Investigating multi-tasking and task rotation as aspects of the complexity of early childhood educators' work.

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Abstract

Researchers of early childhood educators' practice have noted the usefulness of applying various conceptual and methodological resources to create accounts of complexity. This paper contributes to an under-researched area, providing evidence of multi-tasking and task rotation as aspects of the complexity of early childhood educators' practice. The data regarding these aspects was generated in 46 focus groups conducted with 111 directors, teachers and assistants working in Australian early childhood education and care services. Findings of the thematic analysis of focus group data suggest that for participants, multi-tasking and task rotation were considered an integral and regular aspect of practice. Participants also described a range of ways services had to make these sometimes-challenging aspects of practice work for themselves, children and families. The paper concludes with suggestions for making multi-tasking and task rotation more manageable through shared understandings and the creation of enabling conditions within early childhood work environments.

Keywords: early childhood educators or teachers; quality; early childhood education and care; multi-tasking; task rotation, complexity

Introduction

The nature of work in the early childhood sector is notably misunderstood, perpetuating workforce shortages, and low professional status (Gibson, 2013). Making visible the complexity of early childhood educators[1]' (hereafter 'educators') practice allows researchers to demonstrate why work environments, practice and policy need adaptation to the realities of their practice. In this paper, complexity is understood to include: "the number of components making up a system" as well as the nature of the relationships between components (Standish, 2018, 106). Accordingly, existing empirical and theoretical research concerning the complexity of educators' practice has highlighted a number of facets, including the: i) conceptual, methodological and representational difficulties of accurately and fully capturing all it takes to provide high quality education and care to children birth-five years; ii) complexity of contexts governing educators' practice; iii) complexity of the pedagogical contexts and work environments in which educators work; and, iv) complexity of educators'professional subjectivities.

The term *multi-tasking* describes the human capability to complete multiple tasks simultaneously (Appelbaum et al., 2008). *Task rotation* is a related term but describes the process of changing and completing tasks sequentially, rather than completing them simultaneously. These aspects of educators' work are explored in the Exemplary Early Childhood Educators at Work (EECEW) project - a multilevel, mixed methods study that

[1] In Australia, 'educators' refers to those working directly with children birth-five years – regardless of qualification.

aims to document the personal, professional and organisational dimensions that support the work of exemplary educators working in Australia. The EECEW project applied different methods across three phases, each building iteratively on the findings of the prior phases: Phase 1 used a digital random time sampling (RTS) app to collect time use diary data; Phase 2, focus groups and; Phase 3, case studies. In this paper, we discuss findings from the focus groups, which explored the extent to which multiple demands were made on educators' time through multi-tasking and task rotation.

In the following section, we review existing research that mentions complexity in relation to educators' practice. We then provide an overview of research concerning multi-tasking and task rotation. Given the paucity of research conducted in early childhood education (ECE) contexts, we draw from research in the fields of psychology and education to discuss ways these concepts have been studied empirically.

Literature review

Part 1. Complexity of early childhood educators' practice

Four themes – that arose from analysis of the research papers reported below – are used to structure the following review of literature concerning the complexity of educators' practice: complexity - conceptual, methodological and representational challenges; complexity of governing contexts and work environment; complexity of pedagogical contexts; and, complexity of educators' professional subjectivities.

Complexity - conceptual, methodological and representational challenges.

Early childhood researchers have utilised a variety of conceptual and methodological resources to create accounts of complexity in educators' practice (e.g. Kilderry 2004; Lash 2008; Sumsion et al. 2014). Elliott and Davis (2009, 74), for example, suggest that the "complex social and ecological systems in the biosphere" provide a model for understanding the operation of relationships in early childhood practice. Qualitative approaches (Hsieh 2004; Davis et al. 2018) are often used to empirically explore complexity in educators' practice. However, other researchers have sought to make complexity visible by utilising post-structural approaches (e.g. Hultman and Lenz Taguchi 2010) and new materialist perspectives (e.g. Pacini-Ketchabaw 2013). Time use studies have also attempted to record the 'number of components' (Standish 2018) aspect of the complexity of educators' practice – see for example, Ryan et al. (2004) and Wong et al. (in press). These accounts make the many elements of complexity visible and possibly more understandable. However, there is no one agreed conceptualisation of, or approach to studying complexity in educators' practice.

Complexity of governing contexts and work environment

Educators' practice occurs within complex governing contexts that include educators' initial education contexts through to the practice landscape (Vartuli et al. 2016). Complex organisational arrangements and practices within this landscape such as a lack of facilities and time to engage in mentoring (Langdon et al. 2016) also reflect the complex governing context. Discursive influences are another related aspect of the complexity of these governing contexts. For example, authors contend that discourses of 'quality' in ECE

(McMullen 2020) and gendered and classed discourses (Osgood 2009), enact governing forces in relation to educators and their work. Meanwhile, neoliberal discourses are reported to contribute to the complexity that characterises EC policy landscapes (Johansson et al. 2016) and policy production (Sumsion et al. 2014) in many countries. This range of discursive influences governing the EC sector through legislative, initial education, industrial, organisational and practice contexts, clearly illustrate the multifaceted complexity of the educators' practice.

Complexity of pedagogical contexts

The theme of 'pedagogical contexts' refers to the complex relational and curricular landscape of EC practice. Examples include: the practical challenges of planning in ECE settings (Vartuli et al. 2016); taking account of 'cultural variables' (such as: "child and family diversity [and] socioeconomic factors" (Cecconi et al. 2014, 217); the demands of working with families' complex needs (Skattebol et al. 2016); working with non-ECE professionals (Garvis et al. 2016); inter-cultural ways of working with Australian First Nations peoples (Fasoli and Ford 2001), and with refugee communities (Hurley 2011). As discussed by Kilderry (2004, 34), many of these complexities involve working for social justice – "…see[ing] the educational site as …one that can perpetuate and maintain the status quo" if conscious action to redress disadvantage is not taken.

Other aspects of the complexity of pedagogical contexts concern ways that quality is enacted, and negotiation of the many discourses of care circulating in ECE settings (Powell et al. 2020). Lash et al. (2008) underline the intrinsic complication, mental load and multi-faceted nature of decision-making in ECE, and Powell et al. (2020) call for greater appreciation in policy and public discourse of the complex ethics of educators' work. Educators' capacity and ability to make sound decisions is recognised to be affected by the responsibility for determining "…how much care, freedom and control should be given to children at any certain moment" (Hsieh 2004, 327), and educators' endeavours to honour children's claims for their rights (Johansson et al. 2016). These examples further illustrate what Gibson et al. (2015, 330) describe as the complex "…intersections of discourses of economics, productivity …neuroscience…play and love/care" that educators must negotiate in their practice.

Complexity of educators' professional subjectivities

Educators' professional subjectivities are similarly complex, for example, Arndt et al. (2018) write about professional identities as locally informed, shifting and contextual, rather than as a uniform or static ECE 'professionality'. Similarly, Malm (2020, 356) cites Murray's (2014) concept of educators' professionalism as: "formed through a complex web of relationships among the educators as individuals, their workplaces, and the national context". Part of this web might also include educators' years of experience, which McMullen (2020) argues could enable educators to develop strategies for working with the complexity of practice. Emotion - the ways it is deployed and the effects it produces - is another aspect of complexity in educators' work. Madrid et al. (2016, 390, emphasis in original) describe educators' emotion as "complex, messy,

dynamic, and *political"*, highlighting not only the qualities of emotion in educators' work, but that emotions are part of the relations of power that shape practice itself.

Summary. This brief review demonstrates the complex contexts of educators' practice and subjectivities, and of practice itself. However, despite some implicit attention to time in studies of complexity, and recognition of the mental load associated with the multi-faceted nature of educators' practice, there appears to be a gap concerning time-use as a feature of complexity in educators' practice. We now turn to our review of the concepts of multi-tasking and task rotation, and their use in empirical research.

Part 2. Multi-tasking and task rotation

Multi-tasking and task rotation have been the subject of experimental psychological research for close to 100 years (Monsell et al. 2000). While no universal theory of multi-tasking exists, there are some widely accepted tenets. First, although multi-tasking can be used to describe doing two tasks simultaneously, they are often not similarly complex tasks. That is, one task might require less attention or conscious thought than the other (Brante 2009). Second, while research participants are said to report that saving time is a principal reason for multi-tasking, it is often the case that multi-tasking takes more time, and can decrease the person's performance quality and productivity (Brante 2009). This is because doing two (or more) tasks simultaneously carries additional cognitive, perceptual and motor demands relating to the cognition needed to manage multiple tasks. Resolving potentially conflicting requirements during the process of undertaking the task can also decrease efficiency (Monsell et al. 2000). Task rotation may also incur "switch costs" (Courage et al. 2015, 10), such as increased reaction times and error rates when tasks are rotated more quickly. This "resumption lag" (2005, 14) can also occur as workers switch back to a primary task after being interrupted, in order to undertake a second task. Rotation between many tasks can lead to distraction, errors and fatigue (Monsell et al. 2000).

While frequently presented as problematic aspects of work, studies also suggest that multi-tasking and task rotation can enable greater cognitive flexibility and creative adaptation that actually improve efficiency (Courage et al. 2015). Educators' beliefs about the concepts of multi-tasking and task rotation also play a role; for example, when undemanding tasks are undertaken simultaneously, multi-tasking can appear 'effortless' (Brante 2009, 6). Preconceptions of multi-tasking can impact on individuals' experiences of, and satisfaction with work; for example, a negative preconception of multi-tasking can contribute to an individual feeling less satisfied with work that requires a high degree of multi-tasking (Brante 2009). Further, it makes a difference whether the task rotation is self-initiated or caused by external interruption. Having the opportunity to prepare for a switch can reduce 'switch cost' (Monsell et al. 2000). Greater stimulation, exploration and reorganisation are associated with self-initiated task rotation, compared to more frustration, resistance and exhaustion when task rotation results from external interruption (Brante 2009). Individual preferences for ways of working may also influence educators' experience of multi-tasking and task rotation – some prefer to multi-task, or find this satisfying, while others find this stress-inducing (Courage et al. 2015).

Multi-tasking and task rotation research in early childhood education

Database searches of articles written in English include just three studies that have examined multi-tasking and/or task rotation in early childhood educators' work – Harrison et al. (2019) and Wong et al. (in press), Mitchell et al. (2019), and Kusma et al. (2011). Harrison et al. (2019) report on time-use data gathered over the couse of a day through an open-ended pen-and-paper format with 21 educators in Australia. The aim of this study was to make visible the diversity and complexity of the participants' work across 10 primary activity areas. Time-use data showed that participants were completing between 3.75 - 10.24 different activities per hour, with an average of 7.04 activities per hour. The authors also discovered that at peak times in the day, participants might have four or more changes of activities within a 20-minute period. Although there were high numbers of rotations between tasks, these could be between relatively similar tasks, or, between tasks requiring a more significant cognitive switch (Harrison et al. 2019).

The same team continued this research by examining multi-tasking and task rotation through the development amd piloting of a digital random time sampling (RTS) app in preparation for the first phase of the EECEW study (Wong et al. in press). Activities were recorded by participants in 6-minute time blocks. Participants reported that one-third of their activities occurred for 6 minutes or less, and two-thirds of their activities occurred for no more than 18 minutes. This early finding suggested that, on average, educators changed from one domain of activity to another every 6 to 18 minutes regularly throughout the working day.

A time use diary study conducted by Mitchell et al. (2019) in New Zealand with 22 teachers used the same taxonomy of activity domains as that developed by Harrison et al. (2019). Mitchell et al.'s study was underpinned by a desire to make visible the complexity of teachers' practice as a way of challenging the persistent undervaluation of ECE in New Zealand. Mitchell et al. found that there were 'hot spots' in the participating teachers' day, in which multi-tasking was at its most intense. From 10-11am was a peak time for multi-tasking, along with periods on either side of lunch (11am-12 midday and 1-2pm). During these times, up to four different activity domains were reported to be undertaken within a 20-minute period.

A real-time observational time-use study, conducted by Kusma et al. (2011) in Germany with 11 early childhood teachers, examined multi-tasking and task rotation in order to quantify work conditions and workflow, and identify sources of stress. The researchers found that, on average, participants were multi-tasking 47.14% of each workday, and performing 24 different tasks per work hour. The most common multi-tasking activities included supervising children at play while talking to a colleague. The researchers concluded that time pressure was the reason for multi-tasking, and that the amount of multi-tasking and associated interruptions were sources of stress for participants.

A random time use study conducted by Brante (2009) with 59 Swedish primary and secondary school teachers provides additional insight into multi-tasking and task rotation in educational settings. Brante examined how time use enabled or constrained what teachers achieved in their workday. In his analysis, Brante distinguished between three types of multi-tasking: i) undertaking two actions simultaneously; ii) undertaking an action while thinking about future actions; and, iii) doing work, or thinking about it, during non-work periods of the day. Brante (drawing on Stoneman 2007) argued that 'true' multi-tasking – two tasks being undertaken simultaneously – is often hard to distinguish from a high number of tasks undertaken in succession (task rotation). Brante's study also underlined the importance of teachers' perceptions of multi-tasking. These perceptions, he says, have: "implications for their experienced work and work satisfaction" (2009, 433). For example, some participants in the study perceived multi-tasking to be: 'tiresome and lead[ing] to feelings of not accomplishing one's work' (2009, 435). Brante suggests that supporting teachers to consciously engage with their perceptions of multi-tasking, and in how to best manage work conditions, might assist in improving their experiences of work.

Together, the conceptual and empirical findings above demonstrate the value of exploring multi-tasking and task rotation in particular work contexts. Accordingly, an examination of educators' perceptions and experiences of these concepts in early childhood educators' work seems likely to generate a more complete understanding of the complexity of their practice.

Materials and methods

Aim

The aim of the overall EECEW study was to identify and map the distinctive nature and complexity of exemplary educators' work, and to identify the personal, professional and work environment resources that facilitate this exemplary work. The overall research question pertinent to the data reported in this article is: What constitutes the everyday work of educators in high quality ECEC centres?

Methodology

Australian ECE services use a national regulation, assessment and quality improvement approach. The EECEW study drew its sample of educators from the population of services that had achieved an overall quality rating of 'exceeding' (the highest possible rating) in each of the seven Australian National Quality Standards (Australian Children's Education and Care Quality Authority [ACECQA] 2018), and each sub-element of the Standard.

This paper reports on Phase 2 of the EECEW study – focus groups. Participants in Phase 2 were drawn from preschool/kindergarten and long day care centres in NSW, QLD and WA across metropolitan and non-

metropolitan areas[2]. A total of 46 focus groups and interviews were conducted, with 111 participants. Ethics approval for the EECEW study was gained from the lead institution's Human Research Ethics Committee (Ethics Approval Number 1800000324). Focus groups were held at a time convenient to each service. When conducted during opening hours, centres could claim costs for staff release time, for up to a maximum of 2 hours per participant. If focus groups were held during the evening, each participant received a $50 gift card in appreciation of their time.

Using findings from the Phase 1 RTS time use diary app as a stimulus for discussion, focus groups were designed to provide deep insights into the complex nature of educators' roles, and the resources they drew upon in the course of their work. Accordingly, focus groups were comprised of participants working in the same role at each centre i.e., separate groups for assistants (n = 27), room leaders (n = 34), teachers (n = 23), and directors (n = 27[3]). Each focus group was moderated by research team members (chief investigators and research assistants) or partner organisation managers. Focus groups were conducted either at the service (29), the service provider's offices (1), or online via video call (16). Each focus group was 1-2 hours long, and was audio recorded.

A focus group guide, including a scripted introduction, questions, and probing questions, was developed to promote consistency across each group. Each group commenced with an overview of the EECEW study, a presentation on the taxonomy that informed the RTS app (Wong et al. 2015) and preliminary findings from Phase 1. These findings were that about half of educators' working day consisted of activities that lasted for only 6 or 12 minutes, across the 10 areas of activity, and, most of their time was allocated to 'being with children' followed by 'routine care/transition' and 'intentional teaching'. Participants were also informed that RTS app showed that educators' work was characterised by rapid changes of primary activity and a high level of multi-tasking (approximately 60%)[4]. Focus group participants were asked if these findings from the RTS app resonated with them, how these patterns of activity impacted their work, and whether there were some activities they themselves would like to spend more continuous time in than they were able to. Participants were also asked about what work conditions made managing multi-tasking and task rotation easier.

Focus group data was initially analysed by authors three and four, who separately listened to the 46 audio files and reviewed any notes provided by the focus group leader. These authors then compiled their initial analyses

2 In Australia, education and care services are predominantly provided through centre-based services (97%) - including long day care and preschool services, with family day care schemes making up the remaining 3%. Some states and territories also offer preschool programs within the school system. These are not included in the ACECQA quality rating system. Service provider management types are: private (i.e., non-government), for profit (50%); private, not for profit community-managed operators (21%); private, not for profit organisations (14%); State/Territory and Local Government managed (7%); State/Territory government schools (4%); Independent schools (3%); and Catholic schools (1%) (ACECQA, 2022).

[3] Due to participant availability, in 16 cases individual interviews were conducted with directors.

[4] Participants were also informed of results of a set of ratings of job satisfaction and perceived stress collected through the RTS app after each time use diary entry, however these results are not reported here.

according to the focus group prompts and undertook inter-rater reliability, checking their colleagues' analysis for accuracy. They then created preliminary categories and themes through a collaborative discussion of the data. For each of the job roles, conceptual diagrams were created that recorded categories and themes. Authors 1 and 2 then interrogated the data using thematic analysis techniques derived from the work of Braun and Clarke (2021). The final themes reported below are derived from this analysis, and in response to the questions posed to focus group participants: *Theme one* - Experiences of multi-tasking and task rotation; *Theme two* - Supports and challenges to multi-tasking and task rotation. Within theme two there were four sub-themes: dispositions; work climate, culture and conditions, and strong team.

Results

Experiences of multi-tasking and task rotation

Focus group participants expressed surprise that participants who completed the RTS app reported spending 60% of their time multi-tasking – they expected it to have been higher. However, most of the focus group participants agreed with the finding that educators changed tasks up to 10 times an hour, saying: the "interruptions [to my work] are limitless" and "[task] change is constant". Some participants qualified these comments by noting that rapid change was contextual to the time of day, age group with whom they were working (with infants' rooms requiring the most multi-tasking and task rotation), and the time of the year. It also seemed to make a difference to participants what tasks they had to rotate between, with one participant reflecting: "it's difficult to go straight from theory brain to emotionally supporting [the children]. It's difficult to go really fast between those two". Participants also noted that there were particular combinations of tasks that made multi-tasking stressful, for example when: "you need to do two tasks that aren't complementary", and, when "we are being with children and writing observations". These findings support Brante's (2009) contention that task rotation between two complex tasks may be more difficult than between tasks of greater and lesser complexity.

A key finding from the focus group data was that all educators – regardless of job role – believed multi-tasking and task rotation were a normal part of their work, saying for example: "that is being responsive. It is a dynamic environment, with so much going on. If you did one thing at a time, you wouldn't be doing your job"; "[the] ability to multi-task is critical to being an exemplary educator"; "you have really got to think on your feet - you're juggling", and "that's the childcare life, because your role is so flexible to meet children's needs". This finding echoes those of Harrison et al. (2019) and Kusma et al. (2011) – that educators' work is characterised by high levels of multi-tasking and task rotation.

At the same time, multi-tasking and task rotation could be problematic. Some participants reported feeling: "frustrated because [we] can't spend quality time where [we] want to", or, always "… saying to one child 'I will be right back'". One participant also noted that: "when too many things are happening at once it gets stressful and the children can feel this. Doing too much at once feels like you are not present with children".

These perceptions are similar to those reported in previous studies (Rudow, 2004 cited by Kusma et al. 2011) which noted that educators felt were not having enough time with individual children due to the need for multi-tasking. Previous studies (Bönsch, 2001 cited in Kusma et al. 2011) also comment that educators have perceived that their sense of strain and high workload has a negative effect on their relationships with children. Our participants' reports support this claim, as many reported feeling their stress is transferred to children.

Other focus group participants reported feeling "rushed and on edge and [that they] can't catch [their] tail", or that they "feel guilty because jobs are not done properly" due to the need for multi-tasking and task rotation. Others reported finding multi-tasking and task rotation physiologically and emotionally tiring, with some linking these effects to levels of attrition from the ECE sector. One participant noted that they were on "high alert all the time" and that their "body and brain were so used to rapid change that stopping is difficult". These states of hypervigilance elicited were reported to have negative impacts on participants' personal life - making it hard to relax once the workday was done, and meaning they often needed silence and solitude in order to de-escalate. The perceived requirement to be immediately responsive to children sometimes also meant that administrative paperwork and documentation were done after hours, and this further impacted on their quality of personal life. These findings reflect those in Kusma et al. (2011), and McKinlay (2018) regarding the burden of providing high quality education and care. More generally, the experiences of tiring supports Courage et al.'s (2015) assertion that high rates of task rotation can lead to fatigue.

Supports and challenges to multi-tasking and task rotation

Participants' responses to questions about the enabling factors and work conditions that made managing multi-tasking and task rotation easier are discussed under four sub-themes.

Dispositions

The first sub-theme concerns dispositions that participants said educators need in order to cope with the intensity of the work. One participant described needing to be: "really flexible with what unfolds throughout the day, going with it. If you try to get everything together you will stress yourself out", while another noted: "[you] need to be open minded, be prepared to change, adapt to how the day evolves, be flexible". Underlying personality and preferences for intensive work were also credited as a resource, with one participant observing that it suited some educators to be "on the go all day", and by contrast: "those who are too rigid, structured and not adaptive are not cut out for the job".

Attributes such as cultivating a "calm headspace", and "being aware and reflecting on what does or doesn't work – that cycle of reflection is key" were also noted as useful to coping well with multi-tasking and task rotation. Similarly, the ability to rationalise and balance preparation with flexibility – "you can't always be so flexible that nothing gets done" also helped. One participant shared her experience of positive rationalisation: "I ride that wave and some days are better than others, and you just forgive yourself and understand that there is only one of you". These experiences support Courage's (2015) contention that preferences for ways of

working – such a preference for intense but flexible work – will also affect responses to multi-tasking and task rotation.

Acculturation to multi-tasking also seemed to play a role for some participants, who reported that because they perceived multi-tasking and task rotation to be 'normal' they did not have a sense of disruption to their work. For example: "You forget how many things you are actually doing until you are prompted and go 'wow' I was doing this, this, this all day'", and "most days it doesn't feel that overwhelming", and that there was "no pressure, it is what you expect it to be". These perceptions are similar to Brante's (2009) contention that preconceptions of the concept of multi-tasking can impact on individuals' experiences of work, and their satisfaction with it.

Work climate, culture and conditions

The second theme concerns ways participants' work environments had been adapted to manage the demands of multi-tasking and task rotation. For example, some participants were advocates for strict routines, because these: "assist with not feeling rushed" and "mean you can focus on children", while others felt that it was better to have a lot of "flexibility in the program so staff don't feel rushed". Some ECE services found employing educators for extended hours to cater for planning, and ancillary staff for administrative tasks and cleaning, worked to ensure educators "have a long time to be with the children", or to "feel calm as we have many staff". Other adaptations of work conditions included: restricting times that the phone would be answered; giving three-hour programming blocks; programming intentional teaching in specific blocks of time (30 minutes); and rosters for transition times so that all staff knew where they needed to be at specific times during the day. These examples indicated the uniqueness of educators' workplaces – some workplaces had cultures where routines and micro-planning were valued, others not; some had the resources to employ additional staff, others not; some made adaptations to how educators' work is organised and resourced, while others preferred to embrace flexibility.

Strong team

The third sub-theme identified the value of a strong team for effective multi-tasking and task rotation. Participants noted, for example, the importance of having a shared vision and similar expectations of how to work effectively as a team in an ECE setting "otherwise it can pull in the wrong direction, [so] the whole centre needs to be onboard". Sharing common attitudes to the practical elements of their day-to-day work was also important, with most participants reporting their own and their colleagues' willingness to go beyond the job description and being "happy to step up and assist with paperwork". Participants noted it felt good to work in a strong team with understanding colleagues who were "all on the same page", "step in and support each other" and "have the same work ethic". Other signs of a strong team were knowing colleagues' strengths and ways of working, to the point that team members "become good at reading other staff", and knowing "what we are all doing". These findings echo those of Langford (2010), who affirmed that educators can better

negotiate the complexities of the work environment when their service has an explicit shared philosophy and expectations.

The service leaders' ability to support all educators was also seen as paramount for the effectiveness of a strong team. Participants discussed leaders' ability to "support us through the rapid changes" as well as leaders' capacity to delegate and utilise all team members "to assist with managing tasks". This was noted by participants as "crucial to the flow". The need to actively manage the stressful impact of multi-tasking and task rotation on individual educators was also evidenced in Kusma et al.'s (2011) study. Leadership style was clearly critical to building and maintaining a positive work climate and culture. In particular, participants' perspectives suggested that distributed leadership styles – where responsibilities for managing as well as completing tasks is shared – were most effective in enabling effective multi-tasking and task rotation.

Pedagogical style and quality

This final sub-theme concerned pedagogical styles that enabled managing multi-tasking and task rotation in teaching practice. Participants noted that they used "routine opportunities to find teachable moments" which enabled them to minimise the amount of time spent in multi-tasking and task rotation. Educators experienced "less disruptions", could "be more present" and could "focus on relationships and learning" when planning experiences and project development were done collaboratively with children. These findings add benefits to educators, to the reported benefits of curricular decision making with children (Davis and Dunn 2018). Participants also discussed how intentional planning scheduled at the end of the day resulted in successful "follow through activities for the children". Kilderry (2004) suggested that activities such as these, where educators are able to reflect, engage and negotiate complexities in their pedagogical practices enabled educators to more effectively navigate the complexities of the work environment.

Discussion

Our findings illustrate a number of aspects of complexity in relation to educators' practice. Firstly, relationships between aspects of complexity, as defined earlier in this paper. As with Lash et al.'s (2008) findings that educators' practice involves a high mental load and complex decision-making, participants' accounts in the current study demonstrated an entanglement of aspects of complexity that is difficult to fully represent (as also suggested by Murray 2014, cited in Malm 2020). Participants' experiences and perceptions of multi-tasking and task rotation therefore add new insights to existing literature on these concepts in educators' work, as well as to literature relating to the complexity of educators' practice.

The findings also illustrate the complexity of educators' work environments, and the ways these can be adapted to better enable effective multi-tasking and task rotation. Participants described both routine and flexible approaches that demonstrated the value of adapting to the particular work and pedagogical environment, rather than attempting to adhere to perceived or universal notions of 'best practice'. Similarly, adaptive, flexible educator dispositions were said to make it easier to manage multi-tasking and task rotation during stressful times.

The implicit 'norms' of multi-tasking and task rotation uncovered in our findings echo Brante's (2009) assertion that beliefs about and attitudes towards these concepts play a role in job satisfaction. It seemed that when participants accepted multi-tasking and task rotation, they modulated their practice to the conditions of the moment and 'got on with it'. However, when the intensity or demands of multi-tasking and task rotation interfered with the participants' ability to adequately meet children's needs, or to focus on or be fully present with them, participants reported feeling stress (also noted in Kusma et al. 2011). A sense of stress could result from a clash of values – that is, when educators were prevented from meaningful interactions with children by other pressures to do something that they valued less. It could also be that the feelings of stress resulted from 'switch cost' due to the 'constant interruption' that they could not prepare for (as noted in Brante 2009 and Monsell et al, 2000), and/or, that the intensity of multi-tasking was simply exhausting (as per Courage et al. 2019).

Participants reported that having leaders who could manage and adapt work conditions in response to children's needs and the dynamics of multi-tasking and task rotation were essential to sustainable practice, and to sustaining educators in the sector. However, when work was routinely completed out of hours, and hypervigilance became entrenched (as was reported by participants), there was a risk of physical and emotional burnout, which is a known contributor to attrition from the sector (Grant et al. 2019).

Limitations

We acknowledge that the participants in this study were all from services externally rated as high quality, in which there would likely have been a focus on developing effective teams and workplaces. However, while the study is not representative of all educators, the 111 participants' accounts confirm that multi-tasking and task rotation are normalised aspects of ECE work, and demonstrate the challenges of these aspects of complexity experienced in high quality ECE services. We believe that their experiences and perceptions about the intensity of their work are likey to also be familiar to many other educators.

Conclusion

Our analysis of focus group data illustrates new facets of complexity in educators' practice by making visible participants' experiences and perceptions of multi-tasking and task rotation. These concepts are helpful – offering a means of capturing the complexity of educators' practice through their descriptions of moment-to-moment negotiations of children's needs, regulatory requirements and working effectively in a team with colleagues. Our analysis also illustrates the value of adapting work conditions and cultures to the particularities of each setting.

Further, as each service is unique, they are best served by work cultures that respond to the type of service, the children and families attending it, and the shared philosophy between the staff. As discussed earlier, meaningful practical supports for educators could include allocating additional resources to routines tasks of cleaning or employing additional staff, above the required adult-to-child ratio. We accept, however that these may not be a financially viable options for all services. It may therefore be beneficial (and viable) for teams to

consider and make visible to each other their philosophy, work cultures, whether these work well or not, and how teams might change aspects of culture and conditions given the resources available. Making visible beliefs and attitudes towards multi-tasking and task rotation within teams may also go some way to addressing noted causes of educators' stress (see above, Courage et al. 2019; Kusma et al. 2011).

The findings presented in this paper also have implications for pre-service and ongoing education about work cultures and what to expect of work in the early childhood sector. At the same time, our findings make clear the importance of developing and reflecting upon the benefits of changing attitudes and behaviours in support of a shared purpose or philosophy. Doing so may help to ensure that work cultures and leaders create and sustain strong teams that make multi-tasking and task rotation manageable in educators' work.

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