Advancing Leadership Development in Early Years Education via Digitally Mediated Professional Learning: A Systematic Review

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Executive Summary

International research demonstrates a consistent and robust link between the quality of leadership in early years and children's outcomes (Douglass, 2019). This link exists because the quality of leadership in an early years setting has been shown to influence process quality, which is the extent to which children experience supportive interactions and relationships that enable them to flourish as confident learners (Melhuish & Gardiner, 2019). Investing in the development of leadership in different contexts around the world has had a marked impact on process quality and children's outcomes (Arbour et al., 2016; Douglass, 2017; Carroll-Meehan et al., 2019).

Despite a growing understanding around the importance of leadership for process quality and children's outcomes, there is a severe lack of high-quality leadership development opportunities in the UK early years (EY) sector. The majority of the staff, even those in managerial roles, are formally qualified to level 3 and surveys conducted by sector bodies recurrently demonstrate that opportunities for continuing professional development are limited. For example, in a 2019 survey, EY settings ranked 'leadership development' as one of the top 10 areas of professional learning that they felt to be urgently needed (Ceeda, 2019). Many who are leading practice day-to-day (whether as managers, deputy managers, room leaders or pedagogical leaders) have not had an opportunity to reflect on different approaches to leadership or to proactively foster organisational, pedagogical and community leadership practices (e.g. strategic planning, culture-building, reflective practice, coaching, pedagogical conversations, community organising and so on). As a result, EY remains dominated by 'accidental leaders', struggling to work out the meaning and enactment of quality leadership for themselves (Coleman et al., 2016; Carroll-Meehan et al., 2017).

Digitally Mediated Professional Learning (DMPL) opens up new potentials for advancing and extending leadership development across the sector, and the COVID19 crisis has increased people's willingness and capacity to engage in professional development online (Anderson, 2020; Lockee, 2021; Gomez, 2020). This makes it possible to carry out professional development that is less expensive and time-consuming for participants. DMPL can also increase accessibility since there is no need to travel to a particular location and numbers of participants can be scaled up (for at least some types of DMPL). The next step is a systematic approach to understanding the current landscape and the opportunities that exist within it. It is essential to understand what we can learn from existing literature from around the world about effective DMPL in early years leadership development and from the sector's experience with DMPL before and during the pandemic. Ultimately, the research aims to build our understanding of how DMPL can be used to extend and enhance leadership development in the early years sector in the UK.

This report presents the key findings stemming from a systematic review of literature published in the last ten years (2011-2021) and focusing on two intersecting bodies of literature: 1) leadership development programmes in EY and 2) digitally mediated professional learning in EY. Through focusing on these bodies of literature, the aim is to open up ideas for further consideration in the intersection between leadership development and DMPL as well as highlighting gaps in the current research landscape.

Within the context of this study, leadership is defined as the capacity to influence change in order to improve the quality of provision in the early years (Douglas, 2019).

This definition encompasses traditional administrative leadership enacted by those with positional leadership (such as managers), as well as pedagogical and community leadership practices enacted by individuals regardless of position. In identifying literature on leadership development in EY, we applied this inclusive definition of leadership. The literature therefore includes both articles focusing on the development of positional leadership and the those focusing on the development of distributed leadership (i.e. leadership based on the capacity to influence, rather than position).

Following the application of stringent inclusion criteria, the review looked at 26 articles on leadership development in EY. The research reported in the articles employed a diverse range of evaluative methodologies and focused on programmes of differing duration, intensity, cohort size and focus. Additionally, the review examined 20 articles focused on DMPL in EY, which again were diverse in both the content and modes of delivery used in DMPL, as well as the nature of the evaluations conducted in order to determine the effectiveness of the DMPL programme.

Taken together, the articles suggest that developments in DMPL can be used to improve access to leadership development in EY. However, its effective use depends on a) the presence of multiple delivery modes, b) opportunities for dialogue and connection and c) the integration of authentic reflection experiences. Research suggests that without these characteristics, DMPL can have a potentially negative impact on motivation among EY staff. As new qualifications and delivery pathways emerge that make use of DMPL for leadership development, it is essential to ensure that these meet the practical requirements and constraints of EY educators and their day to day work. These constraints are sector-specific and cannot be generalised based on what we know about primary school teachers and their professional development. This means that EY educators need access to DMPL via learning technologies that integrate well into their everyday teaching environments and are easy to learn.

Professional development focused on leadership is complex because leadership itself is complex. The diverse conceptualisations of leadership in the literature highlight that it is not possible to break leadership down into simply a series of steps or skills. The complexity needs to be kept in mind when thinking about DMPL solutions, since DMPL platforms and tools will need the capacity to respond to this complexity. In-person leadership development programmes have generally prioritised highly interpersonal experiences, critical and collaborative reflection and sometimes intense face to face dialogues. Collaborative reflection can occur via coaching, group dialogues, workshops, learning labs, oral inquiry and more besides. The intensity of the interpersonal element needs to be kept in mind when thinking about the potentials for DMPL to support leadership development across the EY sector. Training providers in particular need to be aware of the centrality of these interpersonal experiences when considering how best to deliver DMPL for leadership development.

Based on this review, it is clear that the evidence base for what effective leadership development looks like is not developed enough to present robust conclusions on 'what works' in terms of leadership development. Early evaluative research on leadership development is based on a conceptual model presented by Douglas (2019) as part of an OECD working paper, in which leadership development programmes are thought to impact on leaders' capacity to positively influence organisational climate, which in turn impacts on the learning environment and child-adult interactions, which in turn supports improved outcomes among children. However, we urgently need

further research to test the reliability and validity of this model, as a starting point for then pinpointing which examples of leadership development programmes can contribute in this concrete way to the quality of the environment and interactions, and ultimately improve children's outcomes. Similarly, research on DMPL in EY is inconclusive about what types of DMPL are beneficial for EY educators in general and more detailed research on this is required.

Aims and Objectives

This systematic review is the first part of a project that aims to understand more about how digitally mediated professional learning (DMPL) might be used to advance leadership development across the UK Early Years (EY) sector. The research comes at an important time for the EY sector, when recruitment and retention challenges are particularly acute. The advancement of professional learning, including the expansion and improvement of leadership development, is seen as an important component in addressing workforce challenges and supporting sector recovery.

As a contribution to this overarching aim, the review explores global research published in the last ten years (2011-2021) in two interconnected fields: 1) leadership development programmes in EY and 2) DMPL in EY. Through focusing on these bodies of literature, we aim to open up ideas for further consideration in the intersection between leadership development and DMPL as well as highlighting gaps in the current research landscape.

Within the context of this study, leadership is defined as the capacity to influence change in order to improve the quality of provision in the early years (Douglas, 2019). This definition encompasses traditional administrative leadership enacted by those with positional leadership (such as managers), as well as pedagogical and community leadership practices which can be enacted by anyone in the organisation, including those without a position of formal authority. In identifying literature on leadership development in EY, we applied this inclusive definition of leadership. The literature therefore includes both articles focusing on the development of positional leadership and the those focusing on the development of distributed leadership, where members of the workforce influence change regardless of their official position in the organisation.

Methodology

Approaching the Systematic Review

Based on this definition, the study undertook a systematic review of two bodies of research over the last ten years (2011-2021). A ten-year period was chosen to ensure we considered a timely but substantial selection of literature: a balance advocated in the guidance on systematic reviews offered by Rogers et al. (2017). The first search (described in detail below) considered leadership development programmes in EY. The review of this body of literature focused on conceptualizations of leadership, modes of delivery, intensity and duration of the programmes, and an evaluation of the programmes. The second search focused on DMPL in EY. The review of this body of literature focused on content and medium of DMPL, evaluative methodologies, and advantages and limitations of digital mediation compared to more traditional face-to-face professional development. Through discussion with the systematic review advisory panel, we have drawn conclusions at the overlap of these bodies of literature, critically examining how DMPL could be used to advance leadership development in the EY sector.

Search 1: Leadership Development in Early Years

The searches for literature on leadership development in EY were conducted via three databases: *Education Journals Taylor & Francis*, *Education Research Complete*, and *Web of Science*. We searched for all permutations of the following terms:

- Leadership AND
- Early childhood OR Early years OR Preschool OR Kindergarten OR Children's Centre

After sifting through titles and deleting duplicates, 70 articles were identified as potentially relevant. We reviewed the abstracts and applied the following inclusion criteria in order to sift those relevant to the aims of the review:

- EY participants
- Empirical results of a particular leadership development programme i.e. not perspectives/experiences of leadership or recommendations for leadership development

After applying this inclusion criteria, we were left with 26 articles to be included in the full read stage.

Following the above initial search procedures, we carried out a cross-referencing activity with Douglas's working paper for the OECD, published in 2019, entitled 'Leadership for Quality Early Childhood and Care'. This article represents a landmark contribution to the field of leadership and leadership development in global EY and so we wanted to ensure that we were accessing all of the relevant articles on which Douglas bases her important conclusions regarding the impact of leadership development. Through cross-referencing, we identified 3 further articles to include in our review. As a result, 29 articles were included in the full read stage. Three of these articles were unavailable and so the final review focused on 26 articles.

Search 2: Digitally Mediated Professional Learning

We searched for literature on DMPL in EY via the same three databases: *Education Journals Taylor & Francis*, *Education Research Complete* and *Web of Science*. We searched for all permutations of the following terms:

- Online OR digital AND

- Early childhood OR early years OR preschool OR kindergarten OR children's centre AND

- Professional learning OR professional development

After sifting through titles and deleting duplicates, 61 articles were identified as potentially relevant. We reviewed the abstracts and applied the following inclusion criteria:

- EY participants

- Empirical results of a particular professional development initiative i.e. not perspectives/experiences of professional development in general

- Professional development initiative was online or blended with detail offered about the nature of digital mediation

This revision brought the total number of items for final review to 25. Two items were not available via the research team's institutional subscriptions and one item was already included in the list of items for the leadership development review and were therefore excluded. One of the articles (Snell et al., 2019) was a systematic review of 11 randomised controlled trials on digitally mediated professional development. After carefully reviewing the paper, we concluded that it would not add further insight, and it was therefore excluded from the final list of items. Finally, one item was a policy briefing providing summary statistics of DMPL uptake in on state in the USA but did not include any evaluation of programmes. Therefore, we excluded it from the final list. As a result, the findings described will refer to a total of 20 items.

Advisory Panel

One of the defining features of a systematic review is the presence and involvement of an advisory panel made up of individuals and organisations in a position to make use of the findings from the review. The input of the panel offers an 'on the ground' perspective regarding the topics of the literature and supports in the articulation of conclusions that are rich, sector-facing, relevant and useful.

While conducting the literature review, three meetings took place with the advisory panel. The panel, consisting of EY experts, stakeholders, and training providers, was a collaborative space in which the systematic literature review was critically discussed. In the first meeting, the panel discussed the aims and procedures of the systematic literature review, agreeing on topics such as sources for the search, search terms, and inclusion criteria. In the second meeting, the research team shared preliminary findings and the panel raised comments, questions, and insights, shaping further lines of inquiry. Following this meeting, a draft report was circulated to the advisory panel. The final meeting was dedicated to sharing feedback on this report and refining the presentation of the conclusions from the review. These sessions created a dynamic space for the research team to consider alternative perspectives on the available

literature and draw richer conclusions, co-constructing knowledge with key leaders in the EY sector.

The following sections explore our findings from both parts of the review 1) leadership development programmes in EY and 2) DMPL in EY, before then considering the overlap of these topics and what we can learn regarding the advancement of leadership development in UK EY via DMPL.

To offer an overview of the two intersecting bodies of literature (leadership development in early years and digitally mediated professional learning in early years), we have created a downloadable spreadsheet. The spreadsheet enables readers to gain deeper insights into the articles considered in this systematic review. For example, readers may be interested to look across the sample sizes used in studies or to examine the duration of professional development programmes reported in articles. As part of the spreadsheet, we have included notes on particular studies when there are nuances or complexities to bear in mind, which cannot easily be shown through completion of the cells in the spreadsheet.

Findings: Leadership Development

Geographical Distribution

Based on the geographical distribution of the articles, there appeared to be clusters of activity around leadership development in the US (8 articles), Australia (7 articles) and the UK (5 articles). Beyond this a range of other countries were represented by 1-2 articles across the collection: New Zealand (1), Finland (1), South Africa (1), Chile (2), Israel (1), Singapore (1) and Canada (2). Given the inclusion criteria that articles were published in English, there was a skew towards English-speaking countries.

Conceptualisations of Leadership

In line with our inclusive approach to thinking about leadership and leadership development, the articles conceptualised leadership in diverse ways. A broad distinction can be made between those leadership development programmes with a clear focus on positional leadership for managers and directors in EY (9 articles), and those with a focus on distributed pedagogical leadership which could be enacted by anyone in an EY organisation regardless of formal hierarchies (19 articles). One article (Whalen et al., 2016) focused on both positional and distributed leadership, examining an evaluation of a two-pronged leadership development programme targeting both EY centre directors and EY teachers. Those articles with a focus on the development of distributed leadership placed an emphasis on different facets of this leadership, including leading aspects of pedagogy, activist leadership and facilitating change in organisational culture and practices. Diversity in the conceptualisation of leadership across these 26 articles highlights the complexity of drawing conclusions about 'leadership development' as a singular construct.

Leadership Development Programmes: Modes of Delivery

Most of the leadership development initiatives discussed in the articles involved more than one delivery mode, for example, combining group workshops with coaching, or action research with written reflection. Looking across the articles, we see the following delivery modes represented:

- Workshops (sometimes called 'learning labs') occur in 18 programmes
- Communities of learning (sometimes called 'reflective practice groups'), 9 programmes
- Coaching (or 'mentoring'), 8 programmes
- Action research (or 'practitioner research'), 7 programmes
- Written reflection (or 'journaling'), 6 programmes
- Oral inquiry (or 'autobiographical narrative'), 2 programmes
- Simulation, 1 programme

It is important to note the highly interpersonal nature of most of these modes of delivery. Workshops, communities of learning, coaching, action research and oral inquiry all involve participants engaging in dialogue with one another or a coach/mentor. They also all involve high levels of collaborative and critical reflection on experiences. Only written reflection and simulation do not offer the strong dialogic

element, and all but one of the programmes involving written reflection also involved other modes of delivery as well.

Leadership Development Programmes: Intensity and Duration

There is significant diversity in the duration, consistency and intensity of leadership development events and programmes explored in the collection of articles. This ranges from the exploration of what unfolds in a single leadership development event situated within a more fluid community of practice context, as in Nicholson and Kroll's (2015) examination of oral inquiry among EY leaders, to longitudinal evaluation of programmes lasting 36 months and involving at least monthly engagement from the same individuals through various modes of delivery including workshops, communities of learning and coaching (e.g. Whalen et al., 2016; Shore et al., 2021).

Twelve of the articles relate to a leadership development programme between 6-12 months long. However, within this range of articles, leadership development involved anything from pre-planned weekly engagement via a range of face to face and online modes (e.g. Ang, 2012) to self-organised and spontaneous engagement among participants. The latter was characteristic of those programmes focused on action research and/or communities of learning (e.g. Henderson, 2017). Intensity of the leadership development programme relates to the extent to which evaluation of the programme was the aim of the research reported in the article. That is, those articles prioritising robust evaluation of a leadership development programme tended to show high levels of carefully managed intensity in the professional development programme. On the other hand, those articles with less of a focus on the comparison of pre- and post-measures were more likely to involve self-managed engagement among participants, via action or practitioner research for example.
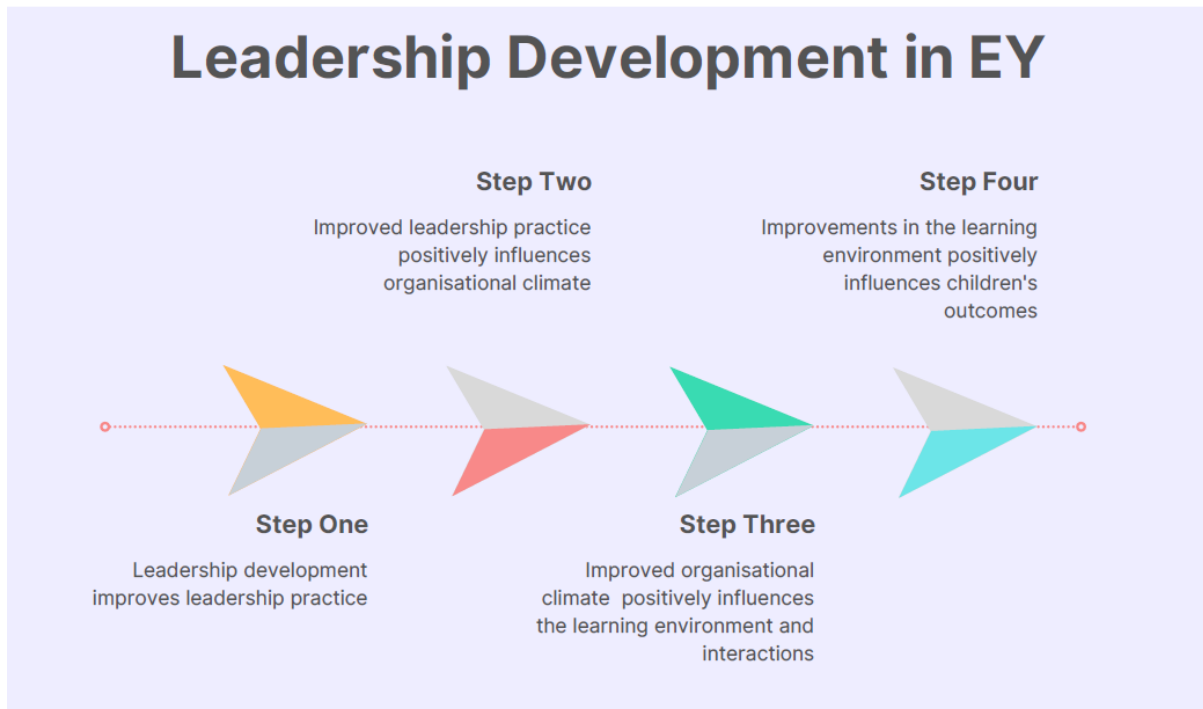
Leadership Development: Evaluation

Most of the articles in the collection present exploratory qualitative accounts of the leadership development programme. For example, Nuttall et al. (2018) collected a wide range of qualitative data including interviews with participants, video records and field notes of the workshops as they occurred, as well as relevant documents from each leaders' workplaces, such as codes of practice or policies. Such articles provide a rich insight into how leadership development unfolds and the impact such programmes have on the day-to-day experiences of leaders.

Quantitative pre- and post-intervention measures are much rarer among the collection of articles. Just 4 articles mention the use of quantitative pre- and post-intervention measures. These articles stem from the same conceptual model regarding the potential for leadership development to positively impact children's outcomes. This conceptual model is also highlighted in the working paper of Douglas (2019) on leadership and leadership development in EY, published by the OECD. In this model, leadership development is taken to impact positively on leadership practices; in turn, this positively influences organisational climate;[1] in turn, this positively influences classroom environment and interactions; in turn, this positively influences children's outcomes (Figure 1).

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[1] In this paper we use the term 'organisational climate' as synonym of 'organisational culture'. The choice of this terms was a pragmatic one as we decided to use the term most used in the literature included in this review.

Figure 1. Modelling the impact of leadership development programmes in EY education

Leadership Development in EY

Step One
Leadership development improves leadership practice

Step Two
Improved leadership practice positively influences organisational climate

Step Three
Improved organisational climate positively influences the learning environment and interactions

Step Four
Improvements in the learning environment positively influences children's outcomes

As a means to both test and develop this model, the following articles make use of pre- and post-measures of not only self-reported leadership, but also organisational climate, classroom quality and children's outcomes.

- In Talan et al. (2014), participants completed the Programme Administration Scale (PAS) periodically throughout the programme. The researchers also gathered data in the form of the ECWES, which is a measure of organisational climate completed by other members of staff. They found an improvement in both measures following leaders' participation in the 10 month Taking Charge of Change (TCC) programme.

- As part of their evaluation, Arbour et al. (2016) included measures of classroom interaction quality (the CLASS measure) and children's language and literacy outcomes. They found improvements in both types of measure when teachers received a language interaction intervention (Un Buen Comienzo - A Good Start) alongside training in continuous quality improvement (CQI). The CQI is taken here to be the component of leadership development in this initiative.

- Ressler et al. (2015) implemented an on-site external measure of leadership (the PAS, as used in Talan et al., 2014) and an on-site external measure of learning environment (the ECERS-R environment rating scale). These were used alongside self-report questionnaires to evaluate a leadership development programme focused on improving positional leadership.

- In their evaluation, Whalen et al. (2016) used CLASS to measure classroom interaction quality (as in Arbour et al., 2016) and also measured children's outcomes through the creative curriculum GOLD assessment. The findings from this evaluation showed positive shifts in socio-emotional interactions and outcomes among children following an intervention targeting both positional

and distributed leadership across selected centres. However, there are many caveats reported by the authors in this study and the article focuses more on reporting fidelity than evaluation.

Taken together, these articles first demonstrate just how little research has robustly evaluated leadership development programmes specifically situated in EY. Second, the articles represent just the tip of the iceberg when it comes to understanding the extent to which the conceptual model underpinning leadership development (figure 1) is a valid way of conceptualising leadership development programmes and their evaluation. If we are to make a robust step forward in leadership development across EY, we urgently need more research to test the model and the causal links it assumes. Finally, the articles helpfully highlight particular tools that can be used within the evaluation of leadership development both to support pre- and post-measures of leadership (e.g. the PAS), pre- and post-measures of classroom interaction and environment quality (CLASS, ECERS-R) and pre- and post-measures of children's outcomes, which are more likely to be context-specific.

Findings: Digitally Mediated Professional Learning in EY

Geographical Distribution

The 20 items included in the review of the topic of digitally mediated professional learning (DMPL) related to research in five countries: 12 studies were based in the USA, 4 in Australia, 2 in Sweden, 1 in Canada and 1 in Germany. The lack of geographical spread was expected given that one of the search criteria was for the literature to be published in English. It is interesting to note that despite the focus on English literature, none of the articles under consideration related to experiences or studies based in the UK.

Study Methodology

There was variety in terms of the methodologies used in the studies under review. Seven studies were based on a randomised controlled trial, 10 studies employed mixed methods such as: sequential mixed methods explanatory study (1 article), pre-post study design (1 article), general mixed methods (7 articles, usually surveys with a mix of question types), and process and impact evaluation (1 articles). Three studies were based on qualitative methods only.

Digitally Mediated Professional Learning: Content and Medium

The articles in this part of the literature review covered studies that examined a variety of professional learning activities either in terms of their content or their delivery medium. From the point of view of the content of professional learning, several articles related to professional development for EY professionals on either language development or STEM. This might in part be explained by the fact that, relatively speaking, in the past decade there has been an increased focus on the development of specific interventions in these areas of learning. For example, Barton et al. (2017) analyses the relationship between EY teachers' use of online demonstration videos and their fidelity of implementation of the MyTeachingPartner-Math/Science early childhood mathematics and science curricula. Helenius et al (2017) also studied an online professional development in mathematics for early childhood teachers. Wagner (2021) explored the experiences of five multilingual early childhood educators accessing online professional development that addresses language practices.

The remaining articles looked at a wide variety of professional development topics including physical education, sedentary behaviour and nutrition; working with children with challenging behaviour and with children impacted by trauma; brain development; and mindfulness. One study had an art focus and studied the development of technological, pedagogical and content knowledge through the creation of digital storybooks by pre-service teachers who would then use them in the classroom to teach various literacy concepts to young children aged four to eight (Oakley, 2020). Two of the studies were focused on professional development that is specific for teachers working with infants and toddlers. Crawford et al (2021) looked at the impact of the CIRCLE Infant-Toddler Teacher Training on teachers' interactions with toddlers. Curenton and Granda (2021) analysed the impact of Conversation Compass©, a professional development approach adapted for ages birth to 24 months, designed to

enhance the quality of conversations in infant-toddler classrooms and family child care homes.

The diversity in content of professional development discussed in these studies could be considered a reflection of the fact that the case for professional development in EY has been made strongly in the past decade and that the offer in terms of "interventions", training activities and opportunities available has followed suit.

Importantly, one study was not about a specific professional development activity but about the impact of online professional development on preschool teachers' self-efficacy, burnout and stress through a randomised experiment (Roberts et al, 2020). The findings from this study suggest that preschool teachers taking an online course experienced emotional exhaustion and decreased self-efficacy when not provided with rich opportunities to express emotions and/or receive supportive feedback alongside the online programme. The authors concluded that professional development designers should be thoughtful about the types of supports teachers receive and how assignments are framed in online environments to ensure teachers learn while also feeling empowered and successful.

From the point of view of delivery modes, the articles reported on DMPL that was delivered through a wide range of mediums, with many using more than one delivery mode, for example combining online learning modules with online coaching. Across the 20 articles, we see the following delivery modes represented:

- Web-based portals with broad range of content
- Online learning modules
- Videos (self-reported performance, observed performance, curricula demonstrations, video reflections)
- Online coaching
- Video conferences (Google Hangouts, Zoom)
- Multimodal online sources: websites, YouTube clips, video streaming, journal articles and book chapters
- Asynchronous online communication in a learning management system and synchronous webinars
- Creation of digital storybooks.

What is important to note though, is that while the focus on this part of the literature review was on DMPL (with the aim to understand similarities, differences, opportunities and challenges compared to the case of face-to-face training), in several of the studies, what was evaluated was the content of the training or the fidelity of intervention, not the delivery mode. Only five articles contained an explicit discussion of the digital vs face-to-face training mode and, as mentioned above, Roberts et al. (2020) was an exception in its targeted examination of the impact of digital mediation in the context of professional learning.

Evaluation

As mentioned above, the focus of some of the articles reviewed in this section was not on understanding the difference between in person and online professional learning provision but rather on whether a certain professional development programme and content were effective, that is, whether it was shown to have a positive impact on teachers' practice and/or children's outcomes. Nevertheless, as most of the training examined was delivered through some form of digital meditation, it is important to

remark that broadly speaking the studies provided evidence of some positive results. In fact, a general positive impact on teachers' knowledge and practice, classroom quality or teacher/child interaction was observed in most of the articles. When the study extended to the analysis of the effect on children's outcomes (e.g. Ascetta et al., 2019; Crawford et al., 2021; Lipscomb et al., 2021) this was usually positive or at worse no effect was detected (Crawford et al., 2021).

One of the key advantages of DMPL suggested by these articles is that it can be useful to decrease time needed for professional development and to reach professionals who would otherwise not be able to access it. In addition, participants in these studies pointed out other advantages of DMPL, such as being able to access training material in their own time. Crucially, online training seemed to be useful to augment face-to-face training efforts.

However, the articles reviewed showed that DMPL was not without difficulties. In some cases, challenges emerged due to teachers' limited digital literacy, which made the online course difficult for them to complete independently (Helenius et al., 2017). In this study, teachers explicitly indicated that of the tasks involved in the professional development, engaging with the texts and videos contributed the least to their learning, while talking to their colleagues was identified as the most effective means of engagement (Helenius et al., 2017).

In other cases, problems with online interactions arose due to workload or wider technology problems and access issues from within educational networks. For example, in Helenius et al. (2017), the lack of time for professional development was noted by 83% of respondents. Given most EY teachers' working conditions, the study found that practitioners need materials readily accessible in the learning environment and available for use throughout the day. With DMPL this is only possible if various digital devices are made available in the learning environment for teachers' use, or if resources are transferred into an alternative physical format (e.g. printed out). Findings from another study suggested that while EY educators may use technology for personal use, they may be less familiar with learning technologies (MacDonald & Douglass, 2015). Participants in the same study indicated that even when their technical competence with learning technologies was secure, they still preferred to use such technologies with the support and feedback from an instructor or supervisor who could guide their participation and engagement (MacDonald & Douglass, 2015).

Taken together, these findings suggest that DMPL does not necessarily work alone but can instead support sustainability and convenience in professional development when there is adequate supervision and support with a high degree of interpersonal engagement. The latter may be easier to develop or more familiar in the context of in-person interactions, hence the focus in the literature on the augmentation of face-to-face professional development with DMPL.

In considering these findings, however, it is important to keep in mind that many of the studies' sample sizes were small and/or lacked diversity. In addition, several articles lacked a clear and detailed description of exactly what the digital mediation entailed. Without detailed descriptions of DMPL, it is more difficult to determine what forms of digital mediation are most effective. In the context of the small number of studies who specifically addressed opportunities and challenges of DMPL versus in-person professional learning, or different modes of digital delivery, the findings discussed above must be taken with caution.

Conclusions

What policy-makers need to know

- DMPL can be used to improve access to leadership development in EY, but its effective use depends on careful design including:
    - Multiple delivery modes
    - Opportunities for dialogue and connection
    - Authentic reflection experiences
- Research suggests that DMPL without these elements can impact negatively on motivation among EY staff.
- DMPL for leadership development must meet the practical requirements and constraints of EY educators and their day to day work, which research shows to be sector-specific. This means supporting EY educators through learning technologies that integrate well into their everyday teaching environments and are easy to learn. Support is essential to enable a positive and useful experience.

What training providers need to know

- Leadership development is complex because leadership is complex. The diverse conceptualisations of leadership in the literature highlight that it is not possible to break leadership down into a set of steps or skills. The complexity needs to be kept in mind when thinking about DMPL solutions, since DMPL platforms and tools will need the capacity to respond to this complexity.
- Leadership development programmes have generally prioritised highly interpersonal experiences, critical and collaborative reflection and sometimes intense face to face dialogues. Collaborative reflection can occur via coaching, group dialogues, workshops, learning labs, oral inquiry and more besides. The intensity of the interpersonal element needs to be kept in mind when thinking about the potentials for DMPL to support leadership development across the EY sector.
- DMPL for leadership development must meet the practical requirements of the EY workforce, with learning technologies that are well-integrated into everyday learning and teaching environments and are easy to use.

What researchers need to know

- The evidence base for what effective leadership development looks like is not developed enough to present robust conclusions on 'what works' in terms of leadership development.
- Early evaluative research on leadership development is based on the conceptual model presented by Douglas (2019), in which leadership development programmes are thought to impact on leaders' capacity to positively influence organisational climate, which in turn impacts on the learning environment and child-adult interactions, which in turn supports improved outcomes among children.
- We urgently need further research to test the validity of this model, as a starting point for then pinpointing which examples of leadership development

programmes can contribute in this concrete way to the quality of the environment and interactions, and ultimately improve children's outcomes.

- Research on DMPL in EY is highly diverse in terms of what the DMPL involves and how it is evaluated, including the focus of the evaluation. This makes it difficult to determine what type of DMPL is beneficial for EY educators in general and future research with this focus is needed. More specifically, we need research that unpicks the specificities of digital mediation in relation to an EY audience, with clear distinctions relating to digital design in terms of both 'hard tech' and platforms.

References

Anderson, B., & Cook, T. (2021). Developing Early Years leadership: Examining the practice of facilitation in and through action research. *Educational Action Research*, 29(5), 787-803.

Ang, L. (2012). Leading and managing in the early years: A study of the impact of a NCSL programme on children's centre leaders' perceptions of leadership and practice. *Educational Management Administration & Leadership*, 40(3), 289-304.

Arbour, M., Yoshikawa, H., Atwood, S., Mellado, F. R. D., Ossa, F. G., Villareal, E. T., & Snow, C. E. (2016). Improving quality and child outcomes in early childhood education by redefining the role afforded to teacher in professional development: A continuous quality improvement learning collaborative among public preschools in Chile. *Society for Research in Educational Effectiveness*.

Ascetta, K., Harn, B., & Durán, L. (2019). Comparing self-reported and performance-based online feedback on early childhood teachers' implementation of language strategies. *Early Childhood Education Journal*, 47(3), 353-365.

Baldacchino, A., Doiron, R., Gabriel, M., Roach O'Keefe, A., & McKenna, J. (2015). From child-minders to professionals: Insights from an action research project on Prince Edward Island. *Canadian Children*, 40(1), 111-129.

Barton, E. A., Whittaker, J. V., Kinzie, M. B., DeCoster, J., & Furnari, E. (2017). Understanding the relationship between teachers' use of online demonstration videos and fidelity of implementation in MyTeachingPartner-math/science. *Teaching & Teacher Education*, 67, 189-201.

Bruijns, B. A., Vanderloo, L. M., Johnson, A. M., Adamo, K. B., Burke, S. M., Carson, V., Heydon, R., Irwin, J., D., Naylor, P., Timmons, B. W., & Tucker, P. (2022). Change in pre-and in-service early childhood educators' knowledge, self-efficacy, and intentions following an e-learning course in physical activity and sedentary behaviour: a pilot study. *BMC Public Health,* 22(1), 1-13.

Carroll-Lind, J., Smorti, S., Ord, K., & Robinson, L. (2016). Building pedagogical leadership knowledge in early childhood education. *Australasian Journal of Early Childhood,* 41(4), 28-35.

Carroll-Meehan, C., Bolshaw, P., & Hadfield, E. (2019). New leaders in Early Years: making a difference for children in England. *Early Child Development and Care,* 189(3), 416-429.

Caudle, L. A., Moran, M. J., & Hobbs, M. K. (2014). The potential of communities of practice as contexts for the development of agentic teacher leaders: A three-year narrative of one early childhood teacher's journey. *Action in Teacher Education,* 36(1), 45-60.

Conroy, M. A., Sutherland, K. S., Granger, K. L., Marcoulides, K. M., Feil, E., Wright, J., Ramos, M., & Montesion, A. (2022). Effects of BEST in CLASS–Web on Teacher Outcomes: A Preliminary Investigation. *Journal of Early Intervention.* Published online first: https://journals.sagepub.com/doi/10.1177/10538151211067544

Crawford, A., Varghese, C., Oh, Y., Guttentag, C., Zucker, T., Landry, S., & Cummins, R. A. (2021). An initial investigation of the CIRCLE Infant-toddler teacher

training for toddler teachers. *Early Education and Development.* Published online first: https://www.tandfonline.com/doi/full/10.1080/10409289.2021.1961427

Curenton, S. M., & Granda, C. (2021). Building blocks of infant-toddler conversation skills: using the Conversation Compass© to drive innovation in Early Head Start classroom conversations. *Early Child Development and Care*, 191(5), 789-799.

Davis, G. (2012). A documentary analysis of the use of leadership and change theory in changing practice in early years settings. *Early Years,* 32(3), 266-276.

Davis, S. (2017). Drama and arts-based professional learning: Exploring face-to-face, online and transmedia models. *Teaching Education,* 28(4), 333-348.

Devine, A., Wallace, R., Lo, J., Miller, M., Sambell, R., Costello, L., Lombardi, K., & Veurink, S. (2019). Online programs build confidence and improve healthy eating messages in early years services. *Australasian Journal of Early Childhood*, 44(2), 139-152.

Diamond, A. (2014). Pre-service early childhood educators' leadership development through reflective engagement with experiential service learning and leadership literature. *Australasian Journal of Early Childhood,* 39(4), 12-20.

Diamond, A., & Whitington, V. (2015). Studying early brain development: Educators' reports about their learning and its applications to early childhood policies and practices. *Australasian Journal of Early Childhood*, 40(3), 11-19.

Douglass, A. L. (2019) Leadership for Quality Early Childhood Education and Care. OECD Education Working Paper No. 211. Accessed 02.03.2021 online: http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP%282019%2919&docLanguage=En

Duffy-Fagan, M., Newman, L., & Leggett, N. (2021). Critically reflective mentoring within team-based leadership: 'having conversations that matter'. *International Journal of Leadership in Education*. Published online first: https://www.tandfonline.com/doi/full/10.1080/13603124.2021.2006798

Fonsén, E., & Ukkonen-Mikkola, T. (2019). Early childhood education teachers' professional development towards pedagogical leadership. *Educational research*, 61(2), 181-196.

Furtado, L., & Anderson, D. (2012). The reflective teacher leader: An action research model. *Journal of School Leadership*, 22(3), 531-568.

Gegenfurtner, A., Zitt, A., & Ebner, C. (2020). Evaluating webinar-based training: A mixed methods study of trainee reactions toward digital web conferencing. *International Journal of Training & Development,* 24(1), 5-21.

Green, S. (2013). Meeting a growing demand: Texas A&M AgriLife extension service's early childhood educator online training program. *Journal of Extension*, 51(6). Accessed online: https://www.learntechlib.org/p/157163/

Hatton-Bowers, H., Howell Smith, M., Huynh, T., Bash, K., Durden, T., Anthony, C., Foged, J., & Lodl, K. (2020). "I will be less judgmental, more kind, more aware, and resilient!": Early childhood professionals' learnings from an online mindfulness module. *Early Childhood Education Journal,* 48(3), 379-391.

Helenius, O., Johansson, M. L., Lange, T., Meaney, T., & Wernberg, A. (2017). To gain knowledge of how to be challenging: Preschool mathematics professional development. *Mathematics Teacher Education & Development*, 19(3), 36-57.

Henderson, L. (2017). 'Someone had to have faith in them as professionals': An evaluation of an action research project to develop educational leadership across the early years. *Educational Action Research,* 25(3), 387-401.

Joseph, G. E., Soderberg, J., Abbott, R., Garzon, R. B. A., & Scott, C. M. E. (2022). Improving language support for infants and toddlers: Results of FIND coaching in childcare. *Infants & Young Children: An Interdisciplinary Journal of Early Childhood Intervention*, 35(2), 91-105.

Kyzar, K. B., Chiu, C., Kemp, P., Aldersey, H. M., Turnbull, A. P., & Lindeman, D. P. (2014). Feasibility of an online professional development program for early intervention practitioners. *Infants & Young Children*, 27(2), 174-191.

Layen, S. (2015). Do reflections on personal autobiography as captured in narrated life-stories illuminate leadership development in the field of early childhood?. *Professional development in education*, 41(2), 273-289.

Lipscomb, S. T., Hatfield, B., Goka-Dubose, E., Lewis, H., & Fisher, P. A. (2021). Impacts of roots of resilience professional development for early childhood teachers on young children's protective factors. *Early childhood research quarterly,* 56, 1-14.

Manburg, J., Moore, R., Griffin, D., & Seperson, M. (2017). Building reflective practice through an online diversity simulation in an undergraduate teacher education program. *Contemporary Issues in Technology and Teacher Education,* 17(1), 128-153.

Marklund, L. (2015). Preschool teachers' informal online professional development in relation to educational use of tablets in Swedish preschools. *Professional development in education*, 41(2), 236-253.

Myran, S., & Masterson, M. (2021). Training early childhood leaders: developing a new paradigm for professional development using a practice to theory approach. *School Effectiveness and School Improvement*, 32(2), 173-196.

Nicholson, J. M., & Kroll, L. (2015). Developing leadership for early childhood professionals through oral inquiry: Strengthening equity through making particulars visible in dilemmas of practice. *Early child development and care*, 185(1), 17-43.

Nuttall, J., Thomas, L., & Henderson, L. (2018). Formative interventions in leadership development in early childhood education: The potential of double stimulation. *Journal of Early Childhood Research*, 16(1), 80-91.

Oakley, G. (2020). Developing pre-service teachers' technological, pedagogical and content knowledge through the creation of digital storybooks for use in early years classrooms. *Technology, Pedagogy and Education*, 29(2), 163-175.

Page, J., & Eadie, P. (2019). Coaching for continuous improvement in collaborative, interdisciplinary early childhood teams. *Australasian Journal of Early Childhood*, 44(3), 270-284.

Ressler, G., Doherty, G., Ferguson, T. M., & Lomotey, J. (2015). Enhancing professionalism and quality through director training and collegial mentoring. *Journal of Childhood Studies*, 40(1), 55-72.

Roberts, A. M., LoCasale-Crouch, J., Hamre, B. K., & Jamil, F. M. (2020). Preschool teachers' self-efficacy, burnout, and stress in online professional development: A mixed methods approach to understand change. *Journal of Early Childhood Teacher Education*, 41(3), 262-283.

Rogers, S., Brown, C, & Poblete, X. (2017) A systematic review of the evidence base for professional learning in early years education (the PLEYE review). Accessed 26.08.2020 from :https://discovery.ucl.ac.uk/id/eprint/10053553/1/Rogers_PLEYE_A%20SYSTEMATIC%20REVIEW%20OF%20THE%20EVIDENCE_Nuffield.pdf

Rutgers, L., & Reddy, C. (2013). Cognitive coaching: Strengthening grade R teachers' leadership capacity as supervising partners of student teachers. *South African Journal of Higher Education*, 27(4), 1005-1020.

Sheridan, K. M., & Wen, X. (2021). Evaluation of an online early mathematics professional development program for early childhood teachers. *Early Education & Development,* 32(1), 98-112.

Shore, R. A., Lambert, R. G., & Shue, P. L. (2021). An evaluation of leadership professional development for early childhood directors. *Leadership and Policy in Schools*, 20(4), 690-703.

Singh, M., Han, J., & Woodrow, C. (2012). Shifting pedagogies through distributed leadership: Mentoring Chilean early childhood educators in literacy teaching. *Australasian Journal of Early Childhood,* 37(4), 68-76.

Skattebol, J., & Arthur, L. M. (2014). Collaborative practitioner research: Opening a third space for local knowledge production. *Asia Pacific Journal of Education,* 34(3), 351-365.

Snell, E. K., Hindman, A. H., & Wasik, B. A. (2019). A review of research on technology-mediated language and literacy professional development models. *Journal of Early Childhood Teacher Education*, 40(3), 205-220.

Spektor-Levy, O., & Abramovich, A. (2017). From "hesitant" to "environmental leader": The influence of a professional development program on the environmental citizenship of preschool teachers. *Eurasia Journal of Mathematics Science and Technology Education*, 13(3), 649-671.

Stamopoulos, E. (2015). The professional leadership and action research training model: Supporting early childhood leadership. *Australasian Journal of Early Childhood*, 40(4), 39-48.

Stone-MacDonald, A., & Douglass, A. (2015). Introducing online training in an early childhood professional development system: Lessons learned in one state. *Early Childhood Education Journal,* 43(3), 241-248.

Talan, T. N., Bloom, P. J., & Kelton, R. E. (2014). Building the Leadership Capacity of Early Childhood Directors: An Evaluation of a Leadership Development Model. 16 (1), accessed online: https://files.eric.ed.gov/fulltext/EJ1045231.pdf

Vick Whittaker, J., Kinzie, M. B., Williford, A., & DeCoster, J. (2016). Effects of MyTeachingPartner–Math/Science on teacher–child interactions in prekindergarten classrooms. *Early Education and Development*, 27(1), 110-127.

Vijayadevar, S., Thornton, K., & Cherrington, S. (2019). Professional learning communities: Enhancing collaborative leadership in Singapore early childhood settings. *Contemporary Issues in Early Childhood*, 20(1), 79-92.

Wagner, C. J. (2021). Online teacher inquiry as a professional learning model for multilingual early childhood educators. *Early Childhood Education Journal*, 49(2), 185-196.

Whalen, S. P., Horsley, H. L., Parkinson, K. K., & Pacchiano, D. (2016). A development evaluation study of a professional development initiative to strengthen organizational conditions in early education settings. *Journal of Applied Research on Children: Informing Policy for Children at Risk*, 7(2).