

**Recruitment, use, and satisfaction with a web platform supporting families of children with suspected or diagnosed developmental coordination disorder: A randomized feasibility trial.**

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**Recruitment, use, and satisfaction with a web platform supporting families of children with suspected or diagnosed developmental coordination disorder: A randomized feasibility trial**

**ABSTRACT.** Current: 150 words.

**Objectives.** To determine the feasibility of recruiting families of children with suspected or diagnosed developmental coordination disorder (sdDCD) and explore their satisfaction with a webplatform aimed at supporting them.

**Design.** A feasibility randomized trial was needed before conducting a full trial.

Participants were parents of children aged 5-12 years old with sdDCD. The intervention group had access to online resources, group and private forums, and videoconferencing with a therapist. Main outcomes were the recruitment and retention rates. Satisfaction was documented through a post-intervention survey and interview.

**Results.** Recruitment rate was 7 participants/month (n=28 participants) and retention rate was 68%. Satisfaction was moderate. Participants formulated various recommendations for improving the intervention, including targeting families earlier in the diagnosis process, and pre-scheduling meetings with therapists.

**Conclusions.** Results demonstrated the feasibility of future trials evaluating webplatforms aimed at supporting children with sdDCD. Improvement areas were identified to ensure greater relevance of the intervention.

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1     Keywords: Developmental disabilities, Motor delay, Web-based services, Internet,  
2     Service delivery  
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4     List of abbreviations: DCD: Developmental Coordination Disorder; sdDCD: suspected or  
5     diagnosed Developmental Coordination Disorder; RCT: randomized controlled trial  
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7     Word count: 3011

For Peer Review Only

## 1 INTRODUCTION

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8 Developmental coordination disorder (DCD) affects 5-6% of school-aged children and  
9  
10 impacts the learning and performance of motor tasks.<sup>1</sup> Children with DCD are under-  
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12 served, face long wait times, and are often ineligible for specialized rehabilitation  
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14 services.<sup>2</sup> Early intervention could prevent DCD-related secondary consequences, such  
15  
16 as social isolation, anxiety and reduced cardiorespiratory fitness.<sup>2-8</sup> Telerehabilitation,  
17  
18 known to increase access to care and foster chronic care management<sup>8-10</sup>, offers  
19  
20 interesting opportunities to implement early DCD interventions according to best  
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22 practices, which state that families should be empowered to manage their child's  
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24 condition through population-based response-to-intervention models, where universal  
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26 design interventions (e.g., information, capacity-building) should be offered first, before  
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28 moving to group- or individual-based interventions.<sup>2,11</sup>  
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35 Previous research has shown that a DCD online module can increase parental knowledge  
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37 but was limited in supporting DCD management.<sup>12</sup> Only one low-quality publication  
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39 reported parental satisfaction with a web platform providing general information about  
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41 DCD, but no control group was used and authors did not thoroughly describe the use of  
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43 the platform nor explore its impact on managing DCD.<sup>13</sup> The feasibility of delivering  
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45 early online DCD interventions is currently unknown but important to document prior to  
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47 conducting a full trial evaluating their effectiveness.  
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1 The primary goal of this study was to determine the feasibility of recruiting and retaining  
2 families with children with suspected or diagnosed DCD (sdDCD) in a trial evaluating a  
3 webplatform aiming to support families. Secondary objectives were to: (1) determine  
4 whether the intervention was feasible (i.e. if families would use the webplatform and the  
5 therapist would be able to deliver the intervention); and (2) explore participant  
6 satisfaction.

## 8 **METHODS**

### 10 **Design**

12 A parallel, 2-group, randomized (1:1), double-blinded feasibility trial (NCT03141333)  
13 was conducted from September 2016 to June 2017. A sequential mixed method design  
14 was used.<sup>14</sup> The study was approved by our Institutional Ethics Board. Two changes were  
15 made after the trial started to increase feasibility of recruitment: only children with  
16 intellectual or physical disability and autism spectrum disorder were excluded, and  
17 participants who had a recent (<1 year) professional evaluation of the Movement  
18 Assessment Battery for Children-Second Edition (MABC-2) were allowed to submit their  
19 report instead of coming to the research centre for evaluation.

### 22 **Participants**

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3 1 Inclusion criteria were to be the parent or legal guardian of a child aged 5-12 years old  
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5 2 with sdDCD (diagnosed DCD or referred by a family doctor for specialized assessment)  
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7 3 who had not yet received DCD-specific rehabilitation interventions. Initial screening was  
8  
9 4 done over the phone. In-person eligibility assessment at the research centre ensured  
10  
11 5 children met DCD international guidelines with regards to MABC-2<sup>15</sup> and DCD-  
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13 6 Questionnaire (DCD-Q)<sup>16</sup> scores. Informed consent was sought following the eligibility  
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15 7 assessment.  
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## 24 10 **Study procedures, Randomization & Blinding**

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28 12 Figure 1 illustrates the recruitment procedure and the number of potential participants  
29  
30 13 screened and assessed. Participants were recruited from September 2017 to January 2018.  
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32 14 In mid-January, all participants were asked to complete the baseline questionnaire online,  
33  
34 15 and respondents were randomized to either the control or intervention group (ratio 1:1)  
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36 16 using a computer-generated list, with random blocks of 2 and 4. The list was managed by  
37  
38 17 an individual external to the project. Two weeks later, the platform manager, who was  
39  
40 18 blinded to participant scores, sent individualized codes granting access to a webpage  
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42 19 listing DCD resources (control group), or the full platform (intervention group).  
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44 20 Participants were made aware of their group allocation once they logged into the  
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46 21 platform. After the 3-month intervention period, participants were asked to complete the  
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48 22 post-intervention questionnaire online. To evaluate the impact of adding participants on  
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50 23 the webplatform, all participants were granted full access to the platform for an additional  
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1 month. Investigators were blinded to all outcomes when quantitative data were collected and analyzed. One month later, qualitative data were collected via phone interviews (see appendix 1 in supplemental online material).

## 6 **Intervention**

8 The intervention consisted of a web-based platform offering online rehabilitation resources and services that participants could access anytime on a voluntary basis. The information available on the platform was developed according to DCD best practices, including response-to-intervention and task-oriented, participation-focused and capacity-building approaches.<sup>2,11,17</sup> The platform included four components: (1) DCD online resources including links to relevant and high-quality webpages such as an evidence-based module;<sup>12</sup> (2) a forum where participants were encouraged to post questions and interact with other participants and an occupational therapist, who acted as an expert, knowledge broker and forum moderator;<sup>18</sup> (3) a private chat function for communicating directly with the therapist; and (4) a videoconference system. Participants were encouraged to use the platform sequentially, trying to find answers to their concerns via the static resource page or forum first, before contacting the therapist directly. The therapist was instructed to only invite families to use videoconferencing if contact via the private chat function was deemed insufficient.

1 The webplatform manager was available to provide technical support throughout the  
2 study. The therapist moderating the forum was initially instructed to wait for the parents'  
3 questions, but was asked after a month to publish new discussion topics (e.g., leisure  
4 activities) on a weekly basis to foster greater use of the forum. The therapist reached out  
5 to each participant via the private chat function, and the webplatform manager sent an  
6 email half-way through the intervention to summarize discussion threads and to  
7 encourage participants to visit the webplatform.

## 8 9 10 **Outcomes**

### 11 12 *Recruitment and retention*

13 The number of potential participants reached, screened, assessed for eligibility, deemed  
14 eligible, randomized, and retained until the post-intervention survey were computed for  
15 each recruitment method. Recruitment rate was defined as the average number of  
16 participants recruited per month. Retention rate was defined as the percentage of  
17 recruited participants who completed the post-intervention questionnaire.

### 18 19 20 *Use of the Web Platform*

21 The participation rate documented the number of participants who accessed the web  
22 platform at least once. Platform utilization data, such as the number of visits to the  
23 platform, time spent, pages visited, and content generated (new topics or posts on the



1 forum or messages via the private chat function) were tracked for all users via an  
2 automatic tracking system. These data were compared across participant groups for the  
3 intervention period. The time spent on the platform by the therapist and the platform  
4 manager were also tracked to document the resources needed to implement such an  
5 intervention. Field notes and a therapist logbook were used to record additional time  
6 spent providing the intervention and any issue with the platform.

### 8 ***Satisfaction***

9 The post-intervention questionnaire evaluated general satisfaction, satisfaction-related  
10 concepts (e.g., How useful was the platform), and general use of the Internet and social  
11 media. This last question was included to explore if a greater score would be related to a  
12 greater use of the platform.

### 14 ***Qualitative data.***

15 To gain a deeper understanding of their perspectives about the platform, 30-minute semi-  
16 structured phone interviews were conducted with 12 participants selected to ensure  
17 maximum variation in the sample (e.g., use of the platform, group allocation, survey  
18 responses, diagnostic status). Questions pertained to factors influencing platform use and  
19 navigation, perceptions about telerehabilitation, and recommendations for future studies.

### 22 **Analysis**

1 Recruitment and retention were described using count and percentages. For participants,  
2 non-parametric descriptive statistics were used to describe sociodemographic, MABC-2  
3 and DCD-Q results.

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5 Platform utilization and satisfaction data were described using medians and quartiles.  
6 Mann-Whitney tests were performed to explore whether these outcomes were different  
7 between groups.

8  
9 Interviews were transcribed and analyzed using NVivo. A content analysis using a mixed  
10 deductive-inductive approach<sup>19</sup> based on the interview guide was used. A research  
11 assistant inductively coded all transcripts, which were then reviewed by the principal  
12 investigator before meeting with the research assistant to discuss the interpretation of  
13 results and validate themes. An individual and group summary of the interviews were  
14 sent to participants for validation.

## 17 **RESULTS**

### 19 **Subject recruitment, retention, and sociodemographics**

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21 Figure 1 illustrates the flow diagram. Out of 118 participants screened over the phone, 28  
22 were eligible, consented to participate, completed the baseline questionnaire and were  
23 randomized. Of those, 21 families were awaiting a clinical assessment and 7 families

1 contacted us (4 referred by family doctors, 2 saw publicity on social media, and 1 from  
2 word-of-mouth) (see appendix 2 in supplementary online material for more details about  
3 recruitment per method of recruitment). The recruitment rate was 7 participants/month  
4 and the retention rate was 68%.

5  
6 Sociodemographic characteristics are presented in Table 1. No differences were found  
7 between groups pre-intervention, or between those who completed the post-intervention  
8 survey and those who did not.

9  
10 (Insert Figure 1 and Table 1 about here)

### 11 12 13 **Use of the platform**

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15 The participation rate was 72%, since 6 participants never accessed the webplatform. The  
16 median number of visits was of 1 and 2, for the intervention and control groups,  
17 respectively (Table 2). There were no significant differences between groups with regards  
18 to platform utilization. In the intervention group, 2 participants created new discussion  
19 topics on the forum, 5 participants contributed responses to those topics, 2 participants  
20 contacted the therapist privately, and no webconference was organized.

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22 (Insert Table 2 about here)



## 1 **Qualitative results**

2

3 Figure 2 illustrates the five inter-related themes, along with their subthemes, that emerged  
4 from the interviews. Themes were common to all participants independently of their  
5 allocation group. *Perceived usefulness* relates to the usefulness of the platform as a  
6 whole. The most positive aspect was perceived to be that relevant DCD information was  
7 aggregated. However, many participants already knew this information and reported  
8 having needs that could not be met by the platform (e.g., neuropsychological  
9 assesement). They suggested the platform be used for families having early  
10 developmental concerns or having recently received a DCD diagnosis, and those who  
11 could not afford private in-person services. Not receiving any public or private services  
12 appeared to positively influence the perceived usefulness of the platform, as well as some  
13 family characteristics (e.g., low DCD knowledge, perceiving their child as having mild  
14 DCD, being social and comfortable with technology). *Perceived usability* pertains to ease  
15 of navigation on the platform and was influenced by the participants' ease with  
16 technology. Technical difficulties was one of the *other factors influencing platform*  
17 *utilization*. Most parents reported having consulted the platform for general information  
18 or by curiosity, but expected to have a stronger motivation to consult the platform in the  
19 event of facing particular issues with their child.

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(Insert Figure 2 about here)

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3 1 The *impact of the platform* refers to the perceived impact of using the platform on the  
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5 2 families. Some reported little impact because they already knew most of the information  
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7 3 while others reported a general increase in DCD knowledge and a concrete impact on  
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9 4 their children's daily lives (via specific sensory exercises or recommendations for leisure).  
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11 5 Participants had many *recommendations for increasing the utilization and impact* of the  
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13 6 platform. Participants suggested to include scheduled activities, such as having  
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15 7 predetermined meetings with the therapist or having online "walk-in clinic" time slots  
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17 8 and punctual activities (e.g., webinars). Improving functionalities and clarifying the  
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19 9 expected utilization refers to ensuring all participants are aware and can easily access all  
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21 10 aspects of the intervention. Subscribing to threads and receiving a summary of activities  
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23 11 by email were perceived to be interesting options, but linking the platform to social  
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25 12 media accounts was also suggested. Including more participants (not only more parents  
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27 13 but also children, other clinicians, and stakeholders, such doctors and teachers) and  
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29 14 ensuring the intervention lasts longer were also suggested.  
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## 40 **DISCUSSION**

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44 19 This feasibility study was the first randomized-controlled trial (RCT) exploring an online  
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46 20 intervention supporting children with sdDCD and their families. Results demonstrated the  
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48 21 feasibility of conducting a future RCT to evaluate the impact of a webplatform and  
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50 22 identified important recommendations to increase recruitment and retention, platform  
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52 23 utilization, and satisfaction with the intervention.  
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5 2 Recruiting participants with sdDCD was feasible with a recruitment rate of 7  
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7 3 participants/month. Comparing the recruitment rate with other studies is difficult, given  
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9 4 the paucity of DCD RCTs and the lack of information with regards to recruitment, but  
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11 5 our rate is lower compared to another online DCD study that required no eligibility  
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13 6 assessment<sup>12</sup>. Our final sample size is comparable to other RCT clinical studies but the  
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15 7 retention rate was lower.<sup>20,21</sup> Loss to follow-up in web-based interventions is generally  
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17 8 reported to be higher and our retention rate is comparable to other web-based studies in  
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19 9 other fields.<sup>22</sup> To increase retention for future DCD web-based interventions, several  
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21 10 recommendations might be formulated. First, the delay between eligibility assessment  
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23 11 and the launch of the platform should be minimal. In the present study, four months had  
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25 12 elapsed and some participants likely lost interest in the study and developed new  
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27 13 priorities. Secondly, qualitative results highlighted the importance of personal  
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29 14 interactions. Ensuring personal contacts throughout the study process, in person, via a  
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31 15 webplatform or the phone, could help retention. Likewise, planning scheduled events and  
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33 16 meetings with the therapist could not only promote the utilization and relevance of the  
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35 17 platform, but also foster personal relationships with and within participants to help  
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37 18 retention.  
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47 20 The analysis of the number of participants contacted, assessed, and enrolled in the study  
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49 21 provides helpful insights for future web-based DCD trials. Contacting families waiting  
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51 22 for assessment was time consuming but effective in recruiting participants. However, the  
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53 23 longer families had been waiting, the less likely they were to be eligible to – or interested  
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3 1 in – the intervention. Offering this type of intervention just-in-time seems particularly  
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5 2 important. Based on our qualitative findings, the type of service proposed might be  
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7 3 particularly useful when parents have developmental concerns, before children are  
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9 4 referred for specialized assessment. Increasing recruitment efforts through collaboration  
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11 5 with family doctors and community-based professionals might ease recruitment for future  
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13 6 trials, and will likely contribute raising awareness of DCD among those groups.<sup>23</sup> Finally,  
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15 7 social media, which had been particularly helpful for other DCD online studies,<sup>12</sup> did not  
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17 8 lead to much recruitment. This is somewhat surprising but might be explained by the fact  
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19 9 that social media users might have not considered the proposed intervention as adding  
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21 10 value to what was already available on traditional social media (e.g., Facebook parent  
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23 11 groups). This finding warrants more study and future trials should optimize recruitment  
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25 12 materials to clearly explain the online intervention and distinguish it from traditional  
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27 13 social media.

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35 15 Utilization data demonstrated the feasibility of using the intervention, both by parents and  
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37 16 the therapists. A web-based DCD study targeting rehabilitation professionals reported  
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39 17 similar usage trends, with some participants not using the platform at all and others using  
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41 18 it frequently.<sup>12</sup> Caution needs to be taken while interpreting utilization data, which might  
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43 19 seem to be low, particularly for the private chat and videoconferencing functions. Other  
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45 20 studies of online interventions have reported the importance of timely access to  
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47 21 information or services as opposed to repeatedly accessing the information.<sup>24</sup>  
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1 Participants reported high scores for ease of use but interviews revealed that some were  
2 not aware that they could privately contact the therapist. The fact forums are intuitive  
3 might mislead parents and future studies should ensure participants are well-aware of all  
4 aspects of the intervention, via in-person training instead of a static user guide. Our  
5 findings also suggest parents need to be better supported, with the therapist assuming a  
6 more proactive role and reaching out to families as opposed to waiting for questions.  
7 Although our findings indicate that the proposed intervention requires little therapist  
8 time, this result needs to be interpreted with caution, since many of the pre-intervention  
9 meetings with the therapist were not captured by the data collection, and greater  
10 participant activity on the platform might impact therapist time. Exploring how  
11 interdisciplinary teams could provide the intervention is an interesting avenue for further  
12 study.

13  
14 Satisfaction was generally moderate, but qualitative findings suggest parents appreciated  
15 knowing the therapist was available, if and when needed. Our participants made various  
16 recommendations that could help increase the relevance of the intervention, as well as  
17 improve recruitment and retention. Caution should be taken while designing web-based  
18 interventions integrating DCD best practice, as the recommended principle of response-  
19 to-intervention might apply differently to a virtual setting. In our design, video-  
20 conferencing was perceived to be a Tier-3 intervention but given the importance of  
21 personal interactions, regularly scheduled activities should be planned proactively while  
22 delivering services online. Further research, partnering with web designers and applying  
23 web ergonomics models, should explore how web-based interventions can be integrated

1 early on in the continuum of care, and be combined with face-to-face interdisciplinary  
2 assessments and interventions, so as to better align current services with DCD best  
3 practices.

#### 5 **Study Limitations**

7 Limitations of this study include biases related to the automatic data tracking system  
8 (e.g., under- or over-estimating active platform time on the platform). The post-  
9 intervention questionnaire was self-reported and not validated. These biases were  
10 diminished by the addition of interviews that provided in-depth information about use  
11 and satisfaction.

#### 14 **CONCLUSION**

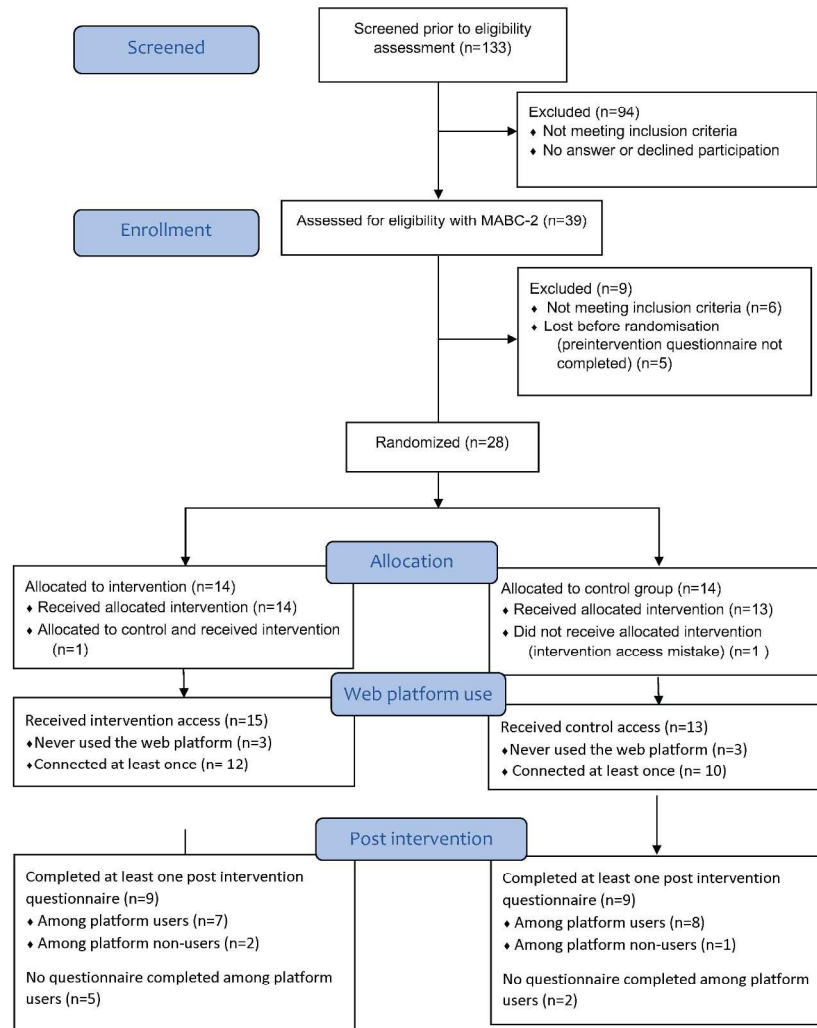
16 There are numerous challenges related to the undertaking of an RCT exploring the impact  
17 of a web-based platform for children with DCD, mostly related to recruitment, as well as  
18 the design and timing of the intervention. This type of intervention might be an  
19 interesting complement to current practices. Implementing the recommendations  
20 formulated by the parents would likely improve the feasibility of such a trial. Ensuring  
21 the intervention includes a greater number of participants for a longer period of time also  
22 appears to be important, and might call for a multi-site approach.

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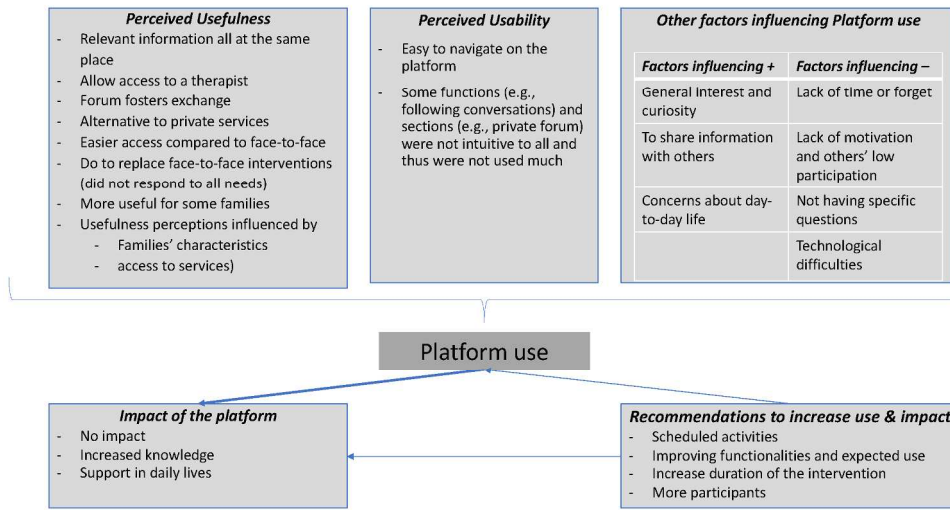
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CONSORT Flow diagram

215x279mm (300 x 300 DPI)



Interrelated themes that emerged from the interviews

338x190mm (200 x 200 DPI)

Table 1: Demographic characteristics

	Control group (n=13)	Intervention group (n=15)	<i>p</i> value
Child age, median y: mo	8:11	8:3	0.14 <sup>a</sup>
Child sex, male, n	10	12	1.00 <sup>b</sup>
Parent sex, female, n	13	14	1.00 <sup>b</sup>
Parent diploma, postsecondary, n	7	5	0.27 <sup>c</sup>
Diagnostic status, medical suspicion of DCD, n	7	11	0.43 <sup>b</sup>
Child had other diagnosis or learning disability, n	6	7	0.98 <sup>c</sup>
No access to any kind of services, n	6	9	0.46 <sup>c</sup>
MABC-2, median percentile (range)	9 <sup>th</sup> (0.5-37)	5 <sup>th</sup> (0.5-37)	0.62 <sup>a</sup>
DCDQ, median (range)*	41 (24-52)	33 (21-59)	0.28 <sup>a</sup>

<sup>a</sup> U-Mann Withney, <sup>b</sup> Fisher exact test, <sup>c</sup> Chi<sup>2</sup>

\*For DCDQ, score under 46-57 (according to the age of the children) indicate possible risk of DCD



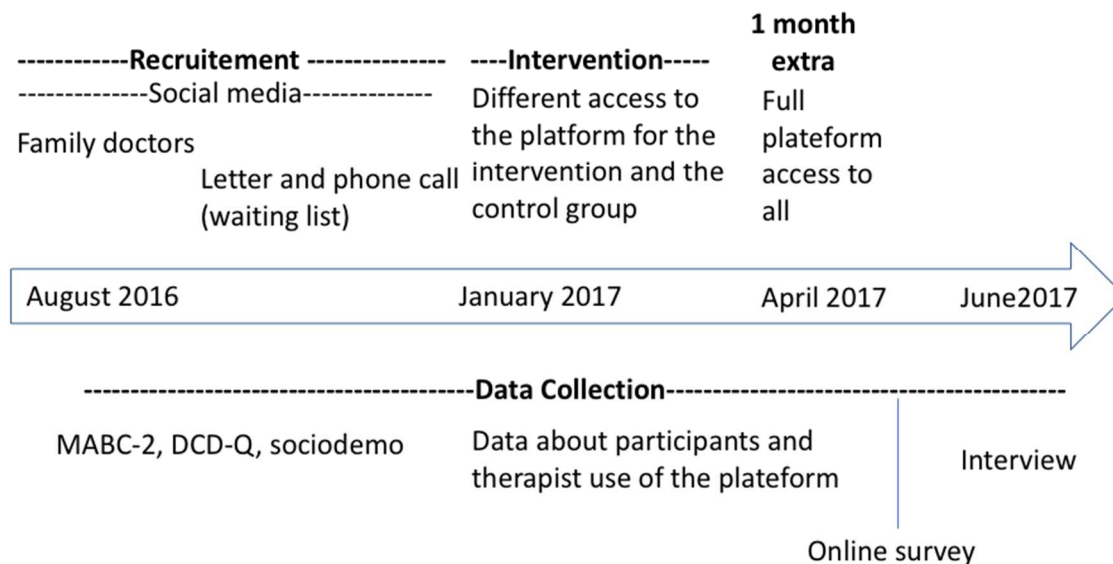
Table 2 : Platform utilization data

	Users		Intervention		Control		Group comparison	Therapist	Platform manager	
	Total	Median [quartiles]	Total	Median [quartiles]	Total	Median [quartiles]			Total	Median [quartiles]
Platform visits	72	1.5 [1.0;3.0]	49	1 [1.0;4.0]	23	2 [0.5;3.0]	0.89	33	24	2.5 [0.5;15.0]
Pages visited	343	3.5 [1.0;7.0]	309	7 [1.0;16.0]	34	3 [1.0;4.5]	0.08	242	305	16.5 [3.5;208.8]
Time spent (min)	4752	30 [10;93]	4340	60 [10;304]	412	30 [5;30]	0.20	1713	1712	106 [25.3;1152.8]
New forum topics	3	0 [0;0]	3	0 [0;0]	N/A	N/A	0.56	6	1	0
Forum responses	12	0 [0;0]	12	0 [0;1]	N/A	N/A	0.14	11	3	0
Private chat messages	3	0 [0;0]	3	0 [0;0]	N/A	N/A	0.56	17	0	0

Table 3. Post-intervention survey results (%)

	Total Median [quartiles] (n=19)	Intervention group Median [quartiles] (n=10)	Control group Median [quartiles] (n=9)	Mann- Whitney (p)
General satisfaction with the platform	65 [31;68]	60 [50;93]	65 [50;85]	0.84
Usefulness for the participant	40 [28;80]	35 [11;60]	68 [38;80]	0.19
Perceived usefulness to deliver services	60 [39;80]	60 [25;80]	60 [50;80]	0.50
Ease of navigation	82 [71;92]	79 [44;92]	86 [76;94]	0.40
Propensity to use the internet for DCD information	50 [31;68]	44 [27;66]	60 [47;80]	0.32

Appendix 1. Study and Data Collection Procedures



Peer Review Only

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Appendix 2. Recruitment and retention per recruitment procedures

Recruitment procedures	Initial sample of families	Number of families interested and eligible following phone screening	Number of families assessed with the MABC-2	Number of families eligible after MABC-2 evaluation	Number of randomized families (who were given access to the platform)	Number of families who logged in at least once on the platform	Number of families who completed the post-intervention survey
Social media	10	2	2	2	2	2	1
Family doctors	9	7	6	5	4	4	2
Hospital waiting list	91	31	30	24	21	15	16*
Reference from rehabilitation center	2	2	2	1	0	0	0
Word of mouth	4	2	2	1	1	1	0
Posters	2	0	0	0	0	0	0
Total	118	44	39	33	28	22	19*

\*Including 4 families who had never logged into the platform.