Experiences of intermediate and secondary school students with auditory processing disorder and remote microphone systems

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ABSTRACT

Under the umbrella of the United Nations Convention on the Rights of the Child (UNCRC), this research explored the experiences of nine intermediate and secondary school students from Aotearoa New Zealand with auditory processing disorder (APD) who used a remote microphone (RM) system at school. Much of the school-based research with those with APD has been conducted with primary-aged students, making post-primary settings of interest in this project. Employing a qualitative research design using semi-structured interviews and subsequent thematic analysis, three themes were identified: the student as expert, the 'hassle factor', and teacher cognisance and action. Findings showed that at a school level, post-primary APD students have space for a voice, can share their voice, have an audience to listen to their voice, and influence, but at a systemic level, this is less apparent. Future Ministry of Education assistive technology policy reviews should therefore include student views about RM systems.

KEYWORDS

Auditory processing disorder, child rights, UNCRC, remote microphone systems, Aotearoa New Zealand, equity

Introduction

The United Nations Convention on the Rights of the Child (UNCRC), ratified by most countries, including Aotearoa New Zealand in 1989, heralded a new era for children's rights. The UNCRC is a landmark international treaty that comprehensively outlines children's rights, influencing national and international policy. It provides a common ethical and legal framework for protecting children and promoting their well-being and equitable access to resources (United Nations, 1989). Therefore, the rationale for this work was to align with UNCRC conventions and protect children's rights, while promoting equity in education in Aotearoa New Zealand. The UNCRC forms the basis for this study,

which explored how post-primary school students in Aotearoa New Zealand with auditory processing disorder (APD) and remote microphone (RM) systems experienced their education. It reflects on UNCRC Article 29(a) which states that a child has the right to the development of their talents and mental and physical abilities to their fullest potential (United Nations, 1989). This research also aligns with UNCRC Article 12, which sets out the right of children to express their views on matters concerning their lives.

The question that guided this qualitative study was:

> What are auditory processing disordered intermediate and secondary school students' experiences of their remote microphone systems in classrooms in Aotearoa?

Positionality

This research acknowledged the tensions between a medical model view created by a formal diagnosis – in this case, auditory processing disorder – and an ecological view applied by the researcher (Toro et al., 2020). The ecological model promotes a strengths-based approach that sees environments as responsible for adapting to individual need, instead of individuals needing to change (Crawford, 2020). To ease this tension, the researcher viewed APD participants' experiences as an interplay between individuals with personalities and strengths and their environments with social and other barriers (Community Law, 2024) and aimed to present a balanced view of the juxtapositions potentially present in this study.

Setting the context

Article 29(a) of the UNCRC states that all students should be enabled to reach their full potential in schooling (United Nations, 1989). APD students have all the rights of the UNCRC, and according to Tomaševski (2006), the "4-A" framework in education is that education should be Available and Accessible, be of an Acceptable standard and be Adaptable to individual needs (Lundy & O'Lynn, 2019). By applying this framework, APD students can have the opportunity to achieve Article 29(a). The "4-A" framework guides the establishment of child rights through education, but child rights also need to be upheld in education (Lundy & O'Lynn, 2019).

Article 12 assigns the right to APD students to express an opinion about matters that impact them (United Nations, 1989). Bourke and O'Neill (2022) state that a genuine partnership occurs when adults let children become their equals and teachers their audience. Otherwise, having a voice can become tokenistic (Lundy, 2018). Intermediate and secondary schools often focus on learning content for achievement (Florian et al., 2017). While New Zealand intermediate and secondary schools are inclusive, the processes of inclusion are usually secondary to achievement (Clark-Howard, 2019). Lundy (2007) outlines a four-component framework for education settings to enable child voice, which includes (a) space – the chance to express a view; (b) voice – facilitation to express a view; (c) audience – the view is heard; and (d) influence – the view is positively acted upon. However, a child's voice is always entwined with adult authority, and though children may know their right to a

voice, adults may not be committed to actualising it (Lundy, 2007). Child rights are often downplayed in education legislation and policy, creating systemic barriers to the child's voice (Smith, 2016).

What does the literature say about inclusion and assistive technology?

Inclusive education invites all learners to participate and be supported to learn and contribute to their local school community (Ministry of Education, n.d.; Mitchell & Sutherland, 2020). In Aotearoa New Zealand, diversity is viewed as a strength, and by identifying and removing barriers, every student can make a meaningful contribution (Ministry of Education, n.d.; Singh & Zhang, 2022). The New Zealand curriculum's inclusion principle requires teachers to deliver a local curriculum that celebrates diverse abilities, identities and talents and provide equitable opportunities for all (Ministry of Education, 2024b).

In 2006, the United Nations (UN) Convention on the Rights of Persons with Disabilities (UNCRPD) was adopted and ratified. Article 24 of the UNCRPD states that disabled people should be granted access to inclusive education in their local communities (United Nations, 2006). These students must be supported to function well in mainstream environments, and assistive technologies may be essential to access learning and social engagement (Hunt, 2021).

Assistive technology (AT) is any device that supports individuals to learn and live (Chambers, 2019). Researchers agree that AT is one of the greatest enablers for children with disabilities to access learning and social inclusion (Chambers, 2019; WHO, 2015). Access to AT is a right according to UNCRC Article 24(c), which states that available technologies should be applied to assist children (UNESCO, 2020). The commitment to AT is another way that child rights can be upheld in education (Lundy & O'Lynn, 2019), as diverse learners may critically rely on devices to engage in the everyday world (Atanga et al., 2020). Several sources agreed that users of AT need to have their AT (a) understood and used correctly, (b) maintained and repaired, (c) updated with newer versions, and (d) be supported in its use (Dell et al., 2016; Perelmutter et al., 2017). Adults must facilitate the right to well-functioning, frequently and purposefully used AT (Ahmad, 2015).

What does the literature say about auditory processing disorder and the use of remote microphone systems?

APD is a brain listening disorder, with audiologists worldwide still trying to reach a consensus on its assessment and treatment (Millett et al., 2012). APD students might have difficulty hearing in background noise, staying focused, identifying phonemes, and processing spoken information (Barry et al., 2015). These issues can persist throughout life (Keith & Purdy, 2014). Johnston et al. (2009) found that while APD requires a multi-faceted support approach, RM system use in school is a meaningful way to support learning.

RM systems have a microphone to capture speech, and ear receivers to receive a wireless signal (Barker, 2020). Numerous studies agree that RM systems can improve the listening skills of those with APD (Reynolds et al., 2015; Schafer et al., 2020). Positive outcomes linked to RM use include (a) increased engagement, (b) improved understanding of speech in noise, (c) better focus on relevant auditory information, and (d) complex acoustic situations became more manageable

(Johnston et al., 2009; Millett et al., 2012). RM devices enable APD students to access learning and facilitate their right to achieve UNCRC Article 29(a).

Worldwide, there is very little qualitative research with APD students in intermediate or secondary schools who use RM systems. In New Zealand, there are fewer than ten qualitative studies involving primary-aged APD or hearing-impaired students with RM devices, and only one including secondary students. Two international qualitative APD studies were sourced that expressed eight secondary students' perspectives. Several qualitative studies involving secondary-aged RM users from the broader perspective of hearing loss, in general, were also located. These studies found that primary-aged students liked their new devices (Barker, 2020), while secondary students showed a drop-off in device use to fit in and be accepted socially (Fry, 2014). Younger RM users felt supported by teachers, whereas secondary students were encouraged less by teachers to use their AT (Fry, 2014; Lawton et al., 2017).

An American study by Peters and Anderson (2019) reported a similar drop-off phenomenon in secondary students' use. Research by Jefferis (2021) and Johnson (2015) found that social pressure, the "hassle factor" (Johnson, 2015), maintenance difficulties, or outdated hardware contributed to AT discontinuation. Negative teacher attitudes and inflexible school structures also affected AT use (Lamond & Cunningham, 2020), as did ear comfort and connectivity to other devices (Hitchings, 2023; Jefferis, 2021). RM use was most enabled by a positive student attitude (Hitchings, 2023; Meyer et al., 2014), which was associated with the support of caregivers. Good teacher knowledge of the AT and a positive attitude, along with prompt repair or resolution of difficulties, also helped (Hitchings, 2023; Karlsson et al., 2018). This study therefore sought to understand whether New Zealand APD intermediate and secondary school students have had similar experiences with their RM devices.

Method

This study used a qualitative exploratory approach (Creswell, 2014) to explore how intermediate and secondary students aged 11-17 years, diagnosed with APD, experienced RM systems for learning at school. It was guided by the following research question: What are auditory processing disordered intermediate and secondary students' experiences of their remote microphone systems in classrooms in Aotearoa? Semi-structured interviews enabled in-depth exchanges between participant and researcher and promoted a holistic view of the students (Korstjens & Moser, 2017). Interview questions were piloted with a non-participating APD student, ensuring the clarity of questions was appropriate for secondary school students (Seidman, 2019). This project prioritised the child's voice, as children and young people have unique insights into the schooling journey (O'Neill, 2018). Previously, children were viewed as unreliable research participants (Lundy & McEvoy, 2012), but recently, children have been seen as able to express views about their own lives and as agents of their experiences (Jadue Roa, 2017; Mason & Hood, 2011). The UNCRC has led these shifts, and children's voices are now intentionally sought.

Ethical considerations and Te Tiriti o Waitangi

This research was completed under the Massey University Educational and Developmental Psychology Research Programme 2024, and the ethics approval number was OM3 23/03. The project was assessed as being low risk. Research conducted in Aotearoa New Zealand must be responsive to both partners to Te Tiriti o Waitangi, but especially towards Māori as ethics concerning them have not always been applied (Hudson et al., 2016). Children have the right to have their heritage, culture, and language respected in education settings (Podmore et al., 2016). Therefore, Te Tiriti and UNCRC align in UNCRC Article 12, and Te Tiriti has contributed to overarching ethical principles for research in Aotearoa New Zealand. According to Burns et al. (2024), current conceptualisations focus on the four articles of Tiriti o Waitangi which are to assert kāwanatanga (the right to self-governance); asserting rangatiratanga (the right to self-determination or autonomy); being given ōritetanga (the same rights as other subjects of the Crown, or equity); and protection for ritenga/wairuatanga (the active protection of Māori customs, or avoidance of harm). Autonomy was achieved when information and consent forms were written in language accessible to secondary-aged students with clear participation requirements. The right to withdraw was clearly stated (Massey University, 2017). These actions align with rangatiratanga as participants could decide how to participate in this research (Network Waitangi, 2018). Ritenga/wairuatanga or active protection was exercised when care was taken as participants had diagnoses of APD, making listening and information processing difficult (Keith & Purdy, 2014). Participants were discreetly identified, and communication occurred with only a few key adults. Interviews were conducted in uninterrupted spaces for optimal listening (Keith & Purdy, 2014). Pseudonyms were used to ensure anonymity in reporting (Hammersley & Traianou, 2012).

Recruitment and sample

Nine participants were interviewed for this research. Purposive sampling helped identify intermediate and secondary 11 to 17-year-olds diagnosed with APD, with experience in RM systems, and living in a geographic area on the South Island of New Zealand. Purposive sampling is a non-random sampling method whereby participants who meet specific research requirements are intentionally sought (Campbell et al., 2020). Purposive sampling was necessary because there are few APD students in schools, as the prevalence of APD in New Zealand is thought to be 6.2% of the population (Esplin & Wright, 2014). School rebuilds in the geographic area post-earthquake have seen some secondary schools now include students aged 11-12; therefore, this age group was included. The Heads of Learning Support (HLS) of fifty-five secondary and intermediate schools were emailed using contact information from school websites. Once potential participants were identified, information and consent forms were sent out. About forty students with APD and RM systems were found in this search, and nine agreed to be interviewed. The sample represents 23% of the total intermediate and secondary school APD population in the geographic area. Students came from a socio-economically diverse range of schools as shown by the Equity Index numbers (Ministry of Education, 2023). Participant demographics are in Table 1.

Table 1. Demographic information

Gender	Ethnicity	Age	School Equity Index
Male	NZ European	11	377
Female	NZ European/Māori	13	518
Female	NZ European	13	411
Male	Indian	12	500
Male	NZ European	13	418
Male	NZ European/ Māori	13	418
Male	Māori	12	461
Male	Filipino	11	377
Male	NZ European	12	404

The condition of APD was deeply considered during data collection. A printed interview schedule was available for students as visual information can assist those with hearing difficulty (Drajati et al., 2021), and the positively framed open-ended questions were intentionally designed to help participants relax in the interview process (Fry, 2014). Interviews took twenty minutes and contained nine questions, which kept sessions brief and reduced anxiety, an important consideration for this population (Keith et al., 2019). Interview audio was recorded for transcription purposes with participant consent. Audio data and transcripts were stored on a password-protected laptop and deleted at the end of the project (Braun & Clarke, 2013).

Data analysis

The data was analysed using thematic analysis, and the 2006 and 2013 works of Braun and Clarke guided this work over several phases. *Phase 1:* Spoken information was transcribed word-for-word. *Phase 2:* Transcripts were read to get a feel for what was in the dataset. *Phase 3:* Initial codes were identified. *Phase 4:* Theme identification, whereby ideas with the same codes were grouped. A theme is a recurring idea across the dataset (Punch & Oancea, 2014). Theme identification was done in an Excel spreadsheet. *Phase 5:* Refining of themes whereby the researcher iteratively revisited the data to ensure the adequacy of the final themes (Lincoln & Guba, 1985, as cited in Amankwaa, 2016). *Phase 6:* Main themes were named and explained. *Phase 7:* The final discussion of the data in the report is linked to the research question and the literature.

Findings

Three major themes emerged from the interview data, (a) the student as expert, (b) the hassle factor, and (c) teacher cognisance and action.

The student as expert

The theme of the student as expert relates to the student being the main knowledge holder about their RM device and its use and their personal hearing needs. Students discussed their need and abilities to teach teachers how to use their remote microphones and this formed the sub-theme of the student as teacher.

Student as teacher
In terms of students teaching teachers how to work the microphone, seven of nine participants indicated that they did this. One student's device management was teacher-led, and one stated that he had abandoned the RM system.

The seven students showed teachers how to turn the microphone on and off, as revealed by the following comments:

> No, relievers don't, so I show them because I'm the expert! Once a teacher left it on when she went to the bathroom, and that was weird! Haha! (Hamish)

> Some teachers don't know how to turn the Roger on. But I've helped them. (Ryan)

Some young people show teachers how to wear it, for example:

> I give it to them and tell them to turn it on and put the clip on their shirt. (Nathan)

> Um, just show the turning off and on button and the magnetic [clasp]. (Otto)

Some microphones had special functions, and young people showed teachers how to use these.

> They have been shown and there's a little booklet, but I still like to show them how to work it, like mute and different modes and the functions. (Annabel)

> The student knows how to use it properly, like all the features on it, yeah, the important features. (Yvette)

Student as daily device manager
Seven of the nine students were responsible for initiating the use of the RM system, looking after the device, and charging it at the end of the day or when it needed charging.

> I'm responsible for charging it three times a day, at morning tea, lunch and at home time. I like being in charge of it. (Hamish)

> I get to school and go and play with my friend before the bell rings, then I go into class and get the hearing things, put it on and give the Roger to the teacher. (Matthew)

Several students took their hearing aids out at break times and stored their microphones, some in protective cases, others in their pockets.

> At morning tea I take them off, so I don't lose them. I do have a case for it. (Ryan)

> And I've got the earpieces in my bag, yeah, and I've got the pen that's in the office here. (Nathan)

The young people retrieved their microphones from teachers at the end of a lesson, before changing class.

> Yeah, I give it to them, and make sure they give it back to me at the end. (Matthew)

> I'll use it and then bring it back into my bag and take it to other classes, then drop it off to the office before I leave. (Annabel)

Student as hearing manager

Students also spoke of their personal autonomy around managing their hearing in class. This formed the subtheme of the student as hearing manager. A few students indicated that they sit close to the teacher during lessons, to optimise listening.

> Some classes I sit up front, … actually, most of the classes I'm up the front. Yeah, all of them. (Ryan)

> Well, most of the time I sit near the front. But some classes are really quiet, so it doesn't matter much. But yes, I do that most of the time, sitting close listening. (Annabel)

Two students felt that using the RM system meant that they no longer needed to sit at the front anymore.

> Interviewer: And do you sometimes sit closer to the teacher? Does that make a difference?
> Student: Not really if you're wearing this. (Yvette)

> This is the microphone; it helped me hear from far away. (Otto)

Students said they decided when and how to use the microphone as in some classes it was not feasible or necessary depending on the noise or activity level of the lesson, like in physical education (PE) for example. A few indicated they forgot to use it or take it to the next class.

> Well, there's some classes I don't need it like photography, we just do our own thing and PE it would be hard to use. So, I don't use it in classes like that, but I'm trying to where I think I'd need it, I've been trying to use it. (Annabel)

> I think sometimes I forget to take it with to some classes. (Ivan)

For group discussions the microphone could be placed in the middle of a group of speakers.

> In my old school we would take the Roger off the teacher's neck and put it in the middle of the group. (Yvette)

Hamish had experienced noisy classmates with shrill voices when he described microphone sharing:

> Don't give the microphone to people who scream! Haha!

The hassle factor

The hassle factor refers to the effort put into using the microphone system, including maintenance issues, securing devices at school overnight and retrieving them in the morning, and students needing to constantly hand the microphone to teachers as they progress through the school day.

Maintenance issues

Six out of nine students indicated they had had some form of practical difficulty with the microphone or the charging unit. Two students' devices were new and worked well.

> There were quite some issues with the microphone. We put it in the charger, but the charging unit was broken, we had to have it serviced a few times. It had to be fixed because it died easily. (Otto)

Even newer devices were reported to have had charging issues, and many older microphone batteries were no longer lasting through the day. This caused some students to periodically go without the microphone until it could be charged at break time. One student had abandoned the RM system altogether as the battery was unworkable.

> I got them when I was eight maybe seven … I haven't been using it because the batteries have been running out too quickly. (Uri)

> Sometimes it doesn't charge properly so it doesn't work during the day. Sometimes I keep it in my pocket and then return it to G's office or during break times and put it on charge. (Yvette)

The time taken for repairs to be made to devices was also stated as a frustration.

> It's pretty good with the hearing aids, but the fixing time takes long if something goes wrong. (Hamish)

Collecting and securing devices

All students needed to store their microphones securely at school overnight, but hearing aids could be taken home. This was due to the Ministry of Education's policy about remote microphone storage at school when not in use (Ministry of Education, 2024a). The storage locations were predominantly the main school office, a teacher's office, or a designated area in a classroom.

> It [the microphone] hides behind [the whiteboard]. It slept in here [the classroom]. (Ivan)

> They're kept up in the teacher's office. (Nathan)

Collecting the microphones in the morning required organisation on the part of the young person, to be ready in time for learning. Secondary schools can be large with spread-out classes. Students move classes and engage with numerous teachers during the school day. Students showed varying degrees of engagement with this daily task.

> If I know it's one of the days that I have to cross this high school, I just come earlier to collect the microphone in the office. (Ryan)

> So, it depends what classes I have up first, because I have to travel across the school to get them. So, if I have English like I have after this, then I'll go and get it [the microphone] or maybe for my tech class or yeah science. But if I started with something like maths, it's all the way on the other side of school I don't bother. I'd get it for the next class. (Nathan)

Giving out the microphone

Seven out of nine students gave the microphone to different teachers as they followed their daily timetable. Some did not enjoy this much, but others found no difficulty in it. One student relied on teachers to manage the device, and one was not using the RM system.

> I have to bring it everywhere, giving it to teachers when I move class, it's annoying. I don't like being up front all the time, looking different. (Matthew)

> Um … So I have for my first class of the day, I have to go to G's office to retrieve it. Then I have to carry it around all day, passing it to all the teachers. And then after school I put it back in G's office to charge overnight. I don't mind. (Yvette)

Teacher cognisance and action

This theme relates to how teachers have understood the needs of these specific students and what they require from teachers to learn, and how teachers have acted accordingly. Students stated that teachers had been upskilled in RM system functions, so they were supportive and enabling towards these young people.

Teacher knowledge of RM systems

Eight out of nine young people said their teachers had good knowledge of RM systems, one to the point of knowing how to apply for a new device when an old one was no longer suitable. Staff had been trained in RM systems by an outside specialist or parent. Students reported that their main teachers knew how to help them with the day-to-day use of their devices, and some stated that a specific teacher helped solve maintenance or other problems.

> Well, help from the teachers and stuff to know when to get a new one because we [my family] didn't. We weren't sure about the last one. I tried to pair it. It wasn't working. So, they got a new one. Yeah. (Annabel)

> When I first came, this person called J … she fixes the Rogers and stuff, when they're not working properly. She taught all my teachers how to use it. (Yvette)

Young people appeared to have good relationships with teachers and support staff who employed other adaptive learning strategies.

Adaptive teaching practices

Three young people mentioned that teachers provided written material and oral instruction during lessons. This indicates that some teachers were cognisant of students with hearing difficulties and could provide multi-modal learning opportunities. Learning materials presented visually and orally or kinaesthetically can benefit those with hearing difficulties (Drajati et al., 2021).

> Definitely, all the staff have helped me. Yeah, at my last school, they didn't really help with it [the microphone]. But at this school, they've helped a lot more. Teachers write down stuff or put it in a slideshow. (Ryan)

> There are teacher aides that helped me. Help me with the work, to make me understand a bit more, just making it easier to understand by using different types of words. Sometimes my teacher writes some things down on the whiteboard. (Uri)

Limitations

- This research by design intended to explore experience, not produce generalisable findings (Creswell, 2014), therefore the findings may not necessarily apply to other APD populations.
- This study did not include any students who were in Years 12 or 13 who could reflect on the whole of their secondary schooling.

Discussion

This research aimed to understand how intermediate and secondary APD students experienced using their RM systems at school. This discussion will locate the three themes of the student as expert, the hassle factor, and teacher cognisance and action within the broader context of the research in child rights and student voice and APD.

The student as expert

The APD students expressed that they were experts in the day-to-day use and management of their RM systems. These findings indicate that students knew their RM devices well and when they needed to use them, and how teachers needed to support them. This is consistent with Hunt's (2021) research that when diverse learners are supported to function well in school environments with their AT, they can better access learning and social engagement. Student voice was present in their interactions with their class or subject teachers, as they taught and directed adults about the remote microphone. Many stated that teachers had helped them and acted on their instructions to wear the RM device, which aligns with Bourke and O'Neill's (2022) observation that teachers can enable students to become their equals when they become a student's audience. These findings indicate

that participants had been afforded the space necessary to have a voice and that their teachers were a listening audience. These actions complement Lundy's (2007) 'Voice is not Enough' framework on actualising student voice by providing all four components. These views indicate that at a school level, students are actualising Article 12 of the UNCRC, which assigns the right to all students to express an opinion about matters that impact them (United Nations, 1989), and in this case, the use and management of the RM system. Furthermore, through the facilitation of their voices by their teachers at school, students are positioned to achieve Article 29(a), to be developed and achieve their full potential through AT use (United Nations,1989). These findings indicate that teachers can be adaptable to the needs of individuals (Lundy & O'Lynn, 2019).

At a wider systemic level, however, students did not see themselves as experts (Lundy, 2007). Guidelines for the use and storage of RM systems are stated in the Ministry of Education's AT policy. It promotes a personalised, yet structured device-management approach, with review processes (Ministry of Education, 2024a). Eight students needed to store their microphones in secure places at school, as outlined in the AT policy. These storage requirements had a notable impact on students, and students were clear that it was out of their control to change. Most young people did not know they could have a say in when their devices could be reviewed and updated, and that a knowledgeable adult needed to undertake this, linking again to the AT policy being outworked in practice (Ministry of Education, 2024a). Some young people were using aged RM devices, despite better technology being available (Keith et al., 2019). These experiences are consistent with Smith's (2016) research, which states that systemic barriers to child's voice are created when child rights are downplayed in education legislation and policy. UNCRC Article 24(c) states that access to AT is a right, and readily available technologies should be applied to assist children with inclusion in education (UNESCO, 2020). All students in this study received an initial RM system, which saw them partially fulfil Article 24(c), but some described maintenance difficulties and older microphones failing. Therefore, to have their right to fully functioning AT upheld, the findings of this study support the need for more work to be done in secondary schools to achieve what Karlsson et al. (2018) and Perelmutter et al. (2017) found, that assistive devices need to be timeously maintained, repaired and updated with newer versions. These student experiences link to Bronfenbrenner's Ecological Systems Model, which outlines that individuals are surrounded by a microsystem and mesosystem (Guy-Evans, 2024). These include family, friends, work and school, and the interplay experienced due to or between these relationships. There is also the impact of the exosystem and the macrosystem, which represent more distant relationships to the individual as well as societal norms, political systems and culture (Guy-Evans, 2024). School-related policy and practice impact students at the microsystem level, and the implications of these can be keenly experienced by individuals (Hayes et al., 2017).

The hassle factor

Students expressed the hassle factor, which included storage, retrieval, giving out of devices, maintenance difficulties, and hardware that had become outdated. These align with Johnson's (2015) findings that students with RM systems must constantly manage their devices. Participants appeared resilient despite these hassles and mostly persisted with device use as they felt the benefits were worthwhile. This contrasts with the small amount of literature on teenage RM system users, which showed that hassle, maintenance issues, and aged AT contributed significantly to a decline in RM

system use in the wider hearing-impaired cohort (Karlsson et al., 2018). Also, participants said teachers and school environments were positive and supportive in Aoteoaroa New Zealand intermediate and secondary schools and contributed to device use. This is the opposite of the findings of Lamond and Cunningham (2020) where students experienced negative teacher attitudes and school structures that were unhelpful. Most participants were positive about continuing device use throughout secondary school, which aligns with the findings in the study by Meyer et al. (2014) that RM use was enabled most significantly by a positive student attitude. RM systems can improve the listening skills of those with APD (Keith & Purdy, 2014), but students in this study expressed how much effort was required to use these systems in practice, to gain the benefit.

Teacher cognisance and action

Most students expressed that their current teachers were cognisant of and enabled them to use their devices. Cognisance refers to a deeper understanding of the needs of these particular students, and how they acted on those needs (Cambridge Dictionary, 2024). Findings show that many teachers linked to this study were trained in RM systems and knew how to use them. Students expressed that teachers, through their knowledge and positive attitudes, were able to help them use and manage their AT. These findings align with Barker's (2020) and Traina et al. (2021) research that positive school and teacher attitudes can encourage AT use. These findings align with the research of Gilroy et al. (2017) and Zapf et al. (2016), which found that when adults understand and correctly use AT, students will likely persist with use. Most students in this study experienced productive partnerships with their regular teachers (Bourke & O'Neill, 2022), shown by the greater student requirement to demonstrate use when a reliever was in the class. These teacher characteristics helped outwork children's rights and student voice in education (Lundy & O'Lynn, 2019). While the students were the experts in their RM systems, they felt that their teachers had helped enable them to be these experts. These teacher characteristics demonstrate how intermediate and secondary teachers in Aotearoa New Zealand are outworking Lundy's (2007) framework.

This study found a clear discrepancy between school-level voice and systemic-level voice. It showed that these students had a voice at the school level in using and managing their devices. However, many participants did not know they could have a voice at the policy level. As a result, they found it difficult to express a view, as they were often not afforded the space to have one (Lundy, 2007). Figure 1 demonstrates this partial voice by aligning the students' experiences with Lundy's 2007 'Voice is not Enough' framework at school and systemic levels, respectively. The outer boxes represent the school-level space, voice, audience, and influence that the students identified they had, and the inner boxes represent the systemic level governed by Ministry of Education policy and practice and show how student voice is largely absent.

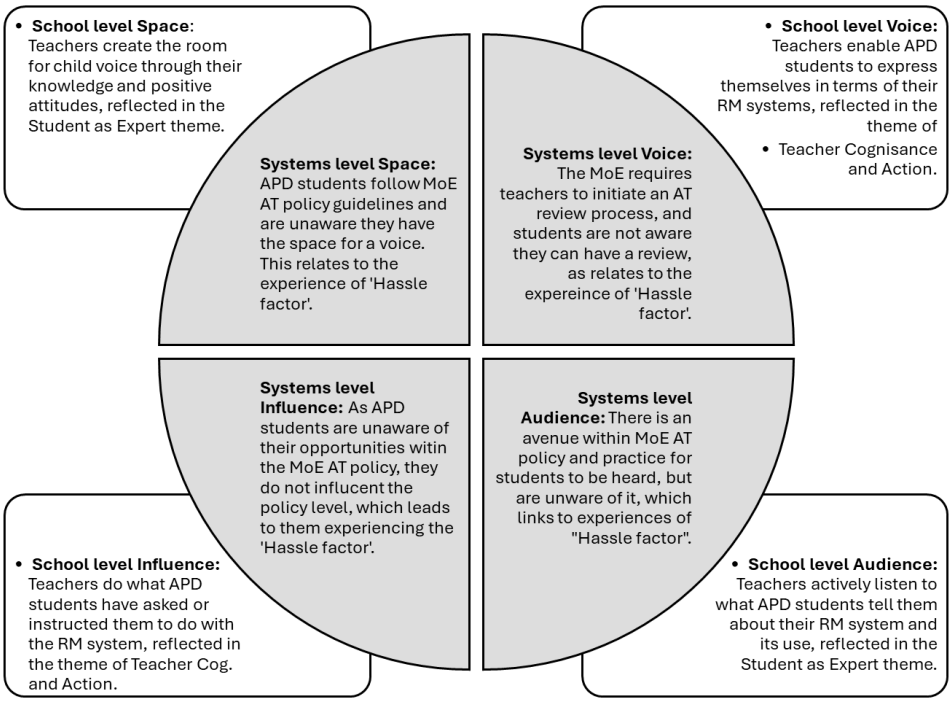

Figure 1. School and systemic level view using Lundy's 2007 Voice is Not Enough framework

Conclusion

This research explored the experiences of APD students and their RM systems at the intermediate and secondary levels. The findings showed that many participants were actualising Articles 12 and 29(a) of the UNCRC (United Nations, 1989) through being given RM systems to support hearing in class. They felt well-supported in their schools, through the cognisance and support of their teachers. Schools in the study were creating an educational experience that was Available and Accessible as well as Adaptable to individual needs, realising most of Tomaševski's (2006) "4-A" Framework. The outworking of this framework meant that child rights were being enacted through and upheld in intermediate and secondary education settings in the geographic area in Aotearoa New Zealand (Lundy & O'Lynn, 2019). These outcomes also evidence that equitable education is occurring in Aotearoa New Zealand through the provision of opportunity to achieve (Bolton, 2017).

The findings differed from the literature as there was continued and positive use of RM systems in secondary school, where the literature found a drop-off in device use from the age of eleven (Peters & Anderson, 2019). The findings were similar to existing literature in that a positive student attitude, knowledgeable teachers, and supportive school environments were found to drive continued AT use (Barker, 2020; Meyer et al., 2014; Traina et al., 2021).

Implications for practice and policy

Implications for practice

At a school and teacher practice level, this study found that intermediate and secondary teachers generally support APD students with RM systems well. An area for teacher improvement that this study highlights is that Heads of Learning Support could better support APD students with RM systems by implementing a systematic review of RM devices when students begin intermediate or secondary school. In these settings, students use laptops for learning (Ministry of Education, 2024a), and several students did not have Bluetooth devices. Those with Bluetooth-enabled devices liked the functionality of connecting to their computers (Hitchings, 2023). A review, as outlined by the Ministry of Education AT policy (2024a), would help highlight ageing hardware and instigate device renewal. Some students stored devices far from their learning spaces, while others stored them more centrally. Microphones stored centrally to learning spaces assisted device use and helped mitigate poor battery life. In larger schools, teachers could help find more accessible storage areas.

Implications for policy

At a policy level, APD students need to be afforded the space to have a voice about how they use their RM systems (Lundy, 2007). APD students should be invited to contribute their experiences of everyday use of their devices when the Ministry of Education reviews its AT guidelines. This study found that students are the experts in their device use and should know they can influence the controls and processes that govern these systems.

Directions for future research

More research could be undertaken with secondary APD students through an ecological model, as this supports the outworking of ōritetanga (Burns et al., 2024). A greater sample size from a wider area might reveal different insights. Future research may seek the views of Year 10-13 students and gauge whether they use their AT into their later secondary years. It could also focus on students who have abandoned their devices altogether.

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