

Who's Counting?: Numeracy and Literacy and Literary Practices of Early Learning and Child Care

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Executive Summary

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Executive Summary

Competence in mathematics is necessary for individuals to successfully compete in an increasingly scientific and technological world. On international assessments, Canadian children perform better than American children, but nevertheless do not do as well as Asian and European children. Furthermore, because children's competency in mathematics before school entry is very predictive of their later performance, early experiences are critical in getting children off to a good start. Our goal in this study was to gather information about the early numeracy and literacy knowledge, practices, and beliefs of early learning and child care (ELCC) practitioners. This initiative was the first Canadian large scale attempt to gather information about ELCC early numeracy practices. A web survey of Canadian Child Care Federation members and recruiting at two major childcare conferences recruited 768 respondents. The majority of respondents were from Manitoba, Ontario and British Columbia. The respondents were well educated—12% reported university degrees, and almost 60% reported college diplomas. One third worked in administrative and instructor roles, another third worked directly with children in childcare centres and the final third worked directly with children in their home (18%), or in nursery schools, or other programs.

Perceived Knowledge of Numeracy and Literacy and Professional Development

We hypothesized that ELCC practitioners may have little knowledge of what constitutes 'early numeracy' or of how to deliver numeracy content using developmentally appropriate practices. Consistent with this prediction, respondents indicated that they felt significantly more knowledgeable about early literacy than about numeracy. They reported attending early numeracy professional development less frequently than other learning activities and were less aware of the availability of early numeracy learning opportunities in comparison to professional development concerning literacy, social skills, or health and safety.

Knowledge about Children's Capabilities. As hypothesized, ELCC practitioners varied in their knowledge of children's capabilities. Based on their responses about the ages at which children become capable of early numeracy and literacy activities (e.g., count to 10, read a few words), the respondents clustered in two groups: one group indicated that children were capable of these skills at a younger age (on average, about a year earlier) than the other group. This "Capable Younger" group gave responses that

were consistent with the developmental literature on when typical children master these skills. This group was also more likely to have worked with children for 10 or more years as compared to the “Capable Older” group. Thus, respondents varied in how knowledgeable they were about children’s capabilities, and their knowledge was related to their experience in working with children.

Practices. Respondents reported how frequently they participated in a set of literacy, numeracy and social-emotional activities: 428 respondents worked with preschoolers (i.e., children aged 3 and 4 years) and 156 respondents worked with toddlers (i.e., aged 1 and 2 years). In general, across both age groups, ELCC practitioners reported pre-reading and quantity activities less frequently than language and counting activities, suggesting that although ELCC practitioners engage in many *basic* literacy and numeracy activities, they are doing fewer *advanced* activities within these domains.

Beliefs. We hypothesized that the ELCC respondents would believe that early numeracy practices are less important than similar early literacy skills, and less important than social and emotional skills. Indeed, the majority of respondents agreed or strongly agreed that social and emotional development is the primary goal of early childhood education. However, the majority of respondents *also* believed that it is their job to teach children about letters, and they believed that numeracy and literacy skills should be assessed regularly. Thus, we did not find that ELCC practitioners rejected a role for early literacy and numeracy experiences in the child-care setting; instead, they varied in whether these activities should be initiated by the children or by adults (as described below).

A cluster analysis of the beliefs revealed that respondents varied in the extent to which they believed that children (vs. adults) should initiate early numeracy and literacy activities. We identified three groups along this dimension, which we labeled *Moderate* (40% of the sample), *Child-Initiated* (39%) and *Adult-Guided* (21%). The defining beliefs for these clusters and associated knowledge, confidence and practices are outlined in the table below. The Moderate and Child-Initiated groups tended to underestimate children’s capabilities. They were more likely than the Adult-Guided group to report being avoidant of mathematics and they reported that children are not capable of early arithmetic until age 5. Accordingly, they were less likely to report frequent use of numeracy activities beyond basic counting, presumably because they believe such activities would not be developmentally appropriate for the children in their care. This perspective was clearly captured in a survey respondent’s comment about numeracy practices: “If it is not DAP (developmentally appropriate practices), I won't do it. It's the parents and politics that are curriculum oriented.”

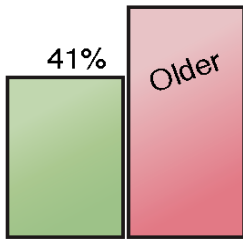
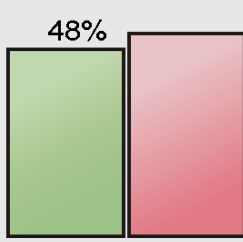
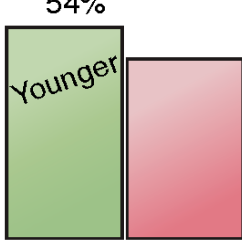
Recommendations

The results of this survey suggest some first steps for improving and supporting early numeracy education for ELCC practitioners. Given that children learn best in a developmentally appropriate environment, providing information about the early capabilities of children may convince ELCC practitioners that early mathematics is developmentally appropriate. Accordingly, the survey results are being used in partnership with CCCF and CLLRNet to develop an evidence-based Resource Sheet that outlines children's early numeracy capabilities.

In addition to providing training on children's capabilities, ELCC practitioners need information about fun and effective early numeracy activities that will increase children's participation, encourage children to initiate these activities, and minimize opting out. Child Initiation is a key belief of over one-third of the respondents. These practitioners indicated that they no longer use worksheets or flashcards, because they do not see these materials as developmentally appropriate. However, they do not appear to know of activities that will help children to experience age-appropriate numeracy activities beyond the counting games that they already perform on a daily basis. Many respondents suggested that they want to learn about other early numeracy activities, and even that the activities assessed in the survey had given them ideas about what they could do. Because the less-experienced practitioners are least knowledgeable about appropriate early numeracy activities, materials directed at college-level preservice programs would have the most impact. However, a greater availability of professional development activities targeting practitioners' knowledge and practices, possibly in combination with further early literacy activities, would also address the gaps identified by survey respondents.

Summary

In summary, this extensive survey of Canadian early learning and childcare practitioners highlights two key opportunities to improve the state of early numeracy education in Canada. ELCC practitioners are aware that they lack knowledge about early numeracy, and that they have few opportunities to address that need. Thus, targeting preservice and in-service training about children's capabilities will open the door to heightened awareness and attention towards children's numeracy development. The second opportunity lies with the group of practitioners eager to acquire more knowledge about developmentally appropriate activities covering the range of early numeracy – from arithmetic to measurement. Resources to address both of these opportunities are in development in partnership with the Canadian Child Care Federation and the Canadian Language and Literacy Research Network.

Early Learning Survey Summary: Characteristics of clusters of survey participants by beliefs, knowledge and practices.			
	Child-Initiated Cluster	Moderate Cluster	Adult-Guided Cluster
Size of Cluster	n = 305	n = 297	n = 164
Shared Belief	Social & Emotional growth is the primary goal.		
Defining Beliefs	All activities should be child-initiated.	All activities should not be child-initiated.	All activities should not be child-initiated.
	Children should be allowed to opt out of numeracy & literacy activities	Children should not be allowed to opt out.	Children should not be allowed to opt out.
	Preparation for school is not the most important goal.	Preparation for school is not the most important goal.	Preparation for school is the most important goal.
Knowledge of children's early numeracy capabilities	 <p>41% Older</p>	 <p>48% Younger</p>	 <p>54% Younger</p>
	Tend to think kids are not capable until older		Tend to think kids are capable at younger ages
Knowledge of Early Numeracy	Most feel knowledgeable, but many do not	Most feel knowledgeable, but some do not	Almost all feel they are sufficiently knowledgeable
Math Confidence	Tend to avoid math	Tend to avoid math	Confident about their math skills
Importance ratings for Simple Arithmetic	Not really important before Grade 1	Not really important before Grade 1	Important before Grade 1, but not as important as reading
Early numeracy activities with children	Play some counting games	Play some counting games	Frequent counting games and some quantities & early arithmetic
Recommendations	Target resources on children's capabilities first	Provide resources on children's capabilities and activities	Provide resources on full range of early numeracy