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Virtual reality to foster empathy in disability workers: A feasibility study during COVID-19

Clare Wilding[1] | Kimberleigh Young[1] | Caroline Cummins[2] | Craig Bowler[3] | Trent Dean[2] | Ali Lakhani[4] | Irene Blackberry[1]

[1]John Richards Centre for Rural Ageing Research, La Trobe Rural Health School, La Trobe University, Wodonga, Victoria, Australia

[2]Mercy Connect, Albury, New South Wales, Australia

[3]Valley General Hospital, Brisbane, Queensland, Australia

[4]Public Health, La Trobe University, Melbourne, Victoria, Australia

Correspondence
Irene Blackberry, John Richards Centre for Rural Ageing Research, La Trobe Rural Health School, La Trobe University, Wodonga, VIC, Australia.
Email: i.blackberry@latrobe.edu.au

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Mercy Connect

Abstract

Background: Empathy is a critical skill required by disability workers. Virtual reality may increase access to staff training to foster empathy.

Method: A mixed methods feasibility study investigated a custom-built virtual reality program, IMercyVE, which aimed to immerse a disability worker in a first-person perspective of having intellectual disability. Data were collected through online surveys ($n = 9$) completed before and after use of IMercyVE, and by videoconference focus groups ($n = 6$).

Results: Qualitative findings included that IMercyVE delivered a novel experience for participants and a distinctive mode of learning that assisted participants to deepen their levels of empathy. Descriptive analyses of the surveys indicated that participants' empathy increased after engaging with IMercyVE.

Conclusions: IMercyVE has the potential to be offered as a remotely delivered and flexible staff training modality suitable for building empathy. Further research with a larger sample is warranted.

KEYWORDS
disability, empathy, technology, training, virtual reality, workforce

1 | INTRODUCTION

1.1 | Empathy and disability support workers

Nearly 18%, or 4.4 million, Australians live with disability (ABS, 2018). Disability support workers assist people living with disability to manage the tasks of daily life and to participate in leisure, productive, and social activities. Being a disability support worker requires attributes such as patience, honesty, and compassion, as well as skills in first aid, administration, information technology, teamwork, providing personal care and problem solving (Aspire Community Services, 2021; Jigsaw Blue, 2021; Mercy Connect, 2021; Moskos & Isherwood, 2019). Empathy is "the ability to share

someone else's feelings or experiences by imagining what it would be like to be in that person's situation" (Cambridge University Press, 2022). Empathy is a vital skill for disability support workers because the presence of empathy may improve the quality of communication and relationships with service users, as well as the responsiveness of workers to the needs of service users (Batchelder et al., 2017; Collins et al., 2017; Neubauer, 2020; Topping et al., 2020).

There are several ways that empathy can be fostered among health and disability workers. A systematic review of empathy programs in medical education found that interventions using patient narrative and creative arts, writing, drama, communication skills, problem-based learning, interpersonal skills training, patient interview,

or experiential learning increased empathy (Batt-Rawden et al., 2013). An arts-based project delivered via a website employs creative arts, quizzes, self-assessment, self-reflection, and video and audio resources to support users to develop empathy (The Felt Experience & Empathy Lab, n.d.). Universities have used empathy suits (which mimic impairments to sight, hearing, and movement for the suit wearer) to educate students to develop understanding of the experience of people living with disability (Levett-Jones et al., 2018; Qureshi et al., 2017; University of Sydney, 2019). Neubauer (2020) used written and verbal instruction, modelling, roleplay, and small group practice to increase empathy for emergency department workers.

1.2 | Virtual reality as a tool for developing empathy

Virtual reality is an innovative way by which empathy can be developed (Dyer et al., 2018; Hirt & Beer, 2020). Virtual reality allows for immersion in a life-like simulated environment and through interaction with this rich sensory environment, communication and understanding of others' perspectives may be strengthened (Dyer et al., 2018; Hirt & Beer, 2020). Studies have found that virtual reality can be used to build empathy and compassion among informal carers, students, and health professionals working with people living with dementia (Hirt & Beer, 2020; Jütten et al., 2018; Slater et al., 2019; Wijma et al., 2018), schizophrenia (Kalyanaraman et al., 2010), or poverty (Menzel et al., 2014). Although these studies show promise regarding the use of virtual reality to assist with the development of empathy, the evidence is weak. For example, Slater et al. (2019) used only qualitative methods and Wijma et al., 2018 conducted a pilot study with 35 participants. Although Menzel et al. (2014) conducted a randomised controlled trial, these authors' focus was on developing sensitivity to social justice rather than empathy, the target population was nursing students, and the study was completed in a university setting. There is a lack of evidence about the use of virtual reality to build empathy specifically about people living with disability and among disability support workers (Collins et al., 2017; Couch, 2016; Herrera et al., 2018). In addition, the context of the present study was unique: it was a purpose-built virtual reality program, used in a real-life setting, with new employees of a disability organisation.

The impetus for the present study arose when Mercy Connect commissioned Valley General Hospital to custom-design a virtual reality program, IMercyVE, for use with Mercy Connect employees to improve their awareness, understanding of, and insight into the experience of living with intellectual disability. As IMercyVE was an initiative, Mercy Connect partnered with La Trobe University to evaluate this newly created virtual reality program and to explore its utility as a training and awareness-raising tool for staff. The study examined how IMercyVE was received by end users, how easy or difficult it was to engage end users, and to explore measures of empathy for disability workers.

2 | METHODS

A feasibility study, using a pre- and post-intervention evaluation design and mixed methods data collection, was undertaken. When a novel intervention is proposed, it is worthwhile to complete a feasibility study prior to undertaking a larger, more costly, study (Orsmond & Cohn, 2015). Feasibility studies aim to evaluate whether: (1) appropriate participants can be recruited; (2) the data collection procedures and outcome measures are suitable; (3) the study procedures and intervention are acceptable to participants; (4) there are sufficient resources and staffing to manage the intervention; and (5) the intervention shows promise of achieving its intended purpose (Orsmond & Cohn, 2015). The study investigated the feasibility of using IMercyVE in a real-world setting. The study received ethical approval from La Trobe University Human Research Ethics Committee reference number HEC20422.

2.1 | Study setting

The study was conducted at Mercy Connect, based in Albury, a regional town in rural Australia. Mercy Connect provides a range of services to support people with disability to live independently and become actively involved in their community. Mercy Connect is a not-for-profit Catholic organisation, delivering programs registered under the Australian National Disability Insurance Scheme.

2.2 | The intervention

IMercyVE was custom built for Mercy Connect through a collaboration with Valley General Hospital, based in Brisbane, Australia. It was developed for support staff who work directly with people living with intellectual disability and autism spectrum disorder. IMercyVE aimed to build empathy and understanding of the experience of intellectual disability by embodying the user in a virtual first-person viewpoint. IMercyVE was published in the Oculus Store for use with an Oculus Quest headset. The Oculus Quest headset is a self-contained and wireless platform that enables interaction with programs without the need for an external computer (Oculus, n.d.; Sag, 2020).

IMercyVE was co-designed by Mercy Connect staff and clients in collaboration with Valley General Hospital. The design group included a behaviour support practitioner, speech pathologist, experienced carers, interactive artists, and designers. The design group developed the look, feel, and content of IMercyVE based on their experience and expertise. IMercyVE was developed over a period of 6 months, through a series of ongoing trials and iterative discussion among the design group.

A household design for IMercyVE was chosen to provide a scenario that may not initially be perceived as challenging or overwhelming, and yet daily activities completed in such an environment can sometimes be difficult for people living with intellectual disability. The layout and ambience of the virtual reality environment resembled homes owned and operated by Mercy Connect, which include supported accommodation for people living with intellectual disability.

134 | WILEY—JARID *Journal of Applied Research in Intellectual Disabilities* bild *Published for the British Institute of Learning Disabilities*

WILDING ET AL.

FIGURE 1 Screenshot from IMercyVE showing the avatar looking at an information brochure that has been deliberately mistyped to simulate possible reading difficulties experienced by people living with disability

FIGURE 2 Screenshot from IMercyVE showing the avatar interacting with a mobile tablet in the virtual home environment

IMercyVE was designed to make the most impactful experience while working with the strengths and limitations of current virtual reality headset technology. Current headsets and controllers are best at commanding the attention of a user's motor skills, vision, and hearing faculties. These mechanics inspired design choices when considering what simulated experiences could be included in IMercyVE. During the program, users are encouraged to interact with items that provide different experiences of everyday living. There is an information brochure, which simulates difficulty with language processing (see Figure 1). There is an iPad, which produces echoing and jumbled speech about the day's planned activities, to simulate visual and aural sensory overload (see Figure 2). In the kitchen space, a spoon can be grasped for eating a bowl of cereal but the spoon trembles and shakes, simulating difficulties with smooth motor control (see Figure 3). Interaction with IMercyVE was designed to last about 10–20 min per user.

2.3 | Recruitment

Convenience sampling was used to recruit participants. Inclusion criteria were staff who had been hired by Mercy Connect in the previous 12 months; there were 70 potential participants. There were no

FIGURE 3 Screenshot from IMercyVE showing the avatar attempting to manipulate cutlery in the virtual home environment

exclusion criteria. All new hires were sent an email invitation to use IMercyVE as an additional onboarding and orientation activity completed during work time. Staff who had agreed to use IMercyVE were emailed information about the study and an invitation to participate. Potential participants then contacted a research officer who answered questions about the study and sent a hyperlink to an online survey (using the REDCap platform) (Harris et al., 2019). Potential participants gave their consent to participate by clicking an online consent form, after which the first page of the online survey opened. Study participation included completing the survey before and after using IMercyVE and attending a focus group after using IMercyVE, which was conducted online by Zoom videoconference. Implied consent to continue participation for each stage of the research was provided through completing these activities online.

2.4 | Data collection

Data were collected at two time periods: one in December 2020 and one in April–May 2021. Data collection methods were the same for both times. Quantitative data were collected by an online survey completed at the participant's convenience, anytime in the 10 days prior to and anytime in the 2–8 days after using IMercyVE. Pre- and post-versions of the survey were identical. Qualitative data were collected by a focus group completed online by videoconference after participants had used IMercyVE.

2.5 | Measures

The survey comprised the Empathy Towards People with Intellectual Disabilities Questionnaire (EMP-ID) (Collins et al., 2017), as well as the Perspective-Taking Scale (IRI-PTS) and Empathetic Concern Scale (IRI-ECS) from the Interpersonal Reactivity Index (IRI) (Davis, 1980, 1983). Only two components of the IRI were used, as these are the ones relevant to patient care (Hojat et al., 2005).

The EMP-ID and IRI surveys rely on participants' self-reports. There are 28 items on the EMP-ID, each rated on a 6-point Likert

Scale with possible scores ranging from 28 to 168, with higher scores indicating greater empathy. Both scales from the IRI had 7 items, each rated on a 5-point Likert scale with possible scores ranging from 0 to 28. Davis (1983, p. 117) reported that IRI scales "have satisfactory internal and test-retest reliabilities (internal reliabilities range from .71 to .77; test-retest reliabilities range from .62 to .71)". The IRI was used as a comparison measure for testing the psychometric properties of the EMP-ID (Collins et al., 2017). These authors concluded there was "early evidence that the EMP-ID does indeed measure empathy, but future investigation is needed" (Collins et al., 2017, p. 142).

Although the EMP-ID is a relatively new measure, it was chosen as it was developed for a population that was consistent with the present study's population. The IRI was developed for use with university students and is not designed specifically for care professionals (Hong & Han, 2020), but it has been widely used across many populations, including within health professions (Konrath, 2013).

After using IMercyVE, qualitative data were gathered through a focus group that discussed participants' previous experiences of using virtual reality (if any), how they felt during the virtual reality interaction, what they thought about the length and depth of the training, how IMercyVE compared to other types of training they had experienced (if any), their feedback about ease of use of IMercyVE and any difficulties experienced, and considering their experience of IMercyVE, how they intended to provide empathetic and person-centred care for people living with disability in the future. An experienced qualitative researcher facilitated the focus groups using Zoom videoconferencing. The focus groups were audio recorded and transcribed verbatim by a professional transcription company.

2.6 | Data analysis

The surveys yielded numerical scores. These data were analysed using descriptive statistics, frequencies, means and standard deviations. As the sample size was small ($n = 9$), any inferential analysis would yield results that would not be reliable, thus such analysis was not conducted.

Transcripts of focus groups were analysed using a thematic analysis process (Braun et al., 2018; Braun & Clarke, 2006). Two researchers were involved in the qualitative data analysis: an experienced qualitative researcher and a novice research assistant. These researchers were employed by the university that was engaged by Mercy Connect to complete the study. These researchers were not involved in the development of IMercyVE.

Data immersion included listening to the audio recordings and checking the transcripts for accuracy. Next, each researcher independently coded the data and produced preliminary themes. As a question guide was used to provide semi-structure for the focus groups, the two transcripts could be compared in sections, and the questions provided a preliminary framework for analysis. The two researchers engaged in further inductive and iterative analysis,

TABLE 1 Summary of qualitative findings

	Title of theme	Brief content of theme
Theme 1	Using virtual reality was a novel experience	• Most participants had not been previously exposed to virtual reality • Using virtual reality was a new experience for participants
Theme 2	IMercyVE deepened empathy	• Participants considered that IMercyVE helped them to develop more insight • Participants felt they developed better understanding of what day-to-day experiences might be like for people living with intellectual disability
Theme 3	Virtual reality provided a unique way of learning	• Using virtual reality provided a first-person perspective about the experience of living with intellectual disability • The first-person perspective was experienced as a different and more immediate way of developing insight than other, more traditional, training methods.

and theme development, through discussion, writing, and presentation of the data to the research team. The data, interpretations of the data, and findings were discussed during research team meetings, which included all members of the research team and were held by videoconference on a monthly basis throughout the study period.

3 | RESULTS

In December 2020, seven participants completed surveys before and after using IMercyVE and two additional participants completed both surveys in April 2021. Thus, there was a total of nine participants (four male and five female). The median age of the participants was 46 years. All participants had worked in the disability sector for fewer than 2 years, and the median months of employment in the disability sector was five. Only aggregate descriptive statistics are presented to assist in preserving the anonymity of participants.

Two focus groups were completed: one in December 2020 (G1, $n = 4$) and one in May 2021 (G2, $n = 2$). There were two male and four female participants. Other demographic characteristics of participants who completed the focus groups were not collected. Two male and one female participant from the December 2020 intake did not participate in a focus group. Their reasons for non-participation were not collected; all stages of the research were voluntary, and participants could withdraw from participating at any time.

3.1 | Qualitative results

There were three themes that characterised the participants' experience of using virtual reality: (1) it was a new type of experience; (2) it facilitated a deeper empathy in participants; and (3) it provided a distinctive mode of learning that was not gained through other learning experiences. Table 1 provides a summary of these main themes.

3.2 | A novel experience

Most of the participants were inexperienced with using virtual reality, with only one having previously used virtual reality as a leisure experience. Although participants lacked experience, they were receptive to using virtual reality. 'I've definitely never used anything like that, but it was very cool' (G1). The participants became engrossed in the virtual reality and found it very credible. 'I got totally absorbed' (G2). The virtual reality world appealed to the participants, and it invited further exploration. 'Everything was beautiful. Everything was colourful. It had three dimensions... I was intrigued by discovering the whole area' (G1).

Because virtual reality was a new type of experience, there was hesitancy about whether difficulty manipulating items in the virtual world was related to lack of skill or if it was a deliberate strategy to mimic challenge due to disability.

> The tablet exercise, if the intention was that I was experiencing difficulty in picking it up and that I needed to pick it up in two hands and be very deliberate about that, I needed to have an experience in the virtual reality first of being capable, because I couldn't differentiate whether it was my inability to do virtual reality with the controllers, or whether this was a frustration with not being able to achieve what I was trying to achieve... I don't know how much of this is trying to experience ... that other world [of disability] and how much is me just not sure of the controlling system. (G2).

3.3 | A deeper empathy development

The experience of being in the virtual reality helped the participants develop understanding of how the world might be experienced by a person living with disability. 'I felt I experienced a snippet of what being disabled [is like] and the frustrations and the stop-starts of life' (G1). 'It gives a much, much deeper understanding' (G2).

> It sort of gave me a good comprehension of why they've got the maladaptation and all the behaviours ... because it's just so intense all the time and so frustrating. I couldn't imagine living with that level of

frustration where you just can't do day to day things and why it's so important to them to just do things that I take for granted. Some of the participants I care for, they take delight in being able to do the smallest things that I think are insignificant. And you can see why, their lived experience is so different to mine. (G1).

Through feeling frustration within the virtual world, participants developed more insight into how difficult life can sometimes be for people living with disability. For example, participants expressed: 'now I've got a bit more of an understanding of that frustration existing inside them' (G2) and 'you will never fully understand what affects them but maybe you can get an understanding on actually how it feels and how scary the world is for them' (G1). Development of awareness of the perspective of a person with disability enabled participants to better comprehend why clients could sometimes express aggression and acting out behaviours; for example: 'that would explain why there are just these eruptions that seem to come out of nowhere, because it just gets too much' (G1).

The participants deepened and extended their existing levels of empathy, by reflecting on their experiences using IMercyVE and considering how this new learning might apply to their future work supporting people living with disability.

> [It] provide[d] me with the understanding that I need to be patient-plus-10. I would have been patient previously, but I now understand the need for that patience, so it makes it easier when faced with a difficult situation to be able to realise it's not about me. Whereas I think, before this experience, I may have thought I set someone off, or I did the wrong thing, rather than understanding that actually this is just a fundamental need of this person and it's not me. That allows you to depersonalise it enough to provide a little bit more service. (G2).

Reflection about the experience of using IMercyVE, which was inherent in the process of completing the focus groups, was seen as a valuable means by which to further deepen participants' learning. 'I think that the reflection part of the exercise is just as important as the exercise itself ... Having someone ask these questions and me having to think about what the experience meant, allows me to process the experience and heighten the value of it' (G2).

3.4 | A unique way of learning

Some participants had prior experience of learning about disability, through personal and professional interactions, however, they considered that the virtual reality experience assisted them to discern the experience of living with disability in a different way than they had previously encountered.

TABLE 2 Pre and post results for survey data

	Mean	Median	Standard deviation	Minimum	Maximum
EMP-ID[a]					
Pre	123.11	123	12.75	102	142
Post	*131.00*	*128*	*10.94*	*116*	*145*
IRI-ESC[b]					
Pre	22.56	22	4.30	16	28
Post	*24*	*26*	*4.21*	*16*	*28*
IRI-PTS[c]					
Pre	20.33	23	4.95	10	26
Post	*21.78*	*21*	*3.23*	*18*	*26*

[a]Empathy towards people with Intellectual Disabilities Questionnaire.
[b]Empathetic Concern Scale—Interpersonal Reactivity Index.
[c]Perspective-Taking Scale—Interpersonal Reactivity Index.

FIGURE 4 Pre and post results for the Empathy Towards People with Intellectual Disabilities Questionnaire (EMP-ID), the Interpersonal Reactivity Index (IRI) Empathetic Concern Scale (IRI-ECS), and IRI Perspective-Taking Scale (IRI-PTS)
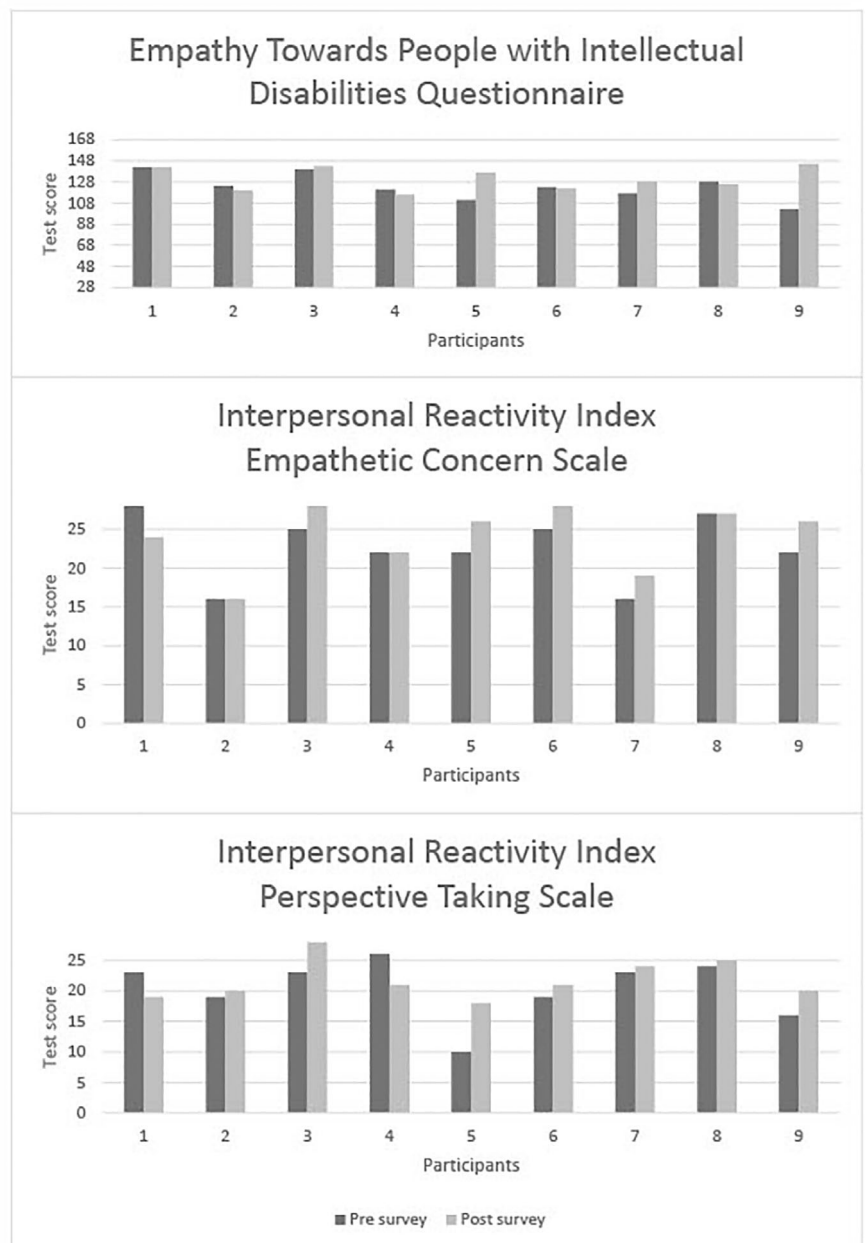
I haven't had any other training in it or anything like that. A lot of mine comes from life experience. I think the virtual reality actually helps you better understand. Because as much patience and perseverance that you have, the virtual reality actually shows you what they're feeling … it makes you think about better ways to approach a situation or a behavior. It shows you that you really do need to listen… feeling what somebody else felt or seeing what somebody else sees I think could possibly be the best type of training there is out there. (G1).

There are several ways to develop empathy but using virtual reality helped the participants to tap an emotional appreciation of disability rather than just an intellectual understanding.

I just feel like you could probably read as much as you want about how people with disability do live but it would never be able to compare to actually experiencing it … You can read about overstimulation and go, 'oh yeah that makes sense'. But until you're in the situation and you can't hear what's going on and you're getting overwhelmed and panicked, you wouldn't really understand. Well, I know I didn't understand it completely. (G1).
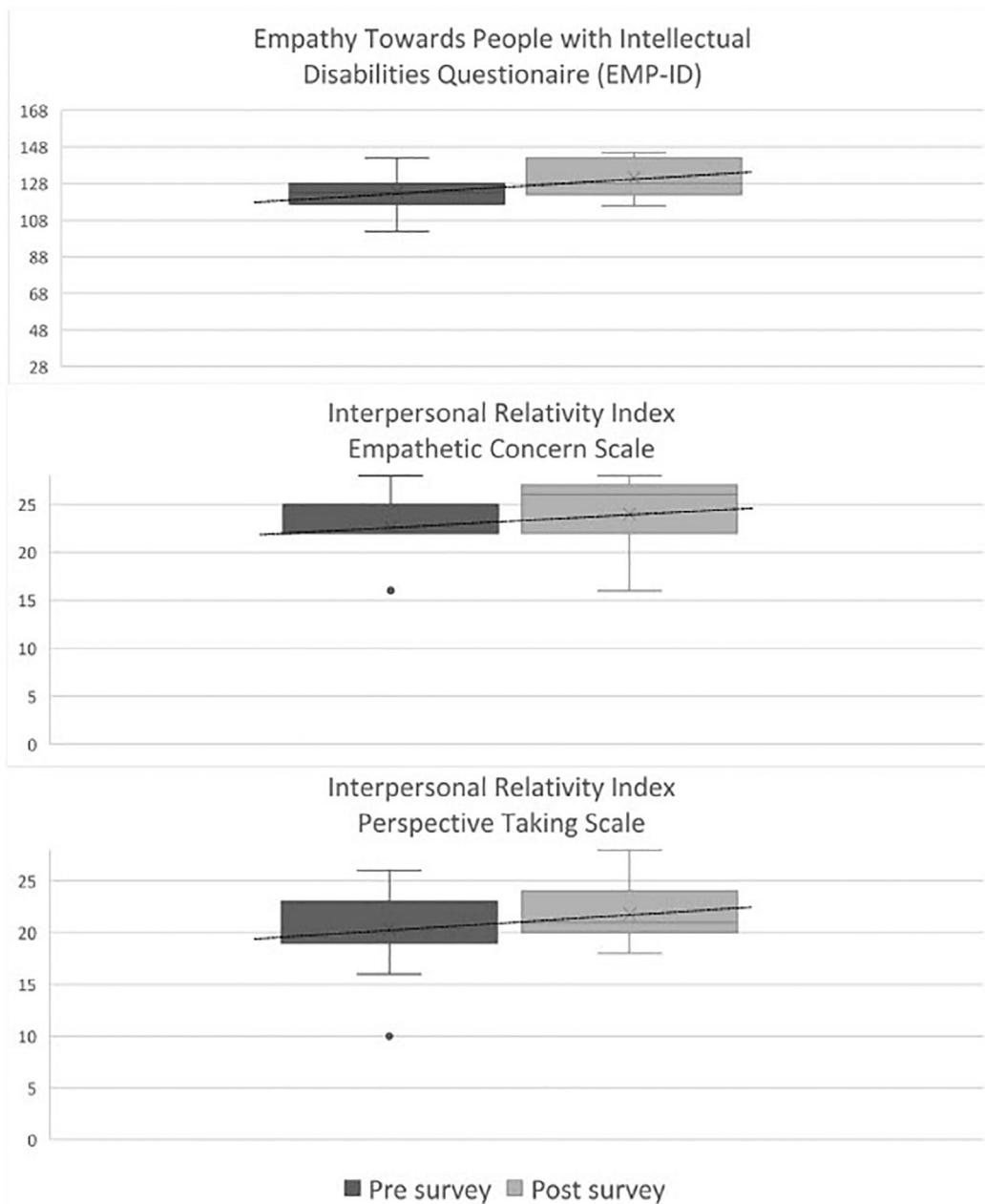

FIGURE 5 Box plot pre and post results for the Empathy Towards People with Intellectual Disabilities Questionnaire (EMP-ID), the Interpersonal Reactivity Index (IRI) Empathetic Concern Scale (IRI-ECS), and IRI Perspective-Taking Scale (IRI-PTS)

3.5 | Survey results

As illustrated in Table 2, median scores on the EMP-ID and the IRI-ECS increased slightly between the pre and post surveys, indicating that participants had more empathy after engaging with IMercyVE. Three graphs depicting each participant's EMP-ID, IRI-ECS and IRI-PTS scores before and after using IMercyVE comprise Figure 4. In relation to the EMP-ID, four (44%) participants had greater post-test scores, indicating these participants experienced increased empathy towards people with intellectual disability after engaging with IMercyVE. For one of the participants, there was no change in empathy. In relation to the IRI-ECS, five (56%) participants had greater post-test scores, indicative of these participants having increased empathetic concern towards people with intellectual disability after engaging with IMercyVE. There was no change in empathetic concern for three participants. In relation to the IRI-PTS, seven (78%) participants had greater post-test scores, indicative of these participants having increased perspective taking towards people with intellectual disability after engaging with IMercyVE.

Figure 5 includes box plots of pre- and post-test scores for the three measures. Compared to pre-test scores, EMP-ID and IRI-ECS post-test scores had a higher interquartile range, indicative of the middle 50% of responses being further spread out. In contrast, the pre- and post-test interquartile ranges for the IRI-PTS were comparable. Compared to pre-test scores, first and third quartile values for post-test scores were greater across all measures, except for the first quartile value for the IRI-ECS, which was the same.

4 | DISCUSSION

4.1 | Feasibility of recruitment and sample

Potential participants, who were employees within their first year of employment, were offered use of IMercyVE, and if they agreed to try IMercyVE they were invited to participate in the study. Of the possible 70 potential participants, only 10 staff agreed to try IMercyVE and only 9 participated in the study. Mercy Connect management reported that the main barrier to participation appeared to be that staff experienced challenges scheduling time to engage in IMercyVE within their rosters, even though it took an average of only 15 min for each participant to use.

Given the low response rate, it would have been worth following up with potential participants who chose not to participate, to find out more about their reasons for non-participation. (This is also a potential avenue of enquiry in future studies.) As Disability Support Workers have been identified as a group of people at high risk of work stress and burnout (Harris et al., 2020) it may be hypothesized that the workers strove to reduce demands on their time, even for this modest time requirement. Although the training only took 15 min, the effort to make time to complete the training may have outweighed the benefit that the workers perceived they would get from the

training. Workers may have perceived that they already had considerable empathy for people living with intellectual disability and therefore they may have decided there would be no additional benefit to completing the training.

Some potential participants may have felt dissuaded to participate due to the research dimension. They may have declined to try IMercyVE as they may have considered that they would be obliged to participate in the research. (If this belief was operating, it was incorrect, as use of IMercyVE was not contingent on participation in the research.) Another possible reason for a low recruitment rate may have been the novelty of using virtual reality. As most of the participants had never used virtual reality prior to using IMercyVE, other potential participants might also have been similarly inexperienced. These people may have felt reluctant or afraid of trying new technology, or the mental strain of learning something new (especially in the context of the COVID-19 pandemic) may have been off-putting.

4.2 | Feasibility of data collection and outcome measures

Collecting data online was efficient and effective. As the study occurred during the COVID-19 global pandemic, with resulting restrictions on researchers' ability to travel to the research site and to collect data face-to-face, it was especially important to use online data collection methods. Additionally, collecting data online enabled participants flexibility about when and where they participated. The participants did not report any difficulties in completing the online surveys, and there were no missing data.

There was a high attrition rate of 33% (three participants). Although data were not collected about why participants withdrew, it is possible that they may have been unwilling, or lacked the skills or infrastructure, to participate in a focus group conducted by video conference. As discussed in the previous section, recruitment rate was also low (14%), and it is possible that unwillingness to complete online surveys may have deterred potential participants.

There is disagreement about the validity of self-reported questionnaires to accurately measure empathy (Batt-Rawden et al., 2013). Some studies found interviews, attitude surveys, ratings by experts and other indicators such as the willingness to sign a petition showed increases in empathy not demonstrated by self-reported empathy scales (Herrera et al., 2018; Jütten et al., 2018; Wündrich et al., 2017). Nevertheless, the IRI has been used by other researchers to measure statistically significant changes in empathy following empathy training (Hattink et al., 2015; Neubauer, 2020; Wijma et al., 2018).

On face value, the EMP-ID appears to be an ideal data collection method and outcome measure for empathy in disability support workers, as it was developed specifically for this purpose and population. However, as it is a relatively new tool and has not been exposed to extensive testing, further research, testing, and development of the EMP-ID is needed.

4.2.1 | Acceptability and suitability of the intervention and study procedures

Although most participants had not previously used virtual reality, they were happy to try it, and they reported it to be an effective way of learning. However, given the finding that using virtual reality was a new experience for most participants, it is possible that the novelty of using virtual reality interfered with participants' development of empathy. Indeed, as illustrated in the findings, at least one participant was unsure if difficulties experienced while using IMercyVE were due to their inexpert use of the controller devices or due to simulation of disability. Thus, this finding points to the need in future training to allow participants to have a virtual reality experience before using IMercyVE, so that development of empathy is not confounded by the novelty of using virtual reality.

The findings also suggest that an opportunity to reflect on the experience of engaging with IMercyVE is a warranted inclusion in the delivery of future empathy training. Use of reflection is reported to be critical in enhancing learning in work settings (Helyer, 2015). It is possible that asking IMercyVE users to reflect on their experience, and how they will use learning from their experience to change and improve their future practice, will better enable them to maximise the learning provided by IMercyVE and apply learning to the practice environment. This hypothesis could be tested in future studies.

Access to training as part of professional skills development can be reduced for workers outside metropolitan locations (Johnsson et al., 2017). Use of IMercyVE might help to overcome such limitations in training opportunities, since it can be delivered anywhere there is access to an Oculus Quest Headset. Thus, this type of empathy development training is accessible to workers in rural and regional areas.

4.3 | Study resources, management, and implementation

Support for the use of IMercyVE was provided by Mercy Connect. IMercyVE was added as an additional activity to the usual onboarding activities for new staff. Mercy Connect provided the virtual reality headset and controllers and commissioned the software development. Mercy Connect also funded the evaluation of the feasibility study.

As the study was able to be conducted remotely, using email and telephone for recruiting, online surveys, and videoconferencing, it was completed efficiently. REDcap was used effectively to manage quantitative data collection. La Trobe University has a licence to use Zoom videoconferencing technology and data were stored securely on La Trobe University servers.

The study was designed, implemented, and supervised by experienced researchers. Less experienced researchers were also involved, and thus the study provided the opportunity for development of research capacity. This type of research partnership between a university and practice environment offers a model for completing high quality research in a real-world setting, with efficient resource usage.

4.4 | Participants responses to the intervention

The survey results provided very weak support that IMercyVE increased empathy. Overall, the participants reported high baseline scores for empathy, indicating that even though the participants were novices in working in the disability sector, they had already attained empathy for people living with disability. Their existing empathy may have been a factor that encouraged them to seek (and attain) employment as disability workers. Topping et al. (2020) found that empathy and understanding are important attributes for disability support workers. In addition, during the focus groups, participants indicated they had prior personal experiences of interactions with people with disability. The high baseline scores reported by participants, meant there was reduced opportunity for increases in their empathy scores.

Although the participants already felt empathy for people living with disability prior to using IMercyVE, the focus group findings were that they considered that through engaging in the virtual reality experience, their empathy for people with disability deepened. This finding is consistent with other studies that illustrated that a virtual reality experience could be used to deepen insight into others' perspectives, such as the experience of people living with dementia (Adefila et al., 2016; Wijma et al., 2018).

Participants in the present study perceived that virtual reality was a particularly effective way of learning about empathy, which is similar to the findings of Herrera et al. (2018), who compared the development of feelings of empathy and connection to people who are homeless, using virtual reality and using a more traditional narrative-based perspective-taking task. Herrera et al. (2018) found that immediately following the interventions both groups reported more empathy towards people who are homeless, but that over time the group that developed empathy using virtual reality had longer lasting and more positive attitudes towards homelessness.

4.5 | Limitations and strengths

As the study was a feasibility study, and thus the first step in a longer research process, there were several limitations, including that the sample size was small and that a convenience sample was used. The study was limited by lack of control over participants' level of prior experience and education in the disability sector. The only demographic information that was collected in the study was gender and disability sector experience. In future research, with a larger sample size, it could be useful to discern if demographic characteristics interact with the effects of participating in the virtual reality training. Although there was excellent congruence between the population designed to be measured by the EMP-ID and the study population, the EMP-ID has not as yet been extensively tested.

Given the sample size of the study, it was not possible to investigate the effect of engaging with the intervention on levels of empathy. Without a control group, it is not possible to establish whether the change in empathy experienced was a result of IMercyVE or due to other factors. Additionally, given the short-term nature of the study

design, it is not possible to clarify whether this change of empathy will be sustained in the longer-term. In future research it would be valuable to examine longevity of any effects of training using virtual reality.

This study has strengths that are important to consider. The study enabled further development of the virtual reality program through systematic collection of feedback and collaboration between disability support workers, health professionals, researchers, and software developers, thus integrating the perspectives of key stakeholders. Furthermore, the mixed-methods data collection employed in the study provided diverse findings that explored both impact and experience of the intervention. As IMercyVE was developed, delivered, and evaluated during a period disrupted by restrictions due to COVID-19, the study illustrates that this type of staff training and evaluation can be performed online and remotely.

5 | CONCLUSIONS

Although the cultivation of empathy can be achieved through several existing interventions, the present study found that virtual reality may offer another viable way to develop this sought-after trait. The study participants' acceptance of the virtual reality program, their perception that using virtual reality deepened their understanding of the lived experience of disability, and that using virtual reality helped them to emotionally connect with the learning experience, indicates that this novel learning modality has potential as a useful method of staff training. Given the findings of the present study, and that virtual reality is being increasingly utilised within health, aged care, and disability practice settings, further research about the efficacy of using virtual reality as a staff training platform is recommended.

CONFLICT OF INTEREST
Mercy Connect funded Valley General Hospital for the IMercyVE software development and funded La Trobe University staff to conduct the feasibility study. Mercy Connect staff, Valley General Hospital staff, and La Trobe University staff produced the study.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID
Clare Wilding https://orcid.org/0000-0003-2467-4264
Trent Dean https://orcid.org/0000-0001-8591-970X
Irene Blackberry https://orcid.org/0000-0003-4482-4936

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142 | WILEY—JARID — *Journal of Applied Research in Intellectual Disabilities* — Published for the British Institute of Learning Disabilities — bild

WILDING ET AL.

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