

# The role of games in overcoming the barriers to paediatric speech therapy training

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**Abstract.** In addition to training at the therapists', an important part of paediatric speech therapy is home practice with parents. The purpose of this study was to investigate the barriers in home practice from the perspective of speech-language pathologists (SLP). Another goal was to gather an understanding on the role of games in speech therapy and how games could be used to overcome the above barriers. Participants were 26 SLPs in Finland who participated in an online questionnaire. Our findings indicate that successful speech therapy home practice is affected by multiple factors, such as resources, motivation and commitment, but also by multiple stakeholders. According to our results, SLPs are active users of games. The games SLPs use in their clinical work are self-made, speech therapy-targeted games (board games, digital games, functional games), commercial board games, and commercial digital games. SLPs commonly use games as platforms that they modify for different purposes. The games are used to make the speech therapy training itself playful, and playing a game is used as a reward after training. Based on our results, the supporting role of games in speech therapy is recognized by SLPs but there is still great unused potential.

**Keywords:** Gamification, Paediatric Speech Therapy, Serious Games, Survey.

## 1 Introduction

Speech-language pathologists (SLPs) work with children of all ages with challenges in speech, language, oral motor skills, breathing, or eating. Children with challenges in speech motor skills, such as childhood dysarthria or childhood apraxia of speech, make up a large proportion of the caseloads of most paediatric SLPs [1]. Studies [2] indicate that a higher dose or higher dose frequency of a specific intervention results in more effective outcomes compared to lower dose or lower dose frequency, meaning that rehabilitating requires a lot of repetition. Thus, speech therapy practice is often intensive, consisting of many repetitions, and can continue daily for months or even years. This kind of persistent training requires a lot from the children, as they must find motivation

to keep up the exercises. Subsequently, SLPs must be able to motivate the children for training repeatedly.

Empirical evidence confirms that with adequate training, parents can provide effective interventions compared to no treatment; in many cases, such interventions can even be as effective as traditional SLP-delivered therapy while being more cost-effective [3–6]. Despite empirical support for (and widespread SLP recognition of) the importance of parental engagement for successful home practice [7–9], ensuring adequate parental involvement is difficult. Unfortunately, parents in prior studies have described home practice as not fun and a chore to get over with [10] and indicated that sustaining their motivation is hard and stressful [11]. Thus, another major motivation challenge of SLPs is to be able to motivate the children and their parents for home training.

Serious games are games used for “serious”, non-entertainment purposes [12,13]. These purposes include, for example, learning and education, rehabilitation, and health promotion. The use of serious games in rehabilitation, including speech therapy, has been studied [12], and they have been recognized as one way of maintaining motivation. Still, there is no previous research data on which games are used by SLPs in their clinical work and in which ways these games are used. Thus, in our publication we study 1) what are the barriers SLPs perceive as preventing the successful implementation of home practice and 2) what is the role of games in paediatric speech therapy?

## 2 Method

### 2.1 Study design and participants

The data collection was conducted using an online questionnaire. A voluntary participation request and a link to our study’s online questionnaire was sent to various social media communities for Finnish SLPs in December 2021. All 26 responses were appropriate and thus included in the data. No additional demographic details (i.e., besides occupation) were collected to maximize anonymity.

The questionnaire was developed iteratively, first among the research team, then tested on an external SLP. Based on this external feedback, item wording was honed, and the questionnaire was tested again on a different external SLP. This version was accepted as final. The content (translated from Finnish) analyzed for the study was in response to the following prompts: (1) How have you made speech motor exercises motivating for a child? Give at least three concrete ideas, (2) Give at least three concrete examples of tasks that motivate to practice speech motor skills at home, (3) In your experience, what practical factors prevent the implementation of home practice? and (4) Free comments on the topic.

### 2.2 Analysis

**Analysis of the barriers.** All research team members concurrently discussed initial data classification of each segment of data that was as small as possible while forming a complete, coherent singular concept. During subsequent phases of thematic

organization, identified codes were checked against these segments to ensure the codes represented the original meanings in the data. These codes were analyzed and categorized further by two researchers resulting in a codebook version containing 4 major themes with a total of 10 subthemes. This codebook version was tested to achieve intercoder reliability by conducting an intercoder agreement to 100% of the data. The agreement with an external researcher, not involved in the research, was 72.6%. After that, all researchers discussed the data and codes, making changes to the codebook. Following that, with the external researcher, another intercoder agreement test by coding 100% of the data was done with the agreement of 87.6%. The researchers conducting the second intercoder agreement discussed the differences until they reached a conclusion. Finally, the codebook was reviewed again and agreed upon by all researchers. The final version of the codebook consisted of 4 major themes and 11 subthemes.

**Analysis of the games.** The research team collected and analyzed all the answers, for questionnaire questions 1 and 2, where SLPs reported on how they use games in their clinical work. First, two researchers went through the data, independently thematizing the responses. Following that, they compared the themes they had formed and discussed the differences until they reached a conclusion about the themes, resulting in a codebook containing 5 major themes and 4 subthemes. During subsequent phases of thematic organization, the identified codes were checked to ensure the codes represented the original meanings in the data. Next, an external researcher, not involved in the research, went through the data to check that all game-related responses had been identified. The external researcher reviewed and commented on the two researchers' codebook. Finally, the codebook was reviewed again and agreed by the two researchers and the external researcher. The final version of the codebook consisted of 4 major themes and 5 subthemes.

### 3 Results and Discussion

#### 3.1 Barriers to Children's Speech Therapy

As seen in Table 1, the four major themes were: (1) family life, (2) parents, (3) challenges in working with the child, and (4) the SLP. The themes are in the table in order of magnitude. Most of the respondents mentioned more than one barrier.

**Table 1.** Themes and subthemes related to barriers identified from the data, with examples mentioned by SLPs and the percentage of respondents who mentioned the theme or subtheme.

Theme	Subtheme	Examples of the barriers mentioned (with respondent ID in parentheses)	By (%)
Family life			76.9
	Resources	“Busy everyday life” (SLP10) “Families are strained.” (SLP 2)	69.2

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	Siblings	“In families with many kids, who sometimes have other special needs kids too, practice tends to be rare.” (SLP 9) “Multiple special needs children in the family” (SLP 20)	19.2
Parents			73.1
	Commitment	“Parents don't commit to practicing.” (SLP 22) “Parental indifference toward practicing” (SLP 3)	38.5
	Not understanding the importance	“Thinking that therapy is for practice” (SLP 2) “Parents don't prioritize home practice because they feel that since the child is understood at home, it's not a big problem that less familiar people don't understand their speech.” (SLP 24)	34.6
	Motivation	“Parents lacking motivation has to be the biggest factor.” (SLP 13) “Poor parent motivation” (SLP 8)	34.6
	Feeling incompetent	“The family is unsure whether they know how to guide practice properly.” (SLP 2) “Experience of not being able to do the job” (SLP 12)	15.4
	Parent language/communication/cognition challenges	“Parents ‘don't know how’ to do exercises despite guidance, as in parents have poor cognitive or everyday-life management skills.” (SLP 14) “The parents' own speech-motor problems [and] bi- or multilingualism can be a hurdle or even a barrier.” (SLP 17)	11.5
Challenges in working with child			57.7
	Motivation	“The child won't do it, because practice without a fun motivator or game just isn't fun.” (SLP 5) “Paper tasks being ‘boring’ and unmotivating.” (SLP 21)	38.5
	Child-parent interaction problems	“Parenting difficulties, in which case I may not even guide toward home practice if the parent is critical or shaming when guiding the child” (SLP 15) “Problems in the child-parent interactive relationship; the child refuses to practice with the parent” (SLP 6)	23.1
SLP			34.6
	Guidance	“Insufficient guidance: if the speech-language pathologist just “throws homework at the family” without sufficient guidance, the parents may think that, e.g., they don't have time to sit down and practice with the child. The SLP must give parents guidance [on] how practice can be implemented amid everyday life: during car trips, or attaching the routine to brushing teeth or playing games, etc.” (SLP 10)	34.6

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Collaboration	<p>“I always take speech-motor clients' parents along for sessions, so they see what and how to practice.” (SLP 13)</p> <p>“Motivating and encouraging parents is the most important thing, so that we can reach a good collaborative relationship.” (SLP 3)</p> <p>“There's no time to see parents and thus I can't motivate/guide them.” (SLP 25)</p>	15.4
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**Family life.** The most often mentioned family life subtheme was resources, meaning general strain or stress and difficulties finding time for and scheduling home training. This was unsurprising given the theme's prevalence in previous studies [11,15–17]. For example, all six parents interviewed by Sugden et al. [11] mentioned how being busy makes it challenging to fit home practice into their schedule. Importantly, at least one parent report from a study by Davies et al. [18] explicitly links the tension of competing family and home time demands to decreased motivation. As more free time is typically difficult to come by, ways around this barrier are likely to be found primarily in more efficient organization of training schedules. For instance, one of our respondents identified evenings as an often-impractical time for training, as the child may be tired, suggesting that practice at day care may be more opportune.

Families' other children were mentioned as another family life barrier for home practice, especially when several children in the same family have special needs or similar challenges, which has also come up in previous studies [11][17]. None of our respondents went into further detail, but prior studies (e.g., [17]) indicate that siblings wanting to be part of the practice activity can be distracting. Suggested solutions to this barrier include having another caretaker distract the siblings during practice or practicing with an older child while younger ones are asleep [17].

**Parents.** The second largest major theme was parent-related barriers. Our results regarding parental feelings of incompetence have also been raised in past studies (e.g., [15,10]). Mothers interviewed by Goodhue et al. [17] inversely connected the severity of the child's problem with their confidence in administering home practice. This is unfortunate, because similar parental uncertainty has been linked to a desire for a less personally active approach in their child's therapy [18]. Such uncertainty may also explain much of what the SLPs perceive as miscellaneous or unexplained parental non-commitment in our data and past studies (e.g., [19]).

Our results suggest many parents don't understand the importance of parental involvement and home practice, often expecting the SLP alone to take responsibility for their child's treatment. These results mirror those of several prior studies, including SLP-surveys [15,16] and parent interview studies [11,17,18]. In these, parents have often expressed uncertainty about what speech-language therapy and their role in it consist of as well as an initial assumption that the SLP would carry out the intervention primarily alone.

Many respondents described parental motivation as vital for home practice. A factor conceptually close to motivation — parental lack of commitment — was among the most-reported barriers in our data. This result mirrors a survey study by Lim et al. [7],

in which lack of parent engagement was the second-most common SLP-service delivery barrier. Some respondents did causally link parents without motivation to other factors: namely, parental expectations that practice won't help anyway, a belief that their child won't be able to concentrate on practice in the home setting, or the idea that the child being understood at home is enough and thus speech practice isn't necessary. These rationales relate to other themes identified in our data, particularly insufficient understanding of home practice importance and challenges in working with the child.

The final parent-related subtheme arising from our data was parental challenges in language, communication, or cognition. One SLP described lacking a common language with the parents as sometimes leading to communication falling short. Parents may also have their own speech-motor challenges or not share (all) languages with the child, making it harder to support the child's home practice. One respondent also attributed parents' not knowing how to do home exercises to poor cognitive skills or everyday life management skills. Past studies have not typically mentioned these types of barriers arising from individual parental traits and abilities, more often focusing on shared difficulties (e.g., time and scheduling), as discussed above.

**Challenges in Working with the Child.** The third largest major theme was the challenges in working with the child. In a study by Watts Pappas et al. [20], negative child emotions evoked by therapy caused strong reactions in parents as well, including discontinuing therapy. Thus, child and parent motivations toward therapy are clearly tightly linked. When children enjoy the practice, they are likely to actively remind the parent to practice with them [17], thus helping overcome many family life or parent barriers.

Our finding of general parent-child relationship features hampering home practice have also come up in past studies, though the importance of this dynamic has rarely been highlighted as a major finding. One example is a study by Thomas et al. [10], wherein parents described how emotionally difficult it can be for them to have to provide negative feedback (as instructed by the intervention) to their child. Many parents also reported that their child expressed fewer negative, had better emotion regulation skills, and generally “worked better” at the clinic with an SLP than with them at home. These findings underscore how vital it is to get parents actively involved during training sessions to properly instruct and practice skills.

**SLP.** The fourth major theme of barriers to speech therapy home training consisted of challenges related to the SLP. Collaboration barriers cited included misunderstandings and being unable to keep in touch regularly enough, either because of too little time or the lack of a shared language with parents. Guidance barriers included insufficient explanations of how and why to do practice, not fully motivating and encouraging parents, not helping parents figure out how to fit practice into busy family schedules, giving the child too many exercises for them to remember, and not including parents in session so they can learn how to practice at home. These results mirror prior findings by Sugden et al. [11] in which parents indicated SLP support in guiding home practice and reassuring parents of their ability to carry it out has been crucial but is still sometimes inadequate.

### 3.2 Role of Games in Paediatric Speech Therapy

**Types of Games.** Although games were not mentioned in the questionnaire, altogether 18 out of 26 (69.23%) respondents mentioned a game at least once. In the analysis about the role of games in speech therapy, 3 major themes about game types one of which had a total of 3 subthemes were identified. The themes were (1) self-made (the respondent or another SLP), speech therapy-targeted games (board games, functional games and digital games), (2) commercial board games and (3) commercial digital games. The games were (1) used during the exercises to make the exercises playful and thus motivating and (2) as a reward, where the child was allowed to play a game (in most cases a tablet game) after speech therapy training. The themes and subthemes, as well as examples of the games mentioned are seen in Table 2.

In a recent study, Saaedi et al. [12] reviewed the use of digital games for children with speech disorders. According to the work, digital games are actively designed specifically for versatile speech therapy purposes and the use of games increased children's motivation and concentration during training. In our results, it is interesting that many SLPs use (commercial) games as platforms that they modify for different purposes, for example by adding parts or functions or just by taking advantage of a game board that is related to child's interests and using it for something else than playing the game itself. Further, it is notable that board games were more often mentioned than digital games, whereas the most often mentioned games were self-made, speech therapy-targeted games (board games, functional games, digital games). SLPs mentioned that fast-paced and surprising games are the most motivating.

The identified parent-related barriers, such as lack of motivation and engagement and feeling of incompetence, were the major themes identified from the responses in this study. These are also supported by an SLP survey by Lim and colleagues [7], where the most-often reported strategy for overcoming the barriers was training parents to conduct therapy at home. The authors in [7] concluded that SLPs could likely benefit from better tools for training and engaging parents. This seems reasonable, as parents can hardly be expected to learn about SLP -service importance without education (or "training"), and without the motivation arising from that understanding, why would they be engaged? Also, many parents in a study by Davies et al. [18] explicitly expressed a desire for the SLP to teach them better techniques for training (and interacting) with their child to replace methods that weren't working. Based on these findings, use of specifically designed games that guide and monitor the home practice could reduce parents' feelings of incompetence and thus increase their motivation for their child's speech therapy practice.

**Table 2.** Themes and subthemes related to role of games identified from the data, with examples mentioned by SLPs and the percentage of respondents who mentioned the theme.

Theme	Sub theme	Examples of the games mentioned (with respondent ID in parentheses)	By (%)
Self-made, speech therapy-targeted games			53.9
	Board games	“I have crafted a fishing game.” (SLP 4) “A dice game where several moving characters in parallel compete to see who can finish first” (SLP 20)	
	Functional games	“Playing tag outside while practicing the /r/.” (SLP 13) “A car track, where you drive around and under the road you can see task cards that you have to collect.” (SLP 24)	
	Digital games	“I have created an electronic game, e.g., on Keynote or in my workplace's own online rehabilitation environment.” (SLP 4) “Animated games made with Power point” (SLP 12) “PowerPoint exercises found from Ideas for remote speech therapy -Facebook group.” (SLP 4)	
Commercial board games		“Use of different games e.g., dice games, memory games, board games.” (SLP 20). “The most motivating games have been fast-paced and surprising games (e.g., Slap the Ghost, Bomb Game or Pop-Up Pirate).” (SLP 8)	38.5
Commercial digital games		“Digital exercises: speech motor exercises can easily be added to a theme that motivates the child, e.g., a Minecraft game.” (SLP 10) “Games on the abcya -site (first task, then decorate e.g., muffins, then task-decorate again...)” (SLP 4)	19.2
Role of games			50.0
	Make training playful	”Tasks combined with different activities: games, playing, building, etc.” (SLP 2) “Game boards related to the child's interests e.g., Frozen, Paw Patrol, etc.” (SLP 12)	
	Training rewarded by playing	“First a speaking task, then favorite game on the Ipad” (SLP 25) “Rewards, such as playing on an iPad” (SLP 19)	

Saaedi and colleagues [12] also stated that most of the games they reviewed had been designed so that they are suitable for home practicing when parent, who has been instructed by a SLP, plays games together with the child. As parental challenges in



language, communication, or cognition also showed up as identified barriers in our responses, games that engage the parents to speech therapy training could offer support, for example in forms of games in different languages and instructive games, to the parents as well. Further, as the other children in the family were seen as a barrier to training, social games that involve the whole family could be an interesting option. Especially the use of functional games, such as car tracks and playing tag, which were mentioned by the respondents, seem a potential way to bring the speech therapy training as part of the family life in a playful way.

Our study contained some limitations that future studies could remedy. Firstly, the respondents were all from Finland, and a more international viewpoint would make the results more generalizable. Further, this study consisted of the views of SLPs only, while studying the views of parents and children themselves is important, because their views of the same situation can provide insights SLPs can't detect, such as how parent and child feelings affect motivation for the intervention (e.g., [20]). We also concur with Lim and colleagues' [7] assessment that parental variables, such as socioeconomic status and mental health may moderate how effectively they can implement home practice for their child, warranting further study. As paediatric speech therapy training is associated with many types of interventions, depending, for example, on the severity of the child's impairment, the barriers may also be experienced differently. Thus, future studies should also investigate how factors, such as age of the children and type of the intervention, affect to the barriers perceived, as those factors were not at the focus of this study.

## 4 Conclusions

There are several barriers, such as resources, motivation and commitment, associated with paediatric speech therapy home practice according to SLPs in Finland. The barriers identified in this study seem to be comparable to the barriers identified in previous international studies (see, e.g., [17,19]). SLPs use board games, functional games, and digital games to make the training playful, and playing a game is used as a reward after training. SLPs often see games as platforms that can be modified to support speech therapy training in versatile ways.

Based on our results, the supporting role of games in speech therapy is recognized by SLPs but there is still great unused potential. We feel that utilizing the data collected, the barriers identified, and the current and potential role of games recognized in this study, support the development of games and playful solutions to address especially those challenges related to paediatric speech therapy home practice. Next, our goal is to connect game designers and SLPs to create design guidelines to provide specific indications to serious game designers.

## References

1. Baker, E., McLeod, S.: Evidence-based practice for children with speech sound disorders: Part 1 narrative review. *Lang, Speech & Hearing Services in Schools* 42(2), 102–122 (2011).

2. Kaipa, R., Peterson, AM.: A systematic review of treatment intensity in speech disorders. *International Journal of Speech Language Pathology* 18(6), 507–520 (2016).
3. Tosh, R., Arnott, W., Scarinci, N.: Parent-implemented home therapy programmes for speech and language: a systematic review. *Int. J. Lang. & Com. Dis.* 52(3), 253–269 (2017).
4. Roberts, M., Kaiser, AP.: The effectiveness of parent-implemented language interventions: A meta-analysis. *American Journal of Speech-Language Pathology* 20(3), 180–199 (2011).
5. Lawler, K., Taylor, NF., Shields, N.: Outcomes After Caregiver-Provided Speech and Language or Other Allied Health Therapy: A Systematic Review. *Archives of Physical Medicine and Rehabilitation* 94(6), 1139–1160 (2013).
6. Roberts, M., Kaiser, AP., Wolfe, C., et al.: Effects of the teach-model-coach-review instructional approach on caregiver use of language support strategies and children’s expressive language skills. *Jour of Speech, Language, and Hearing Research* 57(5), 1851–1869 (2014).
7. Lim, J., McCabe, P., Purcell, A.: Challenges and solutions in speech-language pathology service delivery across Australia and Canada. *Eur. J. for Per. Cent. Heal.* 5(1), 120– (2017).
8. Melvin, K., Meyer, C., Scarinci, N.: What does “engagement” mean in early speech pathology intervention? A qualitative systemat. review. *Dis. and Reh.* 42(18), 2665–2678 (2020).
9. Tambyraja, S.: Facilitating Parental Involvement in Speech Therapy for Children With Speech Sound Disorders: A Survey of Speech-Language Pathologists’ Practices, Perspectives, and Strategies. *Am Journal of Speech-Language Pathology* 29(4), 1987–1996 (2020).
10. Thomas, D., McCabe, P., Ballard, KJ., et al.: Parent experiences of variations in service delivery of Rapid Syllable Transition (ReST) treatment for childhood apraxia of speech. *Developmental Neurorehabilitation* 21(6), 391–401 (2018).
11. Sugden, E., Munro, N., Trivette, CM., et al.: Parents’ Experiences of Completing Home Practice for Speech Sound Disorders. *Journal of Early Intervention* 41(2), 159–181 (2019).
12. Saeedi, S., Bouraghi, H., Seifpanahi, M.-S., et al.: Application of Digital Games for Speech Therapy in Children: A Systematic Review of Features and Challenges. *Journal of Healthcare Engineering*, 4814945–20 (2022).
13. Djaouti, D., Alvarez, J., Jessel, JP., et al.: Origins of Serious Games. In: Ma, M., Oikonomou, A., Jain, L. (eds) *Serious Games and Edutainment App*. Springer, London (2011).
14. Guest, G., MacQueen, KM., Namey, EE.: *Applied thematic analysis*. SAGE Publications, Thousand Oaks (CA) (2012).
15. Sugden, E., Baker, E., Munro, N., et al.: An Australian survey of parent involvement in intervention for childhood speech sound disorders. *Int. J. Speech Lang. Path.* 20(7), 766–778 (2018).
16. Watts Pappas, N., McLeod, S., McAllister, L., et al.: Parental involvement in speech intervention: A national survey. *Clinical Linguistics & Phonetics* 22(4-5), 335–344, (2008).
17. Goodhue, R., Onslow, M., Quine, S., et al.: The Lidcombe Program of early stuttering intervention: mothers’ experiences. *Journal of Fluency Disorders* 35(1), 70–84 (2010).
18. Davies, K., Marshall, J., Brown, L., et al.: Co-working: Parents’ conception of roles in supporting their children’s speech and language development. *Child Language Teaching and Therapy* 33(2), 171–185 (2017).
19. Mandak, K., Light, J.: Family-centered services for children with complex communication needs: the practices and beliefs of school-based speech-language pathologists. *Augm. and Alt. Comm.* 34(2), 130–142 (2018).
20. Watts Pappas, N., McAllister, L., McLeod, S.: Parental beliefs and experiences regarding involvement in intervention for their child with speech sound disorder. *Child Lang. Teach. and Therapy* 32(2), 223–239 (2016).