64)	5.84 (0.55)	+0.47 ^a	$P < 0.001$
Skills (/7)	3.92 (1.05)	5.15 (0.81)	+1.23 ^a	$P < 0.001$
Confidence in using DCD best practice (/10)	5.05 (1.73)	7.66 (0.96)	+2.61 ^a	$P < 0.001$
Confidence in having improved behavioral change goals (/10)	N/A	6.85 (1.65)	N/A	N/A

^aChanges are significant at $P < 0.05$.

Table 3.

CoP Impact on the 5 Dimensions of the Continuous Professional Development Reaction Questionnaire

	Pre-Score	Post-Score	Differential Score	Significance
Belief about capabilities	77.07%	83.71%	+6.64 ^a	$P = 0.002$
Social influence	69.21%	74.29%	+5.08 ^a	$P = 0.03$
Belief about consequences	94.02%	92.88%	-1.16	$P = 0.47$
Moral norm	96.53%	94.69%	-1.84	$P = 0.21$
Intention	89.96%	92.08%	+2.12	$P = 0.25$

^aChanges are significant at $P < 0.05$.

Most factors were not associated with changes in self-perceived knowledge, skills, and practice scores. Only 3 factors were associated with a change in knowledge scores: working in a rehabilitation center and greater pre-scores for “moral norm” and “intention” (on the Continuing Professional Development Reaction Questionnaire). However, these associations were not maintained when all 3 factors were introduced into a multivariate linear regression model. Moreover, the pre-score for “moral norm” was associated with the skills change scores, while the pre-score for “social influence” was found to have a significant association on the practice change scores. Neither of these associations were evaluated in a multivariate linear regression model, as they were the only factors influencing their respective scores.

CoP Impact on Factors Influencing Ability to Implement DCD Best Practice

Table 3 illustrates CoP impact on the Continuing Professional Development

Reaction Questionnaire, as highlighted by a statistically significant increase in participants' beliefs about their own capabilities and social influences. However, no impact was observed on the other factors.

Table 4 lists the factor categories that PTs initially named as influencing their ability to implement DCD best practices. Table 4 also illustrates PTs' perceptions of the CoP's positive impact on all of these factors. This impact appears to have been greater for individual factors, such as the participants' level of DCD training (6.49/7), yet limited for system-level factors, such as the workplace organization and workload (4.76/7).

Discussion

As predicted, our findings demonstrate the CoP's ability to increase PTs' self-perceived knowledge, skills, and practice. The magnitude of the increase in self-perceived knowledge and skills is comparable to a previous study evaluating the physical therapist DCD module.²⁴ The current study also doc-

uments an increase in self-perceived practice change related to overall DCD best practices, and to self-selected physical therapist behavioral change goals. These changes in practice are likely to be clinically significant given physical therapists' testimonials (unpublished qualitative data). The increase in confidence in using DCD best practices is greater in this study than in the previous physical therapist DCD module study, where therapists reported clinically significant changes in their practice.²⁴ This result supports the belief that passive dissemination strategies might improve self-perceived knowledge and skills, but that more interactive, sustained KT strategies may be needed to change practice.^{6,7} Interestingly, our results highlight that a CoP might also address factors influencing the adoption of best practices, an important aspect of KT interventions.¹⁸ The factors identified by physical therapists as influencing their practices are similar to those reported in the literature (eg, level of training, case-load, work environment).^{17-19,22} Not surprisingly, the CoP had a more positive impact on therapist-centered factors but

Table 4.

Community of Practice (CoP) Impact on Factors Influencing Ability to Implement Best Practices in Managing Developmental Coordination Disorder (DCD)

Factors Identified by Physical Therapists as Influencing Their Ability to Implement Best Practice	<i>n</i>	Mean (SD) ^a	95% CI
DCD training	41	6.49 (0.60)	[6.25, 6.73]
Ability to find information and read scientific articles on DCD	41	5.98 (0.85)	[5.70, 6.26]
Clinical experience on DCD	41	5.78 (0.88)	[5.49, 6.07]
Knowledge of best practices for DCD	40	6.45 (0.55)	[6.22, 6.68]
Access to resources on DCD (people, websites, etc.)	41	6.44 (0.63)	[6.20, 6.68]
Access to clinical tools in the workplace	41	5.41 (1.12)	[5.09, 5.73]
Workplace organization and workload	41	4.76 (0.94)	[4.46, 5.06]
Services offered in your workplace	41	5.17 (0.86)	[4.89, 5.45]
Professional role	41	5.22 (0.91)	[4.93, 5.51]
Avenues for exchanges with colleagues	40	5.90 (0.96)	[5.60, 6.20]
Participation in professional committees	40	4.95 (1.13)	[4.62, 5.28]
Ability to work in collaboration with a) Colleagues	39	5.49 (1.05)	[5.17, 5.81]
b) Children with DCD	40	5.87 (0.88)	[5.58, 6.16]
c) Parents and the families of children with DCD	37	5.95 (0.74)	[5.67, 6.23]
d) Community partners	40	5.57 (0.96)	[5.27, 5.87]
e) Researchers	40	5.05 (1.09)	[4.73, 5.37]

^aFour out of 7 corresponded to a neutral influence, with all scores greater than 4 illustrating a positive influence.

a limited impact on factors related to the external environment (eg, workplace). As the importance of the general (eg, political) and work environment (eg, procedures) is well recognized as influencing therapists' ability to implement best practices,^{22,31,32} including strategies within a CoP that support the development of therapists' capacities to positively influence or change their practice environment may warrant further study.

We expected that the CoP would also increase Continuing Professional Development Reaction Questionnaire scores. However, the CoP significantly increased only PTs' beliefs about capabilities and social influences. Even more surprisingly, beliefs about consequences and the moral norm domain scores slightly decreased, while not reaching statistical significance. This may be due to the fact that the CoP focused on social processes related to KT, such as knowing how others practice, sharing knowledge, and strategies to implement DCD best practices, including the

sharing of clinical tools and tips. Consequences and ethical aspects associated with different behaviors²⁸ were not explored and should be considered in future KT studies.

Further study is also required to better understand why the CoP had no impact on the intention domain of the Continuing Professional Development Reaction Questionnaire or on PTs' behavioral change goals, and why, given the direct link assumed between intention and behaviors,^{29,33} the pre-scores on intention did not predict change scores in PTs' behavioral goals. In fact, few of the factors explored were associated with change scores. Different interpretations could be proposed for this finding. First, our study may have been under-powered for the identification of statistically significant factors. Second, the factors explored might simply not affect the CoP's ability to increase self-perceived knowledge, skills, and practice. Finally, our design may not have allowed us to capture the influ-

ence of some factors. For instance, in contradiction with others, we did not find a tendency for information-seeking style,²⁰ and for those using the online forum more frequently,²¹ to have higher change scores. This could be explained by our different pre-/post-design compared with previous predictive studies, and also by the fact that our CoP included face-to-face meetings, online forums, as well as input from researchers and clinical leaders. This multifaceted strategy may have provided opportunities to accommodate different learning styles, thus increasing the effectiveness of our CoP. It may be interesting in subsequent studies to compare the respective impact of face-to-face and virtual CoP activities separately.

Future studies should also seek to explore the relationship between the intensity of online CoP use and perceived CoP usefulness. Despite the relatively low utilization of our online forum by PTs (less than 2 hours per therapist across 5 months), other results related

to this study suggest that getting the appropriate information “just in time,” in an easy-to-access and understandable format, when it is needed most, may be more important in supporting practice change than the intensity of CoP use (Pratte et al, unpublished data, 2017). Moreover, when accessing the CoP platform is a requirement of daily work procedures, greater utilization of online CoPs has been found to influence the implementation of desired behaviors,²¹ but it might be different when CoPs are about general evidence-based information and resources. It is also important to note that previous CoPs targeted health populations commonly seen by PTs (eg, stroke patients),¹⁴ which differs from our study, where most participating PTs only occasionally intervened with children with DCD. It is our belief that the robustness of a CoP is defined not by the intensity of its use, but rather by its perceived usefulness. To sustain these CoPs, knowledge brokers and institutional support are key.³³ Use of physical therapist CoPs could increase in the future, as evidence of their usefulness in fostering professional development is accumulating and changes are ongoing in health care systems to facilitate the creation of professional networks.

Our results have implications for clinicians looking for professional development opportunities as well as for decision-makers and regulatory bodies. It is well recognized that continuing education activities need to focus on changing practice³⁴ and that these activities must extend beyond traditional didactic seminars aimed at improving knowledge and skills.^{34,35} Our CoP was designed to target behaviors and to assist clinicians by providing practical tips and strategies over a sustained period of time. Using more interactive strategies, such as a CoP, could also be an interesting avenue for professional regulatory bodies to support professional development activities, targeting the improvement of clinical competencies and the adoption of best practices. Incorporating both clinical leaders and researchers in CoPs appears to be beneficial, as it is recognized that best practices should combine both research evidence and expert opinion.¹ It

also suggests that decision-makers can support CoPs by encouraging different types of KT activities (eg, face-to-face and online), thus supporting different learning styles and practice needs. For example, the use of an online forum may promote the sharing of additional information and may support the implementation of best practices, but creating the safe environment essential for a CoP may be better developed through face-to-face activities.

Future studies will need to compare the impact of different CoP formats on changing PTs' behaviors. For instance, some CoPs may include additional KT strategies, such as onsite or regional knowledge brokers, who can impact change in organizational factors, further influencing best practice implementation. Decision-makers should also be included in the CoP, as they are key to supporting these professional roles and in providing opportunities for therapists to be involved in the redesign of service delivery.

Strengths and Weaknesses of the Study

The explicit use of The Theory of Reasoned Action/Theory of Planned Behavior⁸ is a strength of this study. Theoretical frameworks linking the intervention and the expected outcomes are recommended in KT research, yet few studies explicitly report their use.¹⁶ This framework allowed the exploration of factors that could potentially influence the impact of a CoP on self-perceived knowledge, skills, and practice. However, our small sample limited our ability to further describe such factors. Other limitations include the use of self-reported measures to document knowledge, skills, and practice changes. Unfortunately, no observational measures are currently available to assess physical therapists' DCD practice. Likewise, we were unable to link actual change in clinical behaviors with patients' outcomes; this would be an important step to further advance this field.

Conclusions

This study indicates that a CoP is an effective KT strategy to improve PTs' self-perceived DCD knowledge, skills, and practice. It furthers the under-

standing of the impact of CoPs and the factors influencing changes in PTs' self-perceived knowledge, skills, and practice. Future research should include long-term follow-up, and the examination of the impact of different CoP formats employing face-to-face and/or online activities on clinicians' behaviors and patient outcomes.

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Ethics Approval

This study was approved by the ethics committee of the research center of Sherbrooke University Health Care Centre.

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Disclosures and Presentations

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The authors report no conflicts of interest.

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References

- 1 Schreiber J, Stern P. A review of the literature on evidence-based practice in physical therapy. *Internet J Allied Health Sci Pract*. 2005;3(4):1-10.
- 2 Canadian Institutes of Health Research. Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches. Available at: http://www.cihr-irsc.gc.ca/e/documents/kt_lm_ktplan-en.pdf. Accessed June 13, 2017.

- 3 Zidarov D, Thomas A, Poissant L. Knowledge translation in physical therapy: from theory to practice. *Disabil Rehabil*. 2013;35(18):1571-1577.
- 4 Graham ID, Logan J. Innovations in knowledge transfer and continuity of care. *CJNR Can J Nurs Res*. 2004;36(2):89-103.
- 5 Wenger E, McDermott R, Snyder W. *Cultivating Communities of Practice: A Guide to Managing Knowledge*. Boston, MA: Harvard Business School Press; 2002.
- 6 Ranmuthugala G, Plumb JJ, Cunningham FC, Georgiou A, Westbrook JJ, Braithwaite J. How and why are communities of practice established in the healthcare sector? A systematic review of the literature. *BMC Health Serv Res*. 2011;11(1):273. doi:10.1186/1472-6963-11-273.
- 7 Li LC, Grimshaw JM, Nielsen C, Judd M, Coyte PC, Graham ID. Use of communities of practice in business and health care sectors: A systematic review. *Implement Sci*. 2009;4(27):16. doi:10.1186/1748-5908-4-27.
- 8 Poissant L, Ahmed S, Riopelle RJ, Rochette A, Lefebvre H, Radcliffe-Branch D. Synergizing expectation and execution for stroke communities of practice innovations. *Implement Sci*. 2010;5(1):44. doi:10.1186/1748-5908-5-44.
- 9 Levac D, Glegg SM, Camden C, Rivard LM, Missiuna C. Best practice recommendations for the development, implementation, and evaluation of online knowledge translation resources in rehabilitation. *Phys Ther*. 2015;95(4):648-662.
- 10 Gagliardi AR, Webster F, Perrier L, Bell M, Straus S. Exploring mentorship as a strategy to build capacity for knowledge translation research and practice: a scoping systematic review. *Implement Sci*. 2014. doi:10.1186/s13012-014-0122-z.
- 11 Merrill HS. Best practices for online facilitation. *Adult Learn*. 2003;14(2):13-16.
- 12 Evans C, Yeung E, Markoulakis R, Guilcher S. An online community of practice to support evidence-based physiotherapy practice in manual therapy. *J Contin Educ Health Prof*. 2014;34(4):215-223.
- 13 Kilbride C, Perry L, Flatley M, Turner E, Meyer J. Developing theory and practice: creation of a community of practice through action research produced excellence in stroke care. *J Interprof Care*. 2011;25(2):91-97.
- 14 David I, Poissant L, Rochette A. Clinicians' expectations of Web 2.0 as a mechanism for knowledge transfer of stroke best practices. *J Med Internet Res*. 2012;14(5). doi:10.2196/jmir.2016.
- 15 Curran VR, Fleet L. A review of evaluation outcomes of web-based continuing medical education. *Med Educ*. 2005;39(6):561-567.
- 16 Davies P, Walker AE, Grimshaw JM. A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Implement Sci*. 2010;5(1):1-6.
- 17 Bridges PH, Bierema LL, Valentine T. The propensity to adopt evidence-based practice among physical therapists. *BMC Health Serv Res*. 2007;7(1):103. doi:10.1186/1472-6963-7-103.
- 18 Iles R, Davidson M. Evidence based practice: a survey of physiotherapists' current practice. *Physiother Res Int*. 2006;11(2):93-103.
- 19 Jette DU, Bacon K, Batty C, et al. Evidence-based practice: beliefs, attitudes, knowledge, and behaviors of physical therapists. *Phys Ther*. 2003;83(9):786-805.
- 20 Korner-Bitensky N, Menon-Nair A, Thomas A, Boutin E, Arafah AM. Practice style traits: do they help explain practice behaviours of stroke rehabilitation professionals? *J Rehabil Med*. 2008;39(9):685-692.
- 21 Díaz-Chao Á, Torrent-Sellens J, Lacasta-Tintorer D, Saigí-Rubió F. Improving integrated care: modelling the performance of an online community of practice. *Int J Integr Care*. 2014;14. doi:10.1002/chp.21253.
- 22 Salbach NM, Jaglal SB, Korner-Bitensky N, Rappolt S, Davis D. Practitioner and organizational barriers to evidence-based practice of physical therapists for people with stroke. *Phys Ther*. August 2007. doi:10.2522/pbj.20070040.
- 23 Camden C, Rivard L, Pollock N, Missiuna C. Knowledge to practice in developmental coordination disorder: impact of an evidence-based online module on physical therapists' self-reported knowledge, skills, and practice. *Phys Occup Ther Pediatr*. 2015;35(2):195-210.
- 24 Rivard L, Camden C, Pollock N, Missiuna C. Knowledge to practice in developmental coordination disorder: utility of an evidence-based online module for physical therapists. *Phys Occup Ther Pediatr*. 2015;35(2):178-194.
- 25 American Psychiatric Association. *Desk Reference to the Diagnostic Criteria from DSM-5™*. Arlington, VA: American Psychiatric Publishing; 2013.
- 26 Creswell, J. W. & Clark, W. L. P. *Designing and Conducting Mixed Methods Research*. 2007.
- 27 Burke Johnson, R., Onwuegbuzie, A. J, Turner, L. A. Toward a definition of mixed methods research. *J Mix Methods Res*. 2007;2(1):112-133.
- 28 Filiatrault J, Richard L. Theories of behavior change through preventive and health promotion interventions in occupational therapy. *Can J Occup Ther*. 2005;72(1):45-56.
- 29 Hurtubise K, Rivard L, Héguay L, Barbari J, Camden C. Virtual knowledge brokering: describing the roles and strategies used by knowledge brokers in a paediatric physiotherapy virtual community of practice. *J Contin Educ Health Prof*. 2016;36(3):186-194.
- 30 Légaré F, Borduas F, Freitas A, et al. Development of a simple 12-item theory-based instrument to assess the impact of continuing professional development on clinical behavioral intentions. Costa MJ, ed. *PLoS ONE*. 2014;9(3):e91013. doi:10.1371/journal.pone.0091013.
- 31 Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77-101.
- 32 Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci*. 2009;4(1):50. doi:10.1186/1748-5908-4-50.
- 33 Flottorp SA, Oxman AD, Krause J, et al. A checklist for identifying determinants of practice: a systematic review and synthesis of frameworks and taxonomies of factors that prevent or enable improvements in healthcare professional practice. *Implement Sci*. 2013;8(1):35. doi:10.1186/1748-5908-8-35.
- 34 Green LA, Wyszewianski L, Lowery JC, Kowalski CP, Krein SL. An observational study of the effectiveness of practice guideline implementation strategies examined according to physicians' cognitive styles. *Implement Sci*. 2007;2(1):41.
- 35 Légaré F, Freitas A, Thompson-Leduc P, et al. The majority of accredited continuing professional development activities do not target clinical behavior change. *Acad Med*. 2015;90(2). doi:10.1097/ACM.0000000000000543.