

The effectiveness of strategies to teach activities of daily living to adults with intellectual disability: a systematic review

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ABSTRACT

Objectives: Adults with intellectual disability are taught a variety of activities of daily living (ADLs) and instrumental activities of daily living (IADLs) to promote independence and quality of life. This systematic review identified ADLs and IADLs taught in instructional adult programs and examined effectiveness to which the targeted ADLs and IADLs were taught (i.e., achieved the mastery criterion, maintained, and generalised).

Methods: A systematic review was conducted using the following databases - ProQuest, CINAHL, Scopus, PsycINFO, MEDLINE and Emcare. The search resulted in 12,158 results, of which 36 met the inclusion criteria.

Results: Food preparation and shopping were taught most, with prompting the most used strategy. Eight studies reported effectiveness measures. All participants in two studies successfully met the effectiveness measures.

Conclusion: The quality of research varied enormously, with very few studies reporting on mastery criteria, maintenance and generalisation. Stronger research evidence is warranted to inform effective teaching approaches for adults with intellectual disability.

KEYWORDS: Activities of daily living, instrumental activities of daily living, intellectual disability, strategies, adults, systematic review.

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LAY SUMMARY

- Adults with intellectual disabilities are being taught activities of daily living (ADLs) and instrumental activities of daily living (IADLs) using a range of strategies.
- Trainers (support staff, researchers, teachers, staff members) are not measuring the effectiveness of their instruction (e.g. mastery criterion, maintenance and generalisation).
- Attention needs to be given to upskilling trainers to ensure their teaching programs are successful in teaching ADLs and IADLs to adults with intellectual disabilities.
- This research also recognises the need for future research to examine the perspectives of adults with intellectual disabilities who are being taught.

I. Introduction

Activities of daily living (ADLs) and instrumental activities of daily living (IADLs) are essential tasks required to maintain personal health and wellbeing. Historically, the ADL index (Katz et al., 1963), has been used to provide a quick and brief snapshot of life domains a person may require assistance in and has been the focus of skill development programs (Levine et al., 2003). ADLs include bathing, dressing, toileting, transfer, continence and feeding (Katz et al., 1963). It has been argued ADLs alone are not indicative of a person's ability to live in community-based environments (Hilgenkamp et al., 2011) as many older adults could be independent in all ADLs but are unable to live without support to perform activities such as shopping, cooking meals, or performing housework (Levine et al., 2003). Therefore, a measure of IADLs was established (Lawton & Brody, 1969). IADLs included in Lawton and Brody's scale include telephone use, shopping, food preparation, housekeeping, laundry, transportation, medication, and finance.

The ability to independently participate in meaningful activities including activities of daily living (ADLs) and instrumental activities of daily living (IADLs) are important predictors of quality of life for people with intellectual disability (Dijkhuizen et al., 2016; Qian et al., 2015). Engaging in ADL and IADLs promotes participation and wellbeing (Hallgren & Kottorp, 2005), develops autonomy and independence (Dollar et al.,

2012), facilitates a meaningful role in domestic environments, and empowers people with intellectual disability (Kottorp et al., 2003). It is evident with the right level of instruction and supports, people with intellectual disability can learn new ADLs throughout their life (Lang & Sturmey, 2021). Therefore, identifying effective instructional methods, and including qualified professionals that promote independence is vital (Snell & Brown, 2019).

ADLs are commonly taught by allied health professionals, direct support staff and family (Gormley et al., 2020). In Australia, instructors also include Developmental Educators (DEs). DEs are tertiary educated disability professionals who establish and apply individualised strategies to support the learning goals of people with a disability (DEAI, 2023; Rillotta & Alexander 2022). Although DEs are one example of professionals familiar with strategies to teach ADLs and IADLs, many people working with people with an intellectual disability do not have qualifications directly related to their role (Campbell 2010; Mahuteau, 2018). Despite this, research and clinical practice offer a range of strategies to teach ADLs and IADLs to adults with intellectual disabilities.

In research and clinical practice, the strategies used to teach daily living skills to adults with intellectual disability include prompting, video-based instruction, visual supports, assistive technology, and task analysis (Burns et al., 2019; Park et al., 2019; Lang & Sturmey, 2021; Taconet et al., 2023). Although strategies are commonly used in research and clinical environments, evidence on the quality and effectiveness of strategies is limited.

When teaching daily living skills, a mastery criterion and measures of maintenance and generalisation should be included to determine effectiveness (Collins, 2012; Cooper et al., 2019; Foxx, 2013). Achieving a mastery criterion is the initial goal of skill acquisition and the standard to be met before a trainer ceases or changes instruction (Fienup & Carr, 2021). The validity of using mastery criteria in teaching life skills to people with intellectual disability has become a contemporary topic in research (Richling et al., 2019; Wong & Fienup, 2022) with research suggesting achieving a mastery criterion of 80% accuracy across three sessions is the most effective for promoting maintenance following skill acquisition (Richling et al., 2019). Maintenance occurs after achieving mastery (McDougale et al., 2020) and involves assessing the skill to ensure it can be completed successfully long term. Generalisation is the ability to perform the ADL or IADL “anywhere and whenever it is needed” (Snell & Brown, 2019, p. 161). Without these components, it cannot be determined a person has effectively learned or can complete a skill over time in a variety of environments (Cooper et al., 2019). Understanding the most effective methods for teaching and learning ADLs and IADLs is critical.

A range of studies have been conducted to determine how ADLs and IADLs can be most effectively taught and learned by people with intellectual disability. Two recent systematic reviews have been published. Burns et al.’s., (2019) review included studies that taught daily living skills to children and adults with intellectual disability. Their review searched a single database (PsychInfo) over a 50-year period (1968-2018). They found the most taught daily living skill was hygiene and cleaning tasks, followed by dressing and food preparation. They found a range of strategies were utilised to teach, with the most frequent being ‘behavioural intervention’ (including modelling and verbal praise), technology (including video instruction, audio prompting or visual prompting) or parent/caregiver training approaches. Their search terms were limited to ‘daily living’, ‘self-care’, ‘self-help’ or ‘life skills’, therefore, a more rigorous review is warranted.

A more recent systematic review by Taconet et al., (2023) focused on interventions to teach independent living skills to secondary and post-secondary students (aged between 13-24 years old) with intellectual disability and/or autism spectrum disorder. Their systematic review utilised two databases (ERIC and PsycINFO) between 1975-2020, however did not provide information on strategies and outcomes for adults aged 24 and above. Their review found prompting followed by video modelling/prompting was the most utilised strategy. The most common skills taught were cooking and cleaning.

While both reviews included the environment skills were taught in, information on who taught the skills were limited. Burns et al., (2019) did not specify who was involved in teaching the skill, whereas Taconet et al., (2023) only mentioned the “provider”, which was limited to teachers or researchers. Neither Burns et al., (2019) nor Taconet et al., (2023) assessed the effectiveness of strategies by reviewing the mastery criteria, maintenance or generalisation.

Further comprehensive research is required to determine the quality of evidence and effectiveness of strategies that support the learning of ADLs and IADLs by adults with intellectual disability. The current study aims to fill this gap by conducting a systematic review of the literature to determine:

- Which ADLs and IADLs are taught to support adults with intellectual disability to live independently?
- What strategies have been utilised to teach these ADLs and IADLs?
- What is the quality of evidence?
- To what extent were the targeted ADLs and IADLs effectively taught (i.e., achieved the mastery criterion, maintained, and generalised)?

II. METHODS

2.1 PROTOCOL AND REGISTRATION

This review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). The systematic review protocol was developed and registered on the International Prospective Register of Systematic Reviews (PROSPERO) database: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023400424

2.2 SEARCH STRATEGY AND ELIGIBILITY CRITERIA

To carry out a comprehensive search, articles were retrieved from six electronic databases: ProQuest, CINAHL, Scopus, PsycINFO, MEDLINE and Emcare. In this review, the Index of Activities of Daily Living (ADLs) (Katz et al., 1963) and the Instrumental Activities of Daily Living scale (IADLs) (Lawton & Brody, 1969) were used to list the skills taught to adults with intellectual disability and included in the search strategy.

The following search terms and keywords were included:

- Activities of Daily Living and Instrumental Activities of Daily Living: ("Activit* of daily living" OR "ADL" OR "instrumental activit* daily living" OR "IADL" OR "bathing" OR "dressing" OR "toilet*" or "transfer" OR "continence" OR "feeding" OR "phone" OR "shopping" OR "food" OR "housekeeping" OR "domestic" OR "laundry" or "transport*" OR "travel" OR "money" OR "financ*" OR "medication" OR "daily living" OR "life skill*" OR "skill development" OR "self?care") AND
- Intellectual Disability: (intellectual disabilit*" OR "intellectual disorder*" OR "neurodevelopmental disorder*" OR "learning disabil*" OR "mental retard*") AND
- Strategies: ("intervention*" OR "program*" OR "instruct*" OR "training" OR "approach" OR "rehabilitation" OR "treatment*" OR "strateg*") AND
- Adult population: ("adult*" OR "middle age" OR "senior" OR "elderly" OR "aged").

A research librarian was consulted for support generating relevant keywords and subject headings. The search was run in December 2022 and included articles from database inception. Although several of these terms are considered outdated, they were included to not exclude relevant studies published when these terms were considered appropriate. Studies were included if they were primary research studies written in English. Studies with any participants aged under 18 or without a diagnosis of intellectual disability were automatically excluded. If study participants also had co-morbidity of a neurodevelopmental disorder (e.g., Autism Spectrum Disorder), it was included. Studies were required to have taught either an ADL or IADL as defined by Katz et al., (1963) or Lawton and Brody (1969). Studies that taught a modern adaptation to an ADL or IADL (for example mobile phone use instead of telephone) were also included. As the focus of this systematic review aims to explore ADLs and IADLs that support adults to live independently, studies were excluded if they were taught in school settings or if any participants were high school students. If studies were taught in post-secondary settings such as University or employment, these were included. Books, dissertations and grey literature were excluded from the review (due to the limited rigour and peer review). Studies with unclear effects (e.g. undifferentiated responding,) and literature reviews were excluded.

2.3 STUDY SELECTION

A total of 12,158 records were identified in database searching (see Figure 1: PRISMA Flow Diagram). After duplicates and ineligible records were removed, one author (DM) screened 4,819 records. After title screening, two authors (DM and JA) independently screened the title and abstract of 366 articles using Covidence (screening and data extraction tool). The remaining 194 were screened at full text against the inclusion and exclusion criteria by the same two authors. Discrepancies in screening were resolved through discussion (Xiao & Watson, 2019).

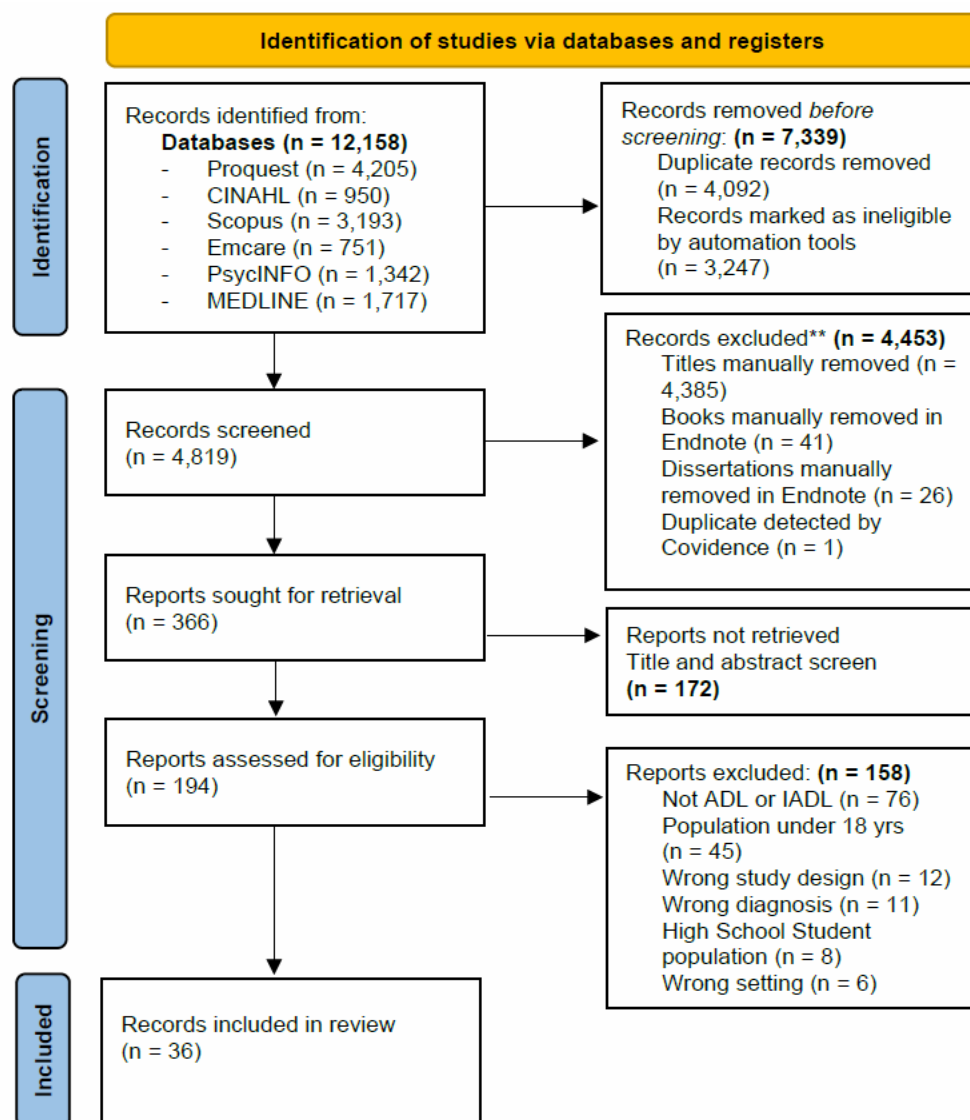


Figure 1: PRISMA diagram (Page et al., 2021).

2.4 DATA ANALYSIS AND DATA EXTRACTION

To assess study quality, the McMaster Quantitative form (Law et al., 1998) and the McMaster Critical Review Form for Qualitative Studies (Version 2.0) was used (Letts et al., 2007). The McMaster tools assess the study design, clinical significance of results, reliability and validity of outcome measures, and appropriateness of analysis method. Quality assessment was undertaken independently by two authors (DM & JA) with disagreements resolved by consensus following discussion. Each study was assessed as to whether it fulfilled the requirements listed under each criterion. If the requirement was fulfilled, it was rated a 'yes' and received a score of 1. If the requirement was not fulfilled or was inadequately addressed, it received a 'no' or 'n/a' and received no points. The maximum score for quantitative studies was 15 and qualitative studies was 24.

Full-text articles meeting inclusion criteria were read and coded (by DM and JA) for participant demographics, ADLs or IADLs taught, strategies used in teaching, teaching environment (including who taught participants and location of training), study outcomes and effectiveness (mastery criteria, maintenance, and generalisation if reported). Participant demographics included, participant age, gender, and number of participants involved. Study methodology was coded based on the type of methodology used (e.g., single-case design, cohort, randomized control trial) and reporting of results.

III. RESULTS

Thirty-six articles met the inclusion criteria (refer to Table 1). Articles were published across a 50-year range between 1971-2021, with eight articles published within the last 10 years. Most studies were conducted in the United States (n = 26), with other countries including Italy (n = 3), Australia (n = 2), New Zealand (n = 2), UK (n = 2), and Ireland (n = 1).

PARTICIPANT DEMOGRAPHICS

Across all studies, 227 participants aged between 18-64 years were included (refer to Table 1). Thirty four articles specified participant gender (104 women; 97 men). The number of participants in each study ranged between 1-28. Most studies had small participant numbers between 1-5 (n = 24 studies, 67%), with 6 studies (17%) reporting on one participant. 18 articles (48.6%) included participant IQ scores (13 reported individual participant IQ scores). Of the remaining 19 articles that did not specify participant IQ scores, 7 articles stated participants had an intellectual disability, 5 stated participants had mental retardation, participants in 2 articles stated learning disabilities. The remaining included participants with a diagnosis of down syndrome (n = 1), apert syndrome (n = 1), "intellectual handicap" (n = 1). 1 study reported on the "mental ages", and 1 only specified their inclusion criteria included participants who were diagnosed with intellectual disability.

STUDY DESIGN

Single-case design was the most common study design used (n = 27, 73%, see Table 1). The remaining articles used a cohort (n = 4), case study (n = 2), randomized controlled trial (n = 1) and pre-post design (n = 1). One article by Posthill (1980) used a qualitative study design where participant outcomes were observed and reported not descriptively. Of the single-case design studies, 16 articles used a multiple baseline/probe across participants design, four used a reversal design, and three used an alternating treatment design. Two articles used a multiple baseline/probe across settings. Of the single-case design studies, 24 articles (65%) provided graphs with results for each participant or probe and 24 reported interobserver agreement (IOA). Only eight articles reported statistical significance.

STUDY QUALITY

As shown in Table 2a and 2b, the McMaster scores indicate the quality of reporting varied significantly. Outcome measures were only reliable for 26 articles (72%) and valid for 29 (81%). Although a high proportion of articles (n = 33, 92%) reported the intervention in detail, it was difficult to determine exactly what effect the strategies had. In addition, the ability to report statistical significance and generalise results were limited. Based on the detail provided, these studies would be difficult to replicate.

TARGETED ADLS AND IADLS

The most frequently taught skills were IADLs (n=31, 86%) including food preparation (n= 10, 5 meal planning, 5 cooking), shopping (n = 7), transport (n = 6, 4 public transport, 2 driving simulation), telephone use (n = 3), finance (n = 3), housekeeping (n = 1) and laundry (n = 1). In both Giere et al's., (1989) and Sarber et al's., (1983) study, both food preparation and shopping were taught. The remaining 6 articles taught ADLs (16%) including toileting (n=4) and feeding (n=2). In this review, no articles teaching ADLs after 1997 were found. Most ADLs listed in Katz et al's Index (1963) were not taught (including bathing, dressing, transfer and continence).

STRATEGIES USED

The results indicated a variety of strategies were used in teaching ADL or IADLs. Prompting was the most frequently used strategy, used in 57% of studies (n = 21). Prompts included gestural, verbal, visual and physical prompts in a least to most or most to least prompting hierarchy. The next most used strategy was reinforcement or rewards (n = 16), followed by verbal instruction (n = 11), task analysis (n = 10), visual supports (n = 8), assistive technology (n = 7), modelling (n = 7), video-based instruction (n = 5), and consequences (n = 5). Less prominent strategies included rehearsal (n = 3), feedback (n = 2), match-to-sample (n = 2), virtual reality (n = 2), role-play (n=1), discrete training trials (n=1), behavioural approach (n=1), colour coding (n=1), chaining (n=1), environmental arrangement (n=1), demonstration (n=1) and errorless learning (n=1). 30 articles (83%) used more than one strategy to teach.

ADLs and IADLs were taught by people in a variety of roles including researchers/research assistants (n = 5), support staff/key workers (n = 4), teachers in university or trade settings (n = 4), and university students (n = 4). Most articles did not mention who trained (n = 7) or used terminology such as trainer/instructor" (n = 5), or "experimenter/investigator" (n = 2). Health professionals including Occupational Therapists (n = 1), ward

staff/nurses (= 2) and specialised roles such as project counsellors (n = 1) and independent learning advisors (n = 1) were also involved in teaching.

Environments where skills were taught varied. A majority of skills (n = 28, 78%) were taught in the natural environment. Community-based environments were the most common (n = 13), which included supermarkets (n = 6), travel routes (n = 5), banks (n = 1) and laundromats (n = 1). This was followed by teaching in residential (n = 9), employment (n = 4), training rooms (n = 3), day option programs (n = 3), hospitals (n = 3), workshop/offices (n = 3) and university campuses (n = 3). For 9 articles, training occurred in more than one environment. Thirty-two articles (89%) reported the frequency of training, ranging between 90 minutes once a week to 4 days a week.

STUDY EFFECTIVENESS

Only 8 of the 36 studies (22%) reported all three effectiveness measures: mastery criterion, maintenance, and generalisation (Kubat, 1973; Giere, 1989; Johnson & Cuvo, 1981; Matson & Long, 1986; Mechling & O'Brien, 2010; Rehfeldt et al., 2003; Sanders & Parr, 1989; Sarber et al., 1983; Scott et al., 2013, see Table 1). An additional 15 reported some (but not all) measures, and the remaining 14 did not report any. The extent to which studies included and met each effectiveness measure is examined below.

Mastery criterion:

One third of articles (n=12, 33%) identified a mastery criterion (Table 1). One study by Giere et al., (1989) included a mastery criterion for some of the IADLs (meal preparation, generating a shopping list and grocery shopping), but not for menu planning. Similarly, in a study by Lalli et al., (1989) a criterion was provided for one participant (learning to match digits on a telephone), but not for the second. Neef et al., (1990) mentioned the term "criterion", but no further information was provided specifying what this was.

Mastery criteria were met in articles that taught food preparation (n = 5), shopping (n = 3), transport (n = 2) and finance (n = 1). Almost all articles where all participants met the mastery criterion utilised prompting in their teaching. Prompting in these studies were used in conjunction with other strategies including reinforcement/rewards (n = 6), modelling (n = 4), verbal instruction (n = 4), video-based instruction (n = 3), and visual supports (n = 3).

Most criteria (n = 8) required participants to perform the ADL or IADL at 100% accuracy or independence. The remaining measures were performed at 90% (n = 2), 80% (n = 1), and 50% (n = 1). The required number of consecutive trials to meet criteria varied between 1 session (n = 3), to 5 sessions (n = 1). Although it was not listed as a mastery criterion, urine alarms in Azrin's (1973) study remained on participants' beds until they had no toileting accidents for 7 consecutive days. In Giere et al's., (1989) and Lalli et al's., (1989) articles, participants needed to complete meal planning and dialling on a telephone 100% independently for 3 consecutive trials.

The mastery criterion was met in 10 studies (28%). In a study by Sigafos et al., (2007), participants were unable to meet the criterion on the dishwashing task when video prompting was removed. However, when video prompting was reintroduced, participants met the criterion. The number of training sessions participants required to meet the mastery criteria were only reported in 4 articles, ranging from 1-22 sessions.

Maintenance

Skill maintenance was reported in 20 studies (57%), ranging between 1 week to 6 months after training (Table 1). In Burckley et al's study (2015), maintenance was assessed during intervention (where the iPad was removed), however the study participant was only able to complete 88% of shopping tasks independently. Ten studies reported all participants had maintained the mastery criterion, assessed between 7 days – 5 months. Although Ballard et al., (1983) did not set a mastery criterion, their participant was able to complete budgeting tasks with 100% accuracy and independence after 8 months. Azrin (1971) stated toileting accidents were "virtually absent" at 5 months.

Generalisation

Of the 13 studies that included a generalisation probe in their study, generalisation only occurred for all participants in four studies (Rehfeldt et al., 2003; Sanders & Parr, 1989; Sarber et al., 1983; Taylor & O'Reilly, 2000). The ADLs and IADLs generalised were food preparation (n = 3) and shopping (n = 2). Generalisation in those scenarios included using a different cookbook (n = 2), shopping in a different store (n = 2) and cooking in a different kitchen (n = 1). Two studies reported some participants had effectively generalised (Mechling et al., 2010; Johnson & Cuvo, 1981). In two studies, generalisation was considered but data was not collected (Singh et

al., 2019; Wilder et al., 1997). These studies targeted toileting and food preparation and attempted to generalise by cooking in a different kitchen and training in two environments. Rehfeldt et al., (2003) demonstrated particularly good practice when one participant generalised food preparation to a different kitchen with 71% accuracy and was provided additional training to achieve 100% accuracy.

IV. DISCUSSION

Effectiveness (Mastery criterion, maintenance, and generalisation)

This review has identified 36 studies that have sought to teach ADLs or IADLs to adults with intellectual disability. The quality of reporting varied enormously, with only eight studies reporting all three measures of effectiveness: mastery criterion, maintenance, and generalisation. Inclusion of these elements in teaching programs is crucial. Without them, effective learning, and the ability to apply skills in diverse settings is restricted (Collins, 2012; Cooper et al., 2019; Foxx, 2013). In addition, independence and quality of life outcomes for adults with intellectual disabilities could be impacted.

Overall, only 2 articles had all effective components met by all study participants (Rehfeldt et al., 2003 & Sarber et al., 1983). In these articles food preparation (Rehfeldt et al., 2003 & Sarber et al., 1983) and shopping were the skills targeted. Both articles utilised a multitude of strategies to teach. There was limited detail about the trainers involved. Surprisingly, the quality of the best reported articles has remained variable over time. Due to a high number of articles not including mastery criteria, maintenance and generalisation components, the research on the effectiveness of strategies is weak. Hence there is a strong need for the quality of research in this sector to be strengthened.

A mastery criterion of 100% accuracy for a minimum of three sessions is the suggested criterion effectiveness (Richling et al., 2019). While ten studies reported all participants successfully met the mastery criterion, only four articles required study participants to meet 100% accuracy for a minimum of three sessions. This raises concerns as it suggests many instructors failed to teach skills to a standard where participants demonstrated their ability to independently complete skills over time.

Five articles (Johnson & Cuvo; 1981; Kubat, 1973; Matson & Long, 1986; Mechling & O'Brien, 2010; Scott, 2013) reported all participants met the mastery criteria, maintained the ADL or IADL, and had generalisation assessed. However, not all participants generalised the ADL or IADL. Given the term generalisation was first defined in the late 1970s (Stokes & Baer, 1977) and acknowledged in earlier research (Horner et al., 1984; Rusch et al., 1976) it is surprising many articles did not measure or achieve generalisation. In research and teaching programs, generalisation is commonly missed as instructors assume generalisation occurs naturally (Erhard & Falcomata, 2023) however, this is not always the case. Including generalization in teaching programs and research is essential. Without generalisation included, the skills learned by adults with intellectual disability may not be functional and will be of limited use (Cooper et al., 2019).

The results from this systematic review support the findings from Canella-Malone and Schaefer (2017) indicating that the three effectiveness measures (mastery criteria, maintenance and generalisation) are not consistently included or achieved in teaching programs for adults with intellectual disability. Future research in this area must include all three effective components. This will help ensure adults with intellectual disability will learn, maintain, and continually use daily living skills.

Strategies

Prompting, specifically face-to-face, was the most used strategy to teach ADLs and IADLs. It was noteworthy that nearly every study where participants met the mastery criterion had used face-to-face prompting as a strategy. These results are consistent with research emphasising that skills can be taught to adults with intellectual disability using face-to-face prompting (Bosner & Belfiore, 2001; Jones & Collins, 1997; Miller & Test, 1989). The use of different prompting methods (e.g., least-to-most, gestural, verbal, self-directed, video and auditory) in teaching daily living skills is recognised (Golisz et al., 2018; Schnell et al., 2023). However, based on the positive outcomes of face-to-face prompting in this systematic review (as opposed to other forms of prompting), it is suggested face-to-face prompting is a worthwhile strategy for trainers to utilise.

The results from this systematic review suggest there are a range of strategies that may be useful in teaching ADLs and IADLs. When teaching life skills, there are many variables to consider. These include individual learning preferences, the appropriate match between the skill and strategy, the delivery of strategies, and the teaching environment. Future research should explore the most appropriate strategies in various contexts (e.g.,

different combinations of strategies, skills being taught, and the teaching environment). This will enable more effective learning for people with intellectual disability and may provide a stronger understanding of which components of teaching are most effective (Cannella Malone & Schaefer, 2017).

Quality of Research/Evidence Based Practice

Although the methodology section of most papers in this review described the teaching programs, the level of detail was not always sufficient to enable replication. It was apparent the focus in most articles was whether participants could learn an ADL or IADL. Overall there was limited detail about whether the strategies contributed to achieving effective measures (i.e., the mastery criterion, maintenance, or generalisation) and there has been no significant improvement of the quality over time.

It is important to engage in evidence-based practice (EBP) when developing and teaching instructional programs (Singh, 2016). Having the best available research evidence is one critical component of EBP (Sackett et al., 1996; Schalock et al., 2011). This review showed a significant number of articles were single case design studies, which, although valuable, are lower in the hierarchy of evidence than study designs such as RCTs (Schalock et al., 2011). It is suggested by McDuff et al., (2021) that replications are paramount in single-case research. Therefore, further research on the outcomes and effectiveness of strategies using rigorously designed and detailed studies is required to improve the best available research evidence for EBP.

Professionals and trainers

The results also illustrated that a variety of people were involved in teaching. However, it was unclear whether certain professionals were more effective at teaching. Research to date has indicated that staff working in disability may have limited knowledge and training of strategies used to teach daily living skills (Alexander et al., 2018; Cook, 2009), which can impact teaching programs. In Australia, the National Disability Insurance Scheme (NDIS) was implemented as a “radical new way of funding disability services” (Cowden & McCullagh, 2021, p. 5). The NDIS intends to provide the reasonable and necessary supports for Australians living with disability through individualised funding (Zubrinich et al., 2024). Approximately 77% of NDIS participants with intellectual disability have primary goals related to daily living (National Disability Insurance Agency, 2022). However, a majority of these goals are not being met. A contributing factor is disability agencies employing staff with limited skills suited to their role (Baines et al., 2019). Furthermore it has also been reported that the NDIS has provided limited funding and opportunities for staff training (Mavromaras et al., 2018). Staff working in the disability sector must be trained to understand the strategies and effective measures to teaching skills. Staff training in strategies will allow adults with intellectual disability to meet their goals and maximise their independence in daily living skills.

Limitations

A number of limitations are acknowledged. Due to the inclusion criteria of this systematic review, all participants were required to have an intellectual disability. This excluded papers that compromised of participants that both did and did not have intellectual disability. Excluding forward, ancestral and hand searching methods in the retrieval of articles can limit relevant studies that might not appear in database searches.

Using Katz’s et al’s (1963) and Lawton and Brody’s (1969) definitions meant there were tasks related to daily living that were excluded (including personal care, social and academic skills). Future research could incorporate definitions from adaptive behaviour assessments such as the *Vineland Adaptive Behaviour Scales, Third Edition* (Sparrow et al., 2016) or *Adaptive Behaviour Assessment System, Third Edition* (Harrison & Oakland, 2015) to establish a list of modern adaptive behaviours. Some examples include completing home maintenance and cleaning duties, road safety and personal hygiene.

Implications for future research and practice

Further studies teaching skills to adults with intellectual disability with rigorous study designs and effective measures is warranted. There is a gap in the existing literature exploring the perspectives of people with intellectual disability who have learned daily living skills. Future research could examine the existing skillset of professionals who are teaching ADLs and IADLs to adults with intellectual disability. This would include identifying the strategies being implemented, and whether effective measures (mastery criteria, maintenance, and generalisation) are being considered.

Given the reported effectiveness of prompting, it is suggested people involved in teaching ADLs and IADLs to adults with intellectual disability understand how to implement face-to-face prompting. Face-to-face prompting is defined as an instructional strategy where a trainer delivers a cue or instruction during a task. Furthermore,

professionals need to include effective measures (i.e., mastery criterion, maintenance, and generalisation) in their training programs to ensure people with intellectual disability can learn daily living skills successfully.

V. CONCLUSION

This review has examined the effectiveness of teaching strategies with adults with intellectual disability. Only eight studies reported all three measures of effectiveness (mastery criterion, maintenance, and generalisation). Unfortunately, only two articles had all effective components met by all study participants. The most common ADLs and IADLs taught to adults with intellectual disability were food preparation and shopping. Prompting was the most utilised teaching strategy, however, many articles utilised more than one strategy. Therefore, there is insufficient evidence and quality of articles in this systematic review to conclude which strategies are effective in teaching ADLs and IADLs to adults with intellectual disability. Hence, additional research with stronger study designs is warranted. It is suggested future research also examines the skill set of professionals teaching skills, and the perspectives of adults with intellectual disabilities who are being taught.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials.

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Table 1: Outline of studies used in systematic review

Author, Year & Country	Participant Demographics	Study Design	ADL or IADL taught*	Trainer	Teaching Strategies	Criterion Reported/Achieved	Maintenance Reported/Achieved	Generalisation Reported/Achieved	All 3 Effectiveness Measures Reported
Azrin & Foxx (1971) USA	9 men; 20-62yrs	Cohort	Toileting	"trainer"	AT, P, consequences, R	No / NA	No / No	No / NA	No
Azrin et al., (1973) USA	12 (7 men; 5 women); mean age 37yrs	Cohort	Toileting	No mention	AT, P, consequences, R	Yes / No	Yes / Partial	No / NA	Partial
Christina et al., (1973) USA	28 (28 women); mean age 55yrs	Before and after	Feeding	"ward staff"	P, consequences	No / NA	No / NA	No / NA	No
Kubat (1973) USA	26 (13 men; 13 women); age not stated	RCT	Transport	"staff member"	P, VI, R	Yes / Yes	Yes / Yes	Yes / No	Yes
Bushby (1980) UK	1 (1 man); 31yrs	Single case design	Feeding	Nurses	P, chaining, environmental arrangement, TA	No / NA	No / NA	No / NA	No
Johnson & Cuvo (1981) USA	4 (3 men; 1 woman); 21-51yrs	Single case design	Food Preparation	"experimenter"	P, R, TA	Yes / Yes	Yes / Yes	Yes / Partial	Yes
Matson (1981) USA	20 (10men; 10 women); 24-48yrs	Cohort	Shopping	Teacher	VI, feedback, R, rehearsal, modelling	No / NA	Yes / No	Yes / No	Partial
Ballard et al., (1983) New Zealand	1 man; 19 yrs	Single case design	Finance	Teacher	Budgeting Skills Program (comprising of R and TA)	No / NA	Yes / Yes	No / NA	Partial
Sarber et al., (1983) USA	1woman; 34yrs	Single case design	Food Preparation & Shopping	"thecounselor"	VS, modelling, P	Yes / Yes	Yes / Yes	Yes / Yes	Yes
LaDuke & LaGrow (1984) USA	4 (gender not stated); 22-26yrs	Single case design	Transport	No mention	VS, match-to-sample, P, VI, R	No / NA	No / NA	No / NA	No
Matson & Long (1986) USA	3men; 32-53yrs	Single case design	Shopping	Teacher	VI, feedback, R, rehearsal, modelling	Yes / Yes	Yes / Yes	Yes / No	Yes
Ballard et al., (1987) New Zealand	1 man, 1 woman; 21 and 18yrs	Case Study	Telephone Use	University students	VI, modelling, role-play, P, R, TA	No / NA	Yes / No	No / NA	Partial
Giere et al.,	8 (5men; 3 women);	Single case	Food Preparation	"trainer"	VS, P, colour	Partial/ No	Yes / Partial	Yes / No	Yes

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(1989) USA	19-39yrs	design	n & Shopping		coding, match to sample, TA, R				
Lalli et al., (1989) USA	2 men; 36 & 44 yrs	Single case design	Telephone Use	No mention	Dial-a-phone (DAP) instructional package (comprising of P, R, match to sample).	Partial / Partial	Yes / No	No / NA	Partial
Sanders & Parr (1989) Australia	4 (3men; 1 woman); 26-50yrs	Single case design	Food Preparation	Staff members	VS, TA, P, R	Yes / Yes	Yes / No	Yes / Yes	Yes
Gines et al., (1990) USA	10 (7 men; 3 women); 21-40yrs	Single case design	Food Preparation	“investigator”	VS, VI	No / NA	No / NA	No / NA	No
Neef et al., (1990) USA	4 (2men; 2 women); 31-64yrs	Single case design	Laundry	No mention	P, R, modelling	No / NA	No / NA	Yes / No	Partial
Posthill & Roffman (1990) USA	5 (1man; 4 women) age not specified beyond “young adults”	Qualitative	Finance	Independent Learning Advisor	Individualised curriculum program	No / NA	No / NA	No / NA	No
Bradley et al., (1995) UK	12 (gender not stated); age not specified beyond “individuals aged 21 and over”	Single case design	Toileting	“key workers”	Behavioural approach, R	No / NA	No / NA	No / NA	No
Singh et al., (1995) USA	3 (1 man; 2 women); 44-49yrs	Single case design	Food Preparation	“trainer”	P, rehearsal, modelling, R	Yes / Yes	Yes / Yes	No / NA	Partial
Wilder et al., (1997) USA	1 man; 21yrs	Single case design	Toileting	Staff member	AT, R, consequences	No / NA	Yes / Yes	No / NA	Partial
Taylor & O'Reilly (2000) Ireland	6 (2 men; 4 women); 19-29yrs	Case Study	Shopping	No mention	VS, P, modelling, VI, discrete training trials	Yes / Yes	No / NA	Yes / Yes	Partial
Rehfeldt et al., (2003) USA	3 (2men; 1 woman); 22-37yrs	Single case design	Food Preparation	No mention	VBI, TA, P, R	Yes / Yes	Yes / Yes	Yes / Yes	Yes
Sigafoos et al., (2007) Australia	3men; 27-33yrs	Single case design	Housekeeping	“trainer”	VBI, TA	Yes / No	Yes / No	No / NA	Partial
Mechling & O'Brien (2010) USA	3 (2 men; 1 woman); 19-20yrs	Single case design	Transport	No mention	VBI, consequences, VI	Yes / Yes	Yes / Yes	Yes / Partial	Yes
Lancione et al., (2011) Italy	1 woman; 31 yrs	Single case design	Food Preparation	Research assistant	VI, P, TA	No / NA	Yes / No	No / NA	Partial
Lancione et al., (2011) Italy	3 (1 man; 2 women); 33-38yrs	Single case design	Food Preparation	Research assistant	VI, P, TA	No / NA	No / NA	No / NA	No
Lancione et al., (2011) Italy	2 (1 man; 1 woman); 38 & 42yrs	Single case design	Telephone Use	Research assistant	AT (a computer aided telephone	No / NA	No / NA	No / NA	No

					system - netbook computer with a specific software).				
Scott et al., (2013) USA	3 (1 man; 2 women); 18-20yrs	Single case design	Finance	Teacher	VBI, P	Yes / Yes	Yes / Yes	Yes / No	Yes
Brooks et al., (2014) USA	4 (2 men; 2 women); 21-23yrs	Single case design	Transportation (driving)	Research assistant	VR, feedback	No / NA	No / NA	No / NA	No
Burckley et al., (2015) USA	1 woman; 18yrs	Single case design	Shopping	“instructor”	VBI, P	No / NA	Yes / No	Yes / No	Partial
Smith et al., (2019) USA	4 (2men; 2 women); 22-25yrs	Single case design	Telephone Use	Research assistant	AT, TA, VS, VI (apps on iPhone 5).	No / NA	No / NA	No / NA	No
O'Neill & Gutman (2020) USA	6 (2 men; 4 women); 21-34yrs	Single case design	Shopping	Occupational Therapist	Meta-cognitive strategy training intervention (comprising of P)	No / NA	Yes / No	No / NA	Partial
McDonnell et al., (2021) USA	10 (6 men; 4 women); 21-35yrs	Single case design	Transport	University student	P, errorless learning, VS, AT	No / NA	No / NA	No / NA	No
Randall et al., (2021) USA	4 (2 men; 2 women); 19-24yrs	Cohort	Food Preparation	University students	AT (apps on iPhone - Meal planner app, Notes app Written list)	No / NA	No / NA	No / NA	No
Randall et al., (2021) USA	14 (10men; 4 women); 21-28yrs	Single case design	Transport	University students	VR, P	No / NA	No / NA	No / NA	No

Key: AT – Assistive Technology, P – Prompting, R – Reinforcement/Rewards,TA – Task Analysis, VBI – Video Based Instruction, VI – Verbal instruction,VR – Virtual Reality, VS- Visual Support

Table 2a – McMaster Quantitative Appraisal Table

Author, Year & Country	Was the purpose stated clearly?	Was relevant background and literature reviewed?	Study Design	Was the sample size described in detail?	Was the sample size justified?	Were the outcome measures reliable?	Were the outcome measures valid?	Intervention was described in detail?	Contamination was avoided?	Concealment was avoided?	Results were reported in terms of statistical significance?	Were the analysis method (s) appropriate?	Clinical importance was reported?	Drop-outs were reported?	Conclusions were appropriate given study methods and results	McMaster Score (Total 15 quant)
Azrin & Foxx (1971) USA	Yes	Yes	Cohort	Yes	NA	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	No	Yes	11
Azrin et al., (1973) USA	Yes	Yes	Cohort	Yes	No	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	No	Yes	11

Christian et al., (1973) USA	Yes	Yes	Before and after	No	NA	Yes	No	Yes	NA	NA	NA	Yes	No	No	Yes	7
Kubat (1973) USA	Yes	No	RCT	No	Yes	Yes	Yes	Yes	Yes	NA	No	Yes	Yes	No	Yes	10
Bushby (1980) UK	Yes	No	Singl e case de sign	No	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	8
Johnson & Cuvo (1981) USA	Yes	Yes	Singl e case de sign	Yes	NA	Yes	Yes	Yes	NA	NA	No	Yes	Yes	No	Yes	10
Matson (1981) USA	Yes	Yes	Co ho rt	Yes	NA	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	No	Yes	11
Ballard et al., (1983) New Zealand	Yes	Yes	Singl e case de sign	No	NA	Yes	Yes	Yes	NA	NA	No	Yes	Yes	No	Yes	9
Sarber et al., (1983) USA	Yes	Yes	Singl e case de sign	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
LaDuke & LaGrow (1984) USA	Yes	Yes	Singl e case de sign	No	No	No	Yes	Yes	NA	NA	NA	Yes	NA	No	No	6
Matson & Long (1986) USA	Yes	Yes	Singl e case de sign	Yes	NA	Yes	Yes	Yes	NA	NA	No	Yes	Yes	No	Yes	10
Ballard et al., (1987) New Zealand	Yes	Yes	Case Study	Yes	NA	Yes	Yes	Yes	NA	NA	No	Yes	Yes	No	Yes	10
Gier et al., (1989) USA	Yes	Yes	Singl e case de sign	Yes	NA	Yes	Yes	Yes	NA	NA	No	Yes	Yes	No	Yes	10
Lalli et al., (198	Yes	Yes	Singl e cas	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10

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9) USA			e de sig n													
Sand ers & Parr (198 9) Aust ralia	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Gine s et al., (199 0) USA	Ye s	Yes	Si ngl e cas e de sig n	No	NA	No	No	No	NA	NA	NA	NA	Yes	No	No	4
Neef et al., (199 0) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	No	Yes	Yes	No	Yes	10
Brad ley et al., (199 5) UK	Ye s	Yes	Si ngl e cas e de sig n	No	No	No	NA	No	NA	NA	No	NA	NA	No	No	3
Sing h et al., (199 5) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Wild er et al., (199 7) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Tayl or & O'R eilly (200 0) Irela nd	Ye s	Yes	Ca se St ud y	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Rehf eldt et al., (200 3) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Sigaf oos et al., (200 7) Aust ralia	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Mec hling & O'Br ien (201 0) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Lanc	Ye	Yes	Si	Yes	NA	No	Yes	Yes	NA	NA	Yes	Yes	Yes	No	Yes	10

ionie t al., (201 1) Italy	s		ngl e cas e de sig n													
Lanc ionie t al., (201 1) Italy	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	No	Yes	11
Lanc ionie t al., (201 1) Italy	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	No	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	9
Scott et al., (201 3) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Broo ks et al., (201 4) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	No	No	Yes	NA	NA	NA	Yes	Yes	No	Yes	8
Burc kley et al., (201 5) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	10
Smit h et al., (201 9) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	No	Yes	Yes	NA	NA	NA	Yes	Yes	No	Yes	9
O'N eill & Gut man (202 0) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	No	Yes	11
McD onne ll et al., (202 1) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes	Yes	12
Rand all et al., (202 1) USA	Ye s	Yes	Co ho rt	Yes	NA	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes	Yes	8
Rand all et al., (202 1) USA	Ye s	Yes	Si ngl e cas e de sig n	Yes	NA	No	No	Yes	NA	NA	NA	Yes	Yes	No	Yes	12

Table 2b – McMaster Qualitative Appraisal Table

	Was the purpose clearly stated?	Was the background literature reviewed?	Was the study design appropriate?	Was a theoretical perspective identified?	Method(s) used	Was the process of sampling described?	Was sampling done until redundancy was reached?	Was informed consent obtained?	Clear and complete description of site	Clear and complete description of participants	Role of researcher & relationship with participants	Identification of assumptions and biases of researcher	Procedural rigor was used in data collection strategies?	Data analyses were inductive?	Findings were consistent with reflective of data?	Decisions on analysis developed?	Processes of analyzing the data was described adequately?	Did a meaningful picture of the phenomenon under study emerge?	Was there evidence of the four components of trustworthiness. (Credibility, transferability, dependability, confirmability?)	Conclusions were appropriate given the study findings?	The findings contributed to the theory & future OT practice/research?	McMaster Score (Total 24)
Pos thill (19 90)	Yes	No	Other	No	Participant observation	No	No	NA	No	No	No	No	NA	No	No	No	No	No	No	Yes	Yes	4