

# Children with cerebral visual impairment related visual issues in the classroom

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## ABSTRACT

Cerebral visual impairment is a high incidence visual issue with a prevalence rate of 3.4% of children in mainstream education (Williams et al., 2021). However, it is still a very unknown condition with very little awareness in the general public (Ravenscroft et al., 2021). The aim of this research was to better understand how CVI related visual issues impact children in the mainstream classroom. Ten parents and eleven classroom teachers of eleven children with CVI related visual issues participated in the research, which used interviews and focus groups to develop a better understanding of the children and to ascertain the effectiveness of a range of strategies that were implemented to support the children throughout the research period. This was shorter than planned due to the COVID pandemic and school lockdowns. The research found that 82% of the children had learning support needs, 100% had emotional support needs, and 91% experienced challenges with social interactions. The CVI education sessions, decluttering, mindfulness, gratitude and calm breaks all helped the children, however the research period was not long enough to assess the overall effectiveness of the strategies and further research is needed in this area.

## KEYWORDS

Cerebral visual impairment, children, classrooms

## Introduction

Having a child in your classroom who is blind or low vision can be an exciting challenge for teachers, especially if it is their first experience of supporting a child with visual needs. In the past, most teachers never got to experience the joy of creating a suitable learning environment for a child who is blind or low vision due to the low incidence of ocular (eye related) visual disabilities. However, there has been a significant shift in the main cause of visual impairment affecting children in the economically developed world in the last 30 years, resulting in more children being identified as having visual issues that impact on their learning and therefore, more children with visual needs in

our classrooms (Williams et al., 2011; Williams et al., 2021). Previously, children predominantly experienced visual impairments due to ocular pathologies such as congenital cataracts and retinopathy of prematurity (Fazzi et al., 2007). Recently, due to improvements in postnatal healthcare, these ocular conditions are detected early and treated effectively (Gorrie et al., 2019). However, this improvement of postnatal healthcare has also seen the rise of the incidence of brain-based or cerebral visual impairment (CVI) (Chong & Dai, 2014). CVI is caused by damage to some parts of the visual brain (the totality of brain elements that serve or support vision) (Lueck & Dutton, 2015), and can be defined as “a verifiable visual dysfunction which cannot be attributed to disorders of the anterior visual pathways or any potentially co-occurring ocular impairment” (Sakki et al., 2018, p. 430).

CVI can cause a range of visual issues, including decreased visual acuity, reduced contrast sensitivity, visual field deficits, eye movement disorders, impaired motion detection, and many visuo-cognitive or visuo-perceptual impairments (often referred to as visual perceptual difficulties or issues with the higher visual functions due to their higher order in the visual process) (Williams et al., 2021). The prevalence rate of CVI related visual issues is approximately 3.4% of children in mainstream education, which equates to around one child in every classroom (Williams et al., 2021). However, currently, many of these children are going unidentified and undiagnosed. This is especially true of the cohort of children that have normal or near normal visual acuity (meaning they can read to the bottom of an eye chart) but significant issues with perceptual processing impairments, resulting in visual perceptual deficits that greatly impact their development and functioning (Chandna et al., 2021; Manley et al., 2022). As a result of the unidentified visual issues, many of these children experience learning difficulties at school and often end up being assessed for developmental conditions such as autism, Attention Deficit Hyperactive Disorder (ADHD), dyslexia, and auditory processing disorder (Dutton, 2015a; Pawletko et al., 2015). This is due to the similarities in the challenges experienced by the child, such as:

- Difficulties with different subjects, especially mathematics, writing and reading,
- Looking like they are not paying attention,
- Struggling to stay focused,
- Appearing to be easily distracted,
- Being overly sensitive and startling often,
- Struggling with friendships and being socially withdrawn (Lam et al., 2010; Philip & Dutton, 2014; Williams et al., 2011).

While it is possible for a child to have both a developmental condition and CVI related visual issues, it is also important to recognise when the visual issues may be the underlying cause of developmental behaviours.

While teachers have become more familiar with identifying and supporting children with different developmental conditions, given the high prevalence rate of CVI related visual issues (3.4%) and the impact these visual difficulties have on their learning, educators also need to be able to recognise when it is visual issues causing the learning difficulties. It is important to distinguish between a visual issue and a developmental condition, to ensure the right support is being provided for the child

within an education context. Strategies and supports for children with developmental conditions may not address the underlying issue for a child with CVI related visual issues and therefore, not result in the expected improvements in functioning (Pawletko et al., 2015).

The world that is seen through the eyes of a child with visual perceptual difficulties can be confusing and uncertain and it has been described as an overwhelming kaleidoscope of visual imagery (McDowell, 2019). This can lead to the child experiencing heightened emotional responses such as anxiety and panic, especially when in challenging environments (McDowell & Dutton, 2019). For children severely affected by visual perceptual difficulties, this regular spiral of uncertainty in their visual abilities can cause anxiety and can ultimately lead to a fight or flight response in their primitive brain, which as Goleman (1995) outlines, impacts on a person's ability to think logically and coherently and therefore, affects their cognitive functioning. These heightened emotional responses often lead to a disparity in not only the child's visual functioning, but also their overall functioning, which parents and teachers may incorrectly conclude is the child misbehaving in certain environments, being uninterested in learning, or experiencing learning difficulties (Dutton, 2015b; Erasmus, 2015).

Given that the impact of CVI related visual issues extends beyond just the visual abilities of a child to also affect their emotions and behaviour, it therefore seems vital that any approach to supporting a child with these visual issues needs to focus on not just their visual needs, but also their emotional and behavioural needs as well. In relation to their visual needs, strategies to support the basic visual functions are well known and regularly implemented for children diagnosed with CVI. These include the prescription of spectacles to cater for both refractive errors and lack of accommodation, providing good clear outlines and increasing font size on teaching material, establishing optimal luminance level, and introducing magnification devices (Buultjens et al., 2010). However, strategies relating to visual perceptual difficulties are only just starting to be explored by those working in the field of supporting children with these kinds of visual difficulties. One such study by McDowell and Budd (2018) looked into the impact of cluttered classrooms on the learning and behaviour of children with CVI. They found that decluttering the classroom environment and creating areas for focused work with blank walls had a significant impact on their overall functioning.

In relation to a child's emotional needs, although there is currently no literature around supporting children with CVI related visual issues using strategies such as mindfulness, there is evidence of the effectiveness of mindfulness in children with other developmental disorders, such as autism and anxiety disorders (Conaughton et al., 2017; Vigerland et al., 2016). Mindfulness interventions are also known to target regulation of emotions and coping processes associated with stress (Perry-Parrish & Sibinga, 2014), which suggests this could be an effective strategy for children with CVI related visual issues, given that they are constantly under high levels of stress. A sample programme of mindfulness-based visualisation was trialled at the Royal Blind School in Edinburgh, where children with CVI attend (Godek, 2015). After using the programme for three school terms, staff involved in the programme reported a reduction in students' agitation and anxiety both at home and at school (Godek, 2015).

The benefits of daily gratitude on children's emotional regulation has also been highlighted by Hugh Van Cuylenburg in the Resilience Project. Van Cuylenburg (2019) outlines how our brain is hard-wired to focus on the negatives, as this was important to our safety for our ancestors. This can negatively impact on a child's mental health, especially when we are not faced with the same challenges to our safety. Van Cuylenburg (2019) has shown that it is possible to rewire the brain to focus on the positives, by starting a gratitude practice of identifying three great things that have happened each day. Van Cuylenburg (2019) encourages children to practice gratitude as part of the Resilience Project, which has significantly helped the mental health of thousands of school aged children around the world. As such, a daily gratitude practice has the potential to also reduce the anxiety levels in children with CVI related visual issues by helping them to focus on the positives in their lives and not the challenges experienced as a result of their visual difficulties.

Given that much of the behaviour displayed by children with CVI related visual issues is as a result of the constant strain on their visual skills causing visual fatigue (Erasmus, 2015), and also their high levels of anxiety, another simple solution would be ensuring that they have regular breaks in a calming environment. This strategy has been described by an adult with CVI as an effective way to recharge the batteries and reduce the feelings of anxiety that can occur when in a challenging environment (McDowell, 2019). One of the benefits of this strategy is that regular calm breaks may help reduce levels of visual and overall fatigue, which in turn would allow the person with CVI to feel more confident in their ability to handle a challenging environment for longer periods of time (McDowell, 2019).

Another effective strategy for supporting children with CVI related visual issues is through information and knowledge sharing in education sessions for the affected person, their parents, and teachers. McDowell and Dutton (2019) describe the positive impact information sharing and education sessions had on an adult with CVI and the difference this made to her rehabilitation. This is further supported by McDowell (2021) who showed how the sharing of knowledge helped to empower parents of children with CVI. A website specifically devoted to the sharing of information and knowledge about CVI was developed by CVI Scotland in 2016 and has since become the leading international resource on the subject (Ravenscroft et al., 2021). One of the main aims of this website was to provide a bridge to public understanding of CVI through educational web resources and these can be used in education sessions for parents and teachers (Ravenscroft et al., 2021).

The aim of this research was to firstly to better understand the impact CVI related visual issues has on children in mainstream classrooms and secondly, to assess a range of strategies implemented to support their visual, emotional and behavioural needs.

## **Methods**

The inquiry into understanding the impact of CVI related visual issues on children in mainstream classrooms and exploring ways to support them was part of a wider research project assessing the effectiveness of the Austin Assessment App as a screening tool for CVI (reported in a separate article). The research was approved by a University Human Ethics Committee.

In phase 1 of the wider research project, parents of children attending a full primary school in Aotearoa New Zealand (years 1-8) were invited to consent to their child being assessed using the Austin Assessment App. This assessment is a simple iPad activity of matching cards with different shapes over five levels, with the numbers of cards increasing from four cards and one pair at level 1, to twelve cards and five pairs at level 5 (McDowell, 2020). A total of 271 children aged between 5-13 were assessed with the Austin Assessment over the course of a week. From this, 26 children were identified as having met the thresholds for further assessment in one of the three variables measured by the Austin Assessment App (these thresholds had been determined following regression analyses on normative range data that had been collected as part of a separate research project). Further assessment by an ophthalmologist, an orthoptist and a vision education specialist (the researcher) were conducted on 23 of these children with a total of ten being identified as having CVI related visual issues. The parents and classroom teachers of these ten children were then invited to participate in phase 2 of the research, which was focused on developing a better understanding of children with CVI related visual issues and the impact these visual issues have within a classroom environment. An eleventh child, who had been identified as having CVI related visual issues in a previous research project was also included in the research and her classroom teachers and one parent also became participants of this research.

### **Participants**

Although the focus of the research was on the eleven children identified as having CVI related visual issues, the children themselves did not participate in the research as such. Instead, the research centred on the children's parents and classroom teachers to ensure that the children were not burdened by the research process. For each of the eleven children, one parent was identified as the main contact for the research (ten parents), although in some instances, both parents attended the interviews. A total of eleven classroom teachers also participated in the research (Table 1).

*Table 1. Research participants*

Child (not research participants)	Parent (research participants)	Teacher (research participants)
Female age 12	P 1	T 1
Male age 10	P 2	T 2 and T 3
Male age 10	P 3	T 2 and T 3
Male age 8	P 4	T 4
Female age 8	P 5	T 5
Male aged 7	P 6	T 5
Female age 7	P 7	T 6
Female age 6	P 8	T 7
Female age 6	P 9	T 8 and T 9
Female age 5	P 7	T 10
Female age 5	P 10	T 11
Total	10	11

## **Procedure**

The qualitative research process involved interviews with the parents and focus groups with the teachers at the start and end of the research period (one school term, ten weeks). The focus of the first interviews and focus groups was to ascertain the level of awareness of CVI related visual issues in general and in relation to each child, and to better understand the potential impacts of each child's visual issues within an education context. At the end of the interviews and focus groups, the participants were also provided with an education session about CVI related visual issues in general and in relation to each child's unique CVI profile. For the next ten weeks, parents and teachers were asked to implement a range of strategies to support the visual, emotional and behavioural needs of the children, and to also observe and take note of any incident that they could now relate to the child's vision (i.e., becoming overwhelmed in new or cluttered environments). During this period, both the parents and teachers were able to contact the researcher at any time to ask questions or for support at school and at home. At the end of the ten-week period, final interviews were conducted with the parents and focus groups with the teachers.

## **Data analysis**

Data gathered throughout the research period included interview and focus groups responses from all research participants (which were transcribed by a research assistant), and email/phone correspondence from research participants. A six phase thematic analysis process was used on all research data, which allowed the researcher to become familiar with the data, develop initial codes, search for themes, review themes, define and name the themes and finally, report the findings (Braun & Clarke, 2006).

## **Results**

### ***Awareness of CVI related visual issues***

Prior to the research, none of the participants (both parents and teachers) had heard of CVI related visual issues. Only three parents reported having concerns about their child's vision. However, these concerns were ocular based (eye related) and had been assessed and treated by either an optometrist or ophthalmologist. Although the participants were not aware of CVI related visual issues, many reported being aware that there was something going on with the children's learning, but they weren't sure what the cause of these challenges were. This was highlighted with comments such as *"I definitely knew something was up yeah. My gut feeling was there's something not quite right"* and *"knew something was going on, we just couldn't pinpoint what it was"*.

Once the participants had been made aware of CVI related visual issues and completed the education session, they were then able to recall situations where, in hindsight, they realised it was related to their vision. For instance, one parent commented her daughter often said to her *"oh, you know I couldn't recognise you mum because you weren't wearing the red jacket that you dropped me off in in the morning"*. Also, from a teacher *"I noticed that she never looks you in the eye particularly well"* and *"it definitely kind of made me think twice about why she's so clumsy and her anxiety"*.

Once they were made aware of CVI related visual issues a number of parents reported a negative response from family and friends when they shared with them their child(ren) were involved in the research, with one parent commenting:

*I was actually surprised that they weren't nearly as supportive as I would have expected them to be and I've reflected on that quite a bit, you know, and I think to some degree there's so many potential diagnoses for things nowadays aren't there? Do you know what I mean and it's kind of like the everyone's gluten free or vegan scenario of it feels like just another label, yeah to some people. So I think that's possibly where the, the scepticism comes from and then the other thing is just an awareness of it as, you know, as a natural condition or you know.*

### **Learning support needs**

Nine (82%) of the children were reported by either their parents or teacher or both to have learning support needs. One parent commented *"my impression is that she learns a bit differently"* and a teacher noted *"I'm going to say they are a diverse learner"*. For the majority of these (seven children), questions had been raised as to whether the child had a developmental condition such as dyslexia, ADHD or Autism. One child had been diagnosed with auditory processing difficulties and one child was reported as having difficulty accessing the learning material. The main areas these learning needs were identified were reading, writing and mathematics. In some instances, the children themselves had raised concerns with their parents about their challenges at school, with one child asking her parent *"what if I don't? What if I never learn how to read?"*.

### **Emotional support needs**

All eleven (100%) of the children were reported to have emotional support needs with high levels of anxiety. Many of the children were also reported as being very easily upset and quick to anger. Both the parents and teachers made comments such as *"it tends to be one or the other. Nothing in between"*, *"he gets upset really fast"*, and *"[child] is unpredictable"*. One teacher noted the difference in emotional regulation between home and school, highlighting:

*Personality wise, so I said to mum that to me, she is the definition of the Coke can theory. I can see that she ... I don't see any emotional variety really at school, but I know that she's very anxious. So, the Coke can is getting shaken through the day and then when she gets home, she has quite emotional outbursts.*

For some of the children, additional support for their emotional regulation had been sought by either the parents or the school.

### **Social interactions**

Ten (91%) of the children were reported to have experienced challenges with their social interactions, either now or in the past. A common theme for all the children was that they were fine in one-to-one situations but found group interactions more challenging. This was highlighted in comments such as *"she's really good one-on-one, but when there's groups of kids, she just doesn't fit"*

in”, “she’s not quite comfortable in social relationships”, and “for sure she had one really good friend, but she’s not in the group”. A number of the children were reported to prefer to be by themselves, choosing to spend their lunch breaks alone. This was highlighted with comments such as “she does choose to still be on her own”, “cause yeah, when she gets on with friends, but she prefers to be on her own”, and “prefers to be by himself”. A number of the children found their social challenges very upsetting. Their parents reported the children saying things like “I don’t have any friends; I don’t have any friends”, and “I just don’t have any friends, and nobody seems to like me and I’m probably the most unpopular person in the school”. One parent described her child as being “desperate to make friends”.

### **Strategies – Education session**

Both the parents and the teachers reported that the education session was really useful and that it helped them to understand the children better with comments such as “once you told us about it and I’d watched that video about what it’s like to have it, everything just went, Oh, I understand what’s going on for this child now”. The teachers also talked about how important it was for them to be aware of CVI related visual issues, noting “this is not the tangent I thought it was going on so even in itself, but some, yeah, it’s good for us to go, to be aware”. Another teacher commented that through understanding the visual difficulties better, it was easy to work out how to support the child in the classroom, “as soon as I could empathise with what life was like for them in the classroom, suddenly it just became very clear how to help”.

### **Strategies – Decluttering**

Many of the teachers reported feeling nervous about decluttering their classrooms at the start of the research period, with comments such as “it’s the decluttering that that scares me the most, because I feel like my classroom is very ‘cluttery’”, “I just feel like everything’s very cluttered and then the teacher space is awful because I’m not a very tidy person so I’m gonna have to work quite hard I think to declutter”, and “when we first started, I think I was. I was worried about what I would need to do to make things better and especially the decluttering, was a real. I don’t know if I’m going to be able to manage that very well”. Despite these reservations, once they had decluttered their classrooms, the teachers also reported that it had been good for them to do this, and it was actually very simple.

The decluttering also had a positive impact on the children, with one teacher reporting:

*I did notice like she always or there’s like a couple of tables that we call like a focus table and even though they are for the children and then they don’t have anything on it. They’re quite, you know, they’re quite blank, obviously no other children on there too. Then she will always go and plonk herself on one of those and I’ve only got two and yeah, so she will always go to that one.*

Another teacher talked with the child about the decluttering and how it made her feel. The child reported that “it made my whole world feel better”, “I used to get headaches and get tired before now I only get headaches because of the sunny days”, and “there’s not so much noise going on in my brain anymore”. The teachers also talked about the impact of the decluttering on the whole class,



not just the children in the research. *"I took all my signage out from around my TV so that only the TV is clear because we do. We have our whole day on a slide show on TV and all the children loved it".* Also, *"I would say it made me more aware of in the whole classroom, not just with those students so the changes that we made that you recommended would benefit probably other children".*

### **Strategies – Emotional regulation**

Both the parents and teachers attempted to implement emotional regulation strategies into the child's day at home and at school. At home, parents downloaded different apps, including Calm (Calm, n.d.) and The Resilience Project (The Resilience Project, n.d.) to support them and their child in practising daily mindfulness and gratitude. At school, the teachers reported incorporating mindfulness, gratitude sessions and quiet breaks into their day. Although the research period of one school term (ten weeks) wasn't long enough to ascertain how much of an impact these strategies had on the children's emotional regulation, both the parents and teachers were surprised how much difference they made. This was highlighted in comments from the parents such as *"definitely the good part of the day, you know, we make an effort to do that every day to talk about the good ... kind of acknowledge her feelings a bit more and this has really helped"*, *"so but that gratitude just worked straight away, it was something that just seemed to hook her and it just sort of set it up"*, and *"I see it, I definitely see her a bit happier afterwards or just ... it's a bit a bit calmer and happier"*. The benefit of the quiet time was also talked about, not just for the children in the research, but all children in the class, *"[child's] teacher certainly did sort of go to the effort of introducing their quiet time after lunch and having sort of audio books and you know, the kids laying down, which I think she actually was amazed at how well they responded to that as a class"*. Also, *"she does have breaks, her quiet breaks, so if she's feeling overwhelmed or in need of a break, she'll find a quiet place often it's in the cloak bay and this has really helped"*.

The importance of the connection between home and school was also highlighted with one teacher commenting *"so I think that the work that [parent] is doing at home I'm seeing the benefits of that in the classroom"*. Many of the parents shared that they would continue with the mindfulness and gratitude, as they felt it really helped their whole family. The teachers were also planning on continuing with the emotional regulation strategies in the classroom, as they felt it was an important area to focus on for all children, especially following the COVID pandemic.

## **Discussion**

Through interviewing the parents and teachers of children with CVI related visual issues, this research has provided some useful insights that may help educators to provide the support these children need to be able to thrive in their education settings. It also meant that the children themselves weren't burdened by the research process, instead, they benefited from the increased understanding of their visual difficulties by the adults around them. The research period was initially planned to extend for a period of two school terms (close to four months), however, due to the COVID pandemic causing school lockdowns, this period was reduced to only one school term (ten weeks). This meant the strategies were not implemented for a long enough period to ascertain the

impact they had on the child. However, the research has still provided some useful findings that can help inform practice moving forward.

An important component of this research project was to determine the level of awareness and understanding of CVI related visual issues within the Aotearoa New Zealand education system. Although the research only focused on a small number of children with these visual issues, it is very clear that it is a very unknown condition in our society. This was not only evident from the parents and teachers, but also in the negative response some parents received from family and friends when they shared their child was involved in this research. This highlights the need for more education and awareness of this condition in society as a whole, especially given the prevalence rate of CVI related visual issues is at least 3.4% in mainstream education (Williams et al., 2021). This need is only going to increase as the prevalence rate of CVI is expected to continue to rise (Chong & Dai, 2014), resulting in teachers seeing more and more children with these visual issues in their classroom. Although the participants weren't aware of CVI, it is interesting to note that all of the teachers and the majority of the parents in this research suspected that the children 'had something going on' but were unable to pinpoint exactly what it was. With the increased awareness and understanding of developmental conditions in recent times, it makes sense that the differences observed in the children were attributed to conditions such as dyslexia, autism and ADHD. It wasn't so long ago that these conditions were also unknown to the general public. The CVI community could look to the neurodiverse community to better understand the best way to increase awareness of this condition moving forward.

Another focus of this research was to better understand the impact CVI related visual issues has on children. The finding that 82% of the children had learning support needs is similar to the findings from the work of the CVI Project in the UK (a large scale study to explore CVI in children), which reported that 80% of the children identified as having CVI related visual issues were experiencing learning difficulties at school (Williams et al., 2021). Although the size of the current study is too small to generalise this finding, it does highlight that this is an area that needs further research to determine the extent of the link between CVI related visual issues and learning support needs in school. It would also be good to explore the nature of these learning support needs. In this current research, the majority of these children were reported to have issues in mathematics, reading and writing, which is also in line with the findings of the earlier work of the CVI project (Williams et al., 2011). Given that these subjects are fundamental for future education attainment, it seems imperative that the learning needs of this cohort of children is better understood.

Another interesting finding in this current research is that all of the children were experiencing emotional regulation difficulties that were impacting on their learning in some way. Although it is impossible to know in this study whether it was the CVI related visual issues causing these issues, it is another area that needs further investigation. This also seems imperative given the current mental health crisis our young people are experiencing in Aotearoa New Zealand, with one in four young people suffering from high levels of anxiety, fatigue and depression (Barber et al., 2023). There is evidence to suggest that there is a link between experiencing CVI related visual issues and mental health conditions such as anxiety, stress and low self-esteem (McDowell, 2019; McDowell & Dutton, 2019; University of Bristol Research, 2019); this link needs to be explored in more depth. Another

finding from this research that may be contributing to the emotional regulation issues experienced by the children was the challenges with social interactions. Although it is not possible to say the CVI related visual issues caused these social difficulties in this research, it was concerning to note that 91% of the children were reported to have difficulties in social settings. The preference to be on one's own or to interact with others in a one-to-one situation rather than a group is in line with the understanding that CVI related visual issues makes cluttered and busy situations more challenging and can cause children to feel overwhelmed (McDowell, 2023). It has also been documented that CVI related visual issues can cause children to be socially withdrawn (Philip & Dutton, 2014). This current research provides further evidence of this and highlights another area that needs a more in-depth examination.

Although the intention of this research was to assess the effectiveness of a range of strategies on the visual, emotional and behavioural needs of children with CVI related visual issues, the shortened research period meant that pre and post assessments of these areas were not conducted, as they would not have provided useful data. However, the findings from this research related to the strategies trialled does provide valuable information in terms of potential avenues for where the research needs to focus. As already shown in previous research, knowledge is power when it comes to CVI (McDowell, 2021) and this was again supported in this research by both the teachers and parents reporting a more intuitive understanding of the children once they had completed an education session about CVI related visual issues. As so perfectly noted by one teacher, "as soon as I could empathise with what life was like for them in the classroom, suddenly it just became very clear how to help". Providing an education session on CVI related visual issues to teachers is a simple strategy that is incredibly easy to implement. There are already fantastic online videos and resources from CVI Scotland that can easily be shared with schools that have been created for this purpose (Ravenscroft et al., 2021).

Another important strategy was the decluttering of the classroom environments. Research has already been done in this area and this current research supports the finding that decluttered classroom environments help improve the learning experience and behaviour of children with CVI related visual issues (McDowell & Budd, 2018). When combined with strategies to support the emotional regulation of children with CVI related visual issues, decluttering has the potential to greatly improve the quality of life for these children, not just in their education attainment, but also in their social interactions and leisure activities. The positive impact the daily mindfulness and gratitude practice, and the calm breaks had on the children with CVI related visual issues also highlights that this area of focus and support warrants further research. An important aspect of this was the consistency of these practices, with both home and school implementing them in the same strategies in the same way and making the practice a priority for the children. There is already valuable research to support the benefits of mindfulness and gratitude on emotional regulation for all children (Van Cuylenburg, 2019) and there are a number of school-based programmes that have been developed in Aotearoa New Zealand (Mindful NZ Schools, Pause Breathe Smile, Mitey), which could be used to determine the benefits of this type of emotional regulation support for a larger cohort of children with CVI related visual issues.

## Conclusion

Although it is difficult to generalise the findings from this research to a larger population of children with CVI related visual issues due to the small number of children on which the research focused, it does provide useful insights into the areas for further research moving forward. In particular, the learning and emotional support needs and the challenges with social interactions are fundamental life areas that if not supported could greatly impact on a child's overall quality of life. It is imperative that more is understood about the possible connection between CVI related visual issues and these areas to ensure children with this condition receive the necessary support. The positive impact that the strategies of education sessions, decluttering, mindfulness, gratitude and calm breaks had in a such a small period of time highlight that these strategies have the potential to really make a difference in these children's lives. However, the most important finding from this research was the urgent need for more awareness and understanding of CVI related visual issues in the general public. By being more aware of this condition, parents and classroom teachers will be more easily able to recognise when a child is experiencing these visual challenges and provide the support they need to thrive in our classrooms.

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