Alberta's Children in Their Early Years of Development:

An Analysis of the Early Development Instrument (EDI), 2010*

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ECMap
Early Child Development
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***This report is based on the Updated Normative II cut-offs.**

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Contents

Acronyms

AE	Alberta Education
CDC	Community Development Coordinators
CUP	Community-University Partnership
DA	Developing Appropriately
E/FSL	English/French as a Second Language
ECD	Early Child Development
ECMap	Early Child Development Mapping Project (ECMap)
ED	Experiencing Difficulty
EDI	Early Development Instrument
EGD	Experiencing Great Difficulty
OCCS	Offord Centre for Child Studies
SN	Special Needs

Executive Summary

This report provides the results from the analysis of Wave 2 (2009/10) Early Development Instrument (EDI) data of teachers' assessment of kindergarten children in Alberta. It gives a snapshot of 16,176 preschoolers in terms of their development in five areas–physical health and wellbeing, social competence, emotional maturity, language and thinking skills, and communication and general knowledge–in a systematic manner at an aggregate level.[1] The intent was to develop similar reports and reports on specific areas (e.g., special needs) as the EDI data become available through different waves. The report is an attempt to analyze all or most of the variables, which will hopefully be a useful starting point in developing community reports and a guiding post to those engaged in EDI research across the province.The insights obtained from the data and information collected in various waves can help policymakers, planners, and practitioners in coordinating and targeting services and programs to those children who are in need of assistance and consequently support all to lead a happier and healthier life, and to have more rewarding experiences throughout their life.

The second wave of the EDI data in Alberta showed interesting findings:

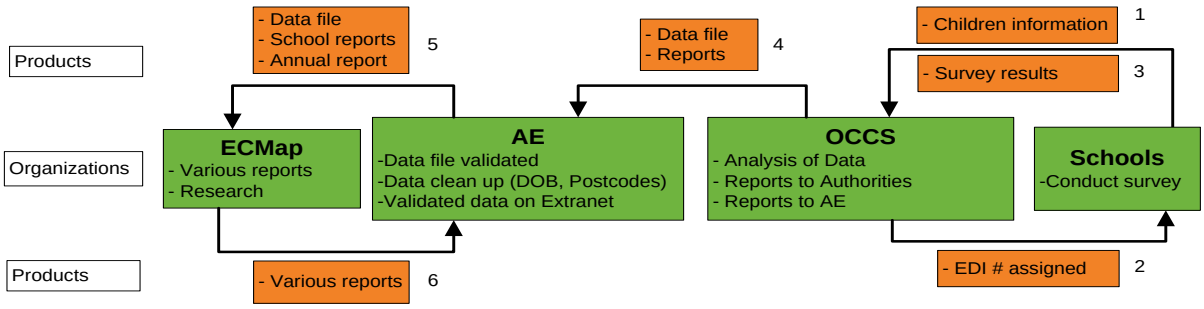
- One-fifth of the children had their first language reported as non-English, with Punjabi being the most spoken language.
- More than two percents of children (2.67%) repeated kindergarten, with half being over 6 years of age.
- Among those reported having one special problem, 60% had problems with speech. Of these, 15.6% had language delay and 14% were E/FSL.
- Approximately 45% of all children were reported to have attended a pre-school or nursery program.
- More than one-fourth of all the children were in non-parental care prior to kindergarten entry, with the majority attending centre-based care arrangement.
- Proportionately fewer children, compared to their Canadian counterparts, fell below the 10th percentile in social competence (8.96%), emotional maturity (9.29%), and language and thinking skills (7.99%).

[1] The term domain has been replaced by area of development or developmental area since the last report using the 2009 data, and the category, *Language and cognitive development* has been changed to *Language and thinking skills* in order to reflect the very nature of the items that constitute the area, namely reading and writing abilities.

Introduction

Information Acquisition and Transfer

Since 2009, Alberta Education (AE) has set out to collect information on kindergarten children's development using a psychometric tool called the Early Development Instrument (EDI) (Janus & Offord, 2007). The EDI was developed by the McMaster University's Offord Centre for Child Studies (OCCS) in Hamilton, Ontario. In Alberta, the information has been collected in four waves, starting in 2009 and ending in 2014. Contracted by AE, Early Child Development Mapping (ECMap) project has been mandated to analyze the EDI. Led by the Community-University Partnership (CUP) for the Study of Children, Youth and Families at the University of Alberta, ECMap collaborates with the AE, OCCS, and various school authorities in the province, in building the foundation for this report. Figure 1 below illustrates the processes of information acquisition and transfer of data for this report.



1. School authorities send child information (name, address, teacher name, school name etc.) to Offord Center after Sep 30 final count.
2. Offord Center assigns ID numbers for children, teachers, and schools and sent this information back to schools; teachers in each school conduct surveys.
3. Schools send questionnaires to Offord Center (electronic or paper versions). Offord Center analyzes data and writes school authority reports. These are sent to school authorities and Alberta Education.
4. Offord Center sends Data file and reports to Alberta Education. AE validates the data and conducts data cleanup, and puts the data on Extranet.
5. Alberta Education sends cohort reports and school authority reports to ECMap. ECMap does further cleaning and recoding of variables, if necessary.
6. ECMap prepares technical reports and summaries.

Figure 1: The Processes of Information Acquisition and Transfer

A Provincial Report

The purpose of this report is to provide a snapshot of developmental aspects of kindergarteners in Alberta, using the EDI 2010 data. This report differs from the 2009 report, not only in the layout but also on two major aspects. First, the report does not include an analysis of the

Multiple Challenge Index (MCI). Second, the report presents only a brief description of the sub-areas within each developmental area. The information is intended for internal purposes (e.g., ECMap team and Community Development Coordinators (CDCs)) and those in the research community. Specifically, the objectives are:

- To analyze the EDI data in all its main aspects by attempting to portray developmental outcomes of Alberta's kindergarten children using national benchmarks;
- To show differentials, if any, in different areas of development (e.g., social competence) between children of different socio-demographic backgrounds; and
- To compare and contrast between Canadian and Albertan children in terms of their developmental difficulties by dividing children into three groups based on Canadian benchmarks.

Chapter 1: Methodology

1.1 The EDI

The EDI was developed at the OCCS at McMaster University for assessing children's level of development in their pre-school years. The instrument is a teacher checklist completed for all children in kindergarten classes. The EDI neither provides any diagnostic information on individual children nor does it measure a school's performance. It is intended to identify areas of strengths and weaknesses in children's development at a macro-level, enabling communities to mobilize their resources to support children's development in their first five years of life.

The EDI comprises 103 items or questions on the development of kindergarten children that includes five broad areas of development. [2] The five areas are broken down into 16 sub-areas as in Table 1.1. In the EDI questionnaire, the five developmental areas are organized into three sections as: Section A: Physical Wellbeing (13 questions); Section B: Language and Cognitive Skills (40 questions); and Section C: Social and Emotional Development (58 questions).[3] Each of the five areas is rated on a scale of 0 to 10, with a high score indicating a more advanced standing in a particular area. The EDI questionnaire also contains a variety of background characteristics: age, sex, English/French as a second language (E/FSL) status, and repeat kindergarten or not.

1.2 A New Approach to School Readiness and Vulnerability

The school readiness is one of the most frequently used terms in discussions of EDI, generally referring to a preschooler's ability to meet the tasks and to assimilate both socially and academically at the time of entry into the formal school system. The concept has attracted enormous interest, both in policy and academic circles, contributing to discussion on an expansion of definition that emphasizes the importance of the school in getting the child ready

[2] The five areas are widely known as domains in the literature. For our purpose here, we refer to them as 'developmental areas' or simply 'areas'. The argument is that if a construct, such as social competence if considered as a domain, it assumes defined boundaries or perimeters with areas or divisions within it. Our discussions here are limited to the five main constructs, and not the sub-areas that they are made up of, and thus we believe the term 'area' is better suited than the term 'domain'.

[3] As stated earlier in footnote #1, *Language and cognitive development* has been renamed by ECMap to *language and thinking skills* in order to better reflect the very nature of the items that constitute the area, namely reading and writing abilities.

Table 1.1: Early Development Instrument (EDI) Areas and Subareas as Outlined by the Offord Centre

Developmental Area	Subarea	Example of items within
Physical health and well-being (13)	Physical readiness for school work	Over- or underdressed for school-related activities
	Physical independence	Is independent in washroom habits most of the time
	Gross and fine motor skills	Proficiency at holding a pen, crayons, or a brush
Social competence (26)	Overall social competence	Overall social/emotional development
	Respect and responsibility	Follows rules and instructions
	Independence and adjustment	Listens attentively
	Readiness to explore new things	Is curious about the world
Emotional maturity (30)	Prosocial and helping behaviour	Will try to help someone who has been hurt
	Anxious and fearful behaviour	Is upset when left by parent/guardian
	Aggressive behaviour	Gets into physical fights
	Hyperactive and inattentive behaviour	Can't sit still, is restless
Language and thinking skills (26)	Basic literacy	Knows how to handle a book (e.g., turn a page)
	Interest and memory	Is generally interested in books (pictures and print)
	Complex literacy skills	Is able to read simple words
	Basic literacy and numeracy	Is able to use one-to-one correspondence
Communication skills and general knowledge (8)	Communication skills	Ability to listen in English

for school (Belsky & Mackinnon, 1994). The complexity of this and related concepts, such as vulnerability contributed to a new categorization by ECMap based on the basic message they convey.

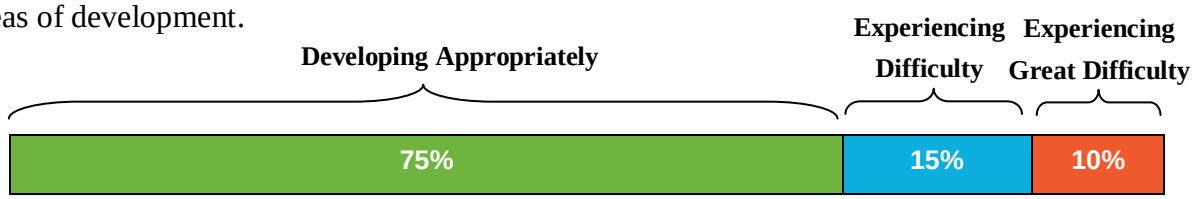
The national average for each domain (Updated Norm II), which is often provided as a benchmark, was used to compare the performance of children in a community for which significant data are available.[4] The percentile scores in each of the five EDI areas were first

[4] Since 1999, the EDI data have been collected for over 550,000 kindergarten children in Canada and beyond, and these data form the basis for creating a national norm. More specifically, the Updated Normative II cut-offs were based on N=174,799. Previously, it was referred to as: Normative II based on 176,201 senior kindergarten children between 3.67 and 7.47 years old, missing one or fewer domains and those identified as having no 'special needs' status (Janus & Duku, 2008). Refer to www.offordcentre.com/readiness for more information on the last normative sample.

estimated and the following terms were used to describe how the distribution of children into percentiles can be translated into categories.

- *Developing appropriately* – the top 75th percentile (shaded green)
- *Experiencing difficulty* – between the 25th and the 10th percentile (shaded amber)
- *Experiencing great difficulty* – the bottom 10th percentile (shaded red)

A child in the third category is, on average, more likely to be limited in his or her development than a child who scores above the 10th percentile cut-off.[5] Percentages of children *experiencing great difficulty* were determined in each area of development in one or more, or two or more areas of development.



1.3 Statistical Analysis

The EDI data at the individual level were aggregated at the provincial level and were analyzed using various descriptive statistics such as frequency, percentage, range, mean (i.e., average). For the purposes of this report, only those children who met the following criteria were included in the analyses:

- Parental consent was provided;
- Children were in class more than one month;
- Children had no diagnosed special needs;
- Data on the five developmental areas were permitted to be missing in none or no more than one area; and
- Children were between 4 and 7 years old.

Parental consent: unlike in 2009, information on parental consent was recorded in 2010. Out of 21,976 EDI questionnaires, 18,263 (83.1%) had parental consent.

[5] Those children falling into this category are often referred to as vulnerable children in the literature.

Children with no diagnosed special needs: Question #7 on the first page of the questionnaire allows us to know whether or not a child has exceptional or special needs[6]. By special needs, we mean all those children who were ***identified already*** as needing special assistance due to chronic medical, physical, or mental disabling conditions (e.g., autism, foetal alcohol syndrome, down syndrome). Severe delay involving language and mild/moderate disability/delay do not belong to this group. Further, if the teacher suspects that the child may be suffering from a disabling condition, or the condition is not severe enough for the child to be classified as "special needs", he or she falls under the "special problem" category.

Not missing more than one EDI developmental area: The three sections of the questionnaire, A, B, and C, included all the items/questions useful in assessing children's developmental levels. Thus, the third criterion that was used to screen valid questionnaires was based on the five areas. Specifically, the criterion refers to none or only one area missing when scores are calculated. An area is considered missing if more than 25% of questions are left blank or has "I don't know" responses. For example, if an area has 30 questions, in order for it to be considered "not missing", it should have at least 8 (30*.25=7.5) questions with scores on them.

Age group 4 - 7 years old: Children with less than 4 years and those older than 7 years were excluded. This is based on ECMap's finding that children's age with high extreme values are present in both 2009 and 2010 datasets and keeping them in the analyses could potentially bias the results. When all communities come on board, a community analysis of the province (community as the unit of analysis) can bias the EDI scores, especially when age is used as a control variable. Foreseeing this, it makes good sense to remove the outliers for age beforehand. On the other hand, if we include them, provincial scores cannot be impacted much as long as the analysis is restricted to individual variables and only their descriptive statistics. To put simply, if any relationship of a variable with age is attempted with the inclusion of extreme outliers, it may introduce bias.

[6] In Alberta, all those children with severe disabilities (cognitive, code 41; emotional/behavioral, code 42; multiple disability, code 43; physical or medical disability, code 44; deafness, code 45; blindness, code 46) belong to a group of exceptional/special needs children. Those with *severe delay involving language* and *mild/moderate disability/ delay* are not included in special needs, and therefore they were automatically gone into the analysis.

An algorithm for arriving at the valid cases (for analysis and reporting purposes) is presented below (Figure 1.1). This enables us to understand why only 16,176 (16,140+36) cases were available for reporting purposes although there were 21,976 questionnaires.

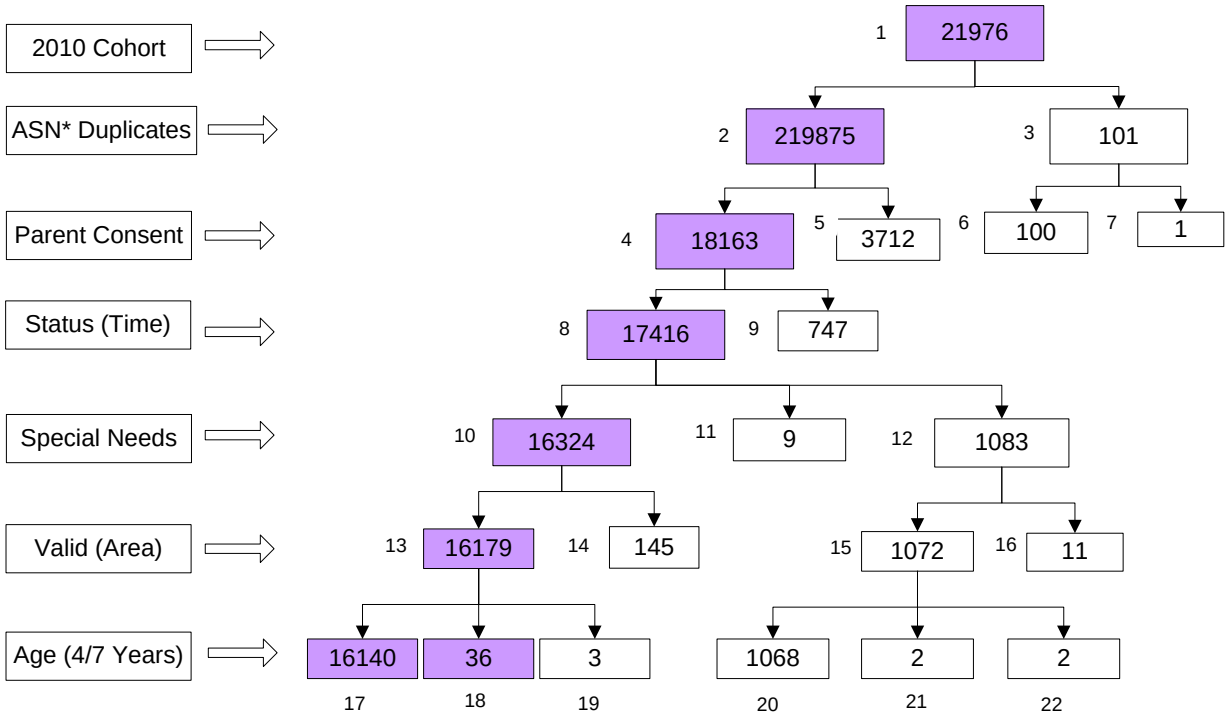


Figure 1.1: The Processes Involved in Arriving at Analyzed Number of Cases (see notes below)

Notes: The numbers below correspond to questionnaires:

1. Total received and scanned in 2010.
2. Total after removing ASN with problems (duplicates or triplicates).
3. Total considered as duplicates when ASN, DOB, GENDER and STATUS are looked at (101 children were removed from the analysis in the dataset).
4. Without ASN problems and with parental consent.
5. Without ASN problems and without parental consent.
6. With ASN problems and with parental consent.
7. With ASN problems and without parental consent.
8. Without ASN problems, with parental consent and children in class more than one month.
9. Without ASN problems, with parental consent, and children not in class more than one month, including "in class less than 1 month", "moved out of class", "moved out of school", "no consent" and "other".
10. Without ASN problems, with parental consent, children in class more than one month, and without special needs.
11. Without ASN problems, with parental consent, children in class more than one month, but with missing special needs.
12. Without ASN problems, with parental consent, children in class more than one month, and with special needs.
13. Without ASN problems, with parental consent, children in class more than one month, without special needs and not missing more than one area.

14. Without ASN problems, with parental consent, children in class more than one month, without special needs and missing more than one area.
15. Without ASN problems, with parental consent, children in class more than one month, with special needs and not missing more than one area.
16. Without ASN problems, with parental consent, children in class more than one month, with special needs and missing more than one area.
17. Without ASN problems, with parental consent, children in class more than one month, without special needs, not missing more than one area, and for children age from 4 to 7.
18. Without ASN problems, with parental consent, children in class more than one month, without special needs, not missing more than one area, and for children with age missing.
19. Without ASN problems, with parental consent, children in class more than one month, without special needs, not missing more than one area, and for children with age younger than 4 or older than 7.
20. Without ASN problems, with parental consent, children in class more than one month, with special needs, not missing more than one area, and for children age from 4 to 7.
21. Without ASN problems, with parental consent, children in class more than one month, with special needs, not missing more than one area, and for children with age missing.
22. Without ASN problems, with parental consent, children in class more than one month, with special needs, not missing more than one area, and for children with age younger than 4 or older than 7.

* Referred to as 'local_id'by the Offord Centre

Chapter 2: Understanding the Spatial Distribution of EDI Data

At a Glance

- **Thirty-eight school districts in Alberta participated in the 2009/10 (Wave 2) survey.**
- **Wave 2 data had 16,176 valid cases (children in class more than one month, without special needs, not missing more than one EDI area and age from 4 to 7).**
- **48.75% of the children were from Calgary (Calgary Board of Education/Calgary Catholic/Calgary French International/Calgary Islamic schools).**

This chapter provides information on who took part in Wave 2 data collection and what criteria were applied to arrive at the participation rate.

2.1 Participation in the EDI in Alberta

In 2009/10, the following 38 school authorities in Alberta participated in the EDI data collection:

Table 2.1: School Authorities, Alberta 2010

#	School Authorities	#	School Authorities
1	Almadina Language Charter Society	20	Khalsa School
2	Black Gold	21	Livingstone Range
3	Calgary Board of Education	22	Medicine Hat Catholic
4	Calgary Catholic	23	Medicine Hat Public
5	Calgary French International	24	New Horizon Charter
6	Calgary Islamic	25	Northern Gateway
7	Chinooks Edge	26	Northern Lights
8	Conseil scolaire catholique Francophone du Sud de l'Alberta	27	Paliser
9	Conseil Scolaire Centre-Est	28	Peace River & Nampa
10	Conseil scolaire du Centre-Nord	29	Peace Wapiti
11	Conseil Scolaire du Nord-Ouest	30	Prairie Land Regional
12	Elk Island Catholic	31	Providence
13	Elk Island Public	32	Renfrew
14	Fort McMurray Catholic	33	Rockey View
15	Fort McMurray Public	34	Sherwood Park
16	Golden Hills	35	St. Albert Protestant
17	Grand Prairie	36	West Mount
18	Holy Spirit	37	Wetaskiwin & Windfield
19	Horizon	38	Wild Rose

Wave 2 (2009/10) covered only a small proportion of children in their kindergarten years in the province (See, Figure 2.1). The city of Lloydminister has the EDI data collected, but is not included in this report. The results are presented in a Community Information Package (CIP). This means, meaningful generalizations of results can be somewhat problematic because it excludes 430 valid EDIs, collected in 2010.

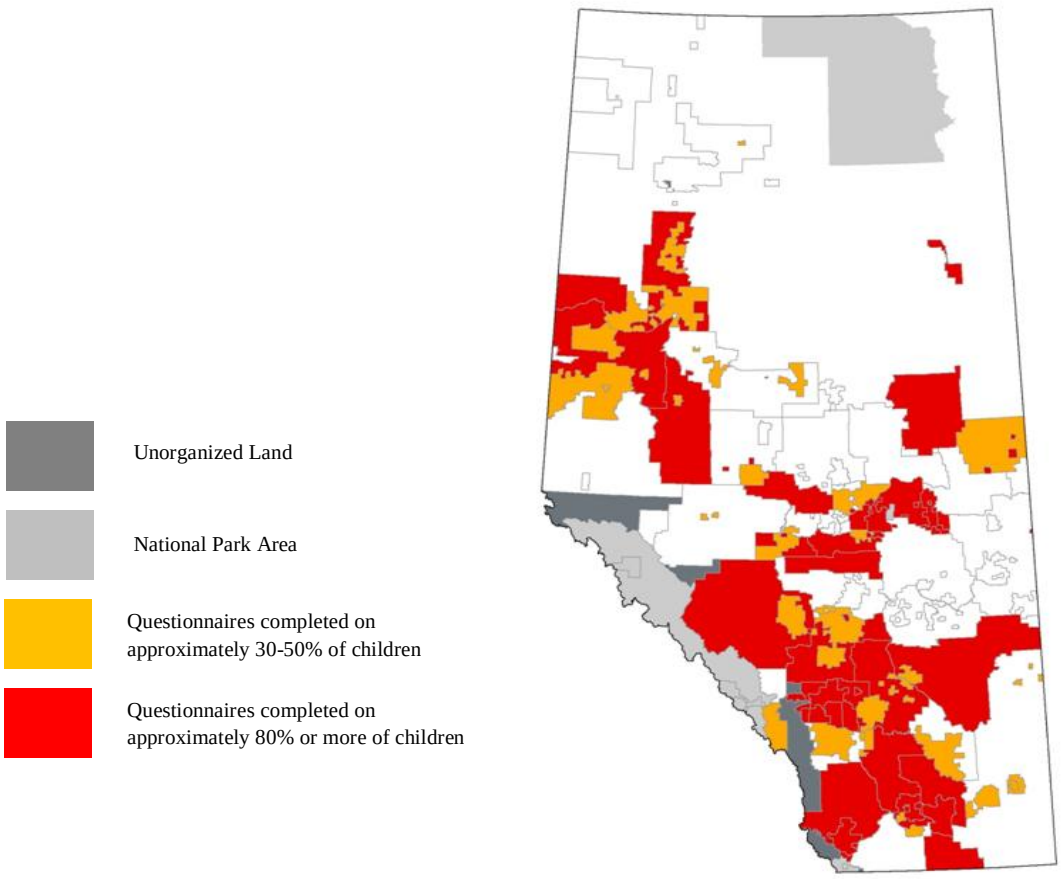


Figure 2.1: Percentages of Children with Completed EDI Questionnaires

The number of children surveyed by school authority is presented in Table 2.2. As Table 2.2 indicate, out of the 21,976 EDI received, 10,714 (48.75%) were from Calgary, including Calgary Board of Education, Calgary Catholic, Calgary French International and Calgary Islamic schools. As well, Elk Island Public and Rockey View had comparatively larger provincial percent (5.54% and 6.71%). Readers are cautioned that the results of the analysis of 16,176 children are not representative of all kindergarten children in the province as they come from the 38 participating school authorities, with about half from the city of Calgary.

Table 2.2: EDI Participation by School Authority, Alberta 2010

School Authority	EDIs Received	Valid EDI	Participation Rate	Provincial Percent
Almadina Language Charter Society	82	80	97.56%	0.49%
Black Gold	659	458	69.50%	2.83%
Calgary Board of Education	7326	4917	67.12%	30.40%
Calgary Catholic	3232	2332	72.15%	14.42%
Calgary French International	74	66	89.19%	0.41%
Calgary Islamic	82	76	92.68%	0.47%
Chinooks Edge	724	546	75.41%	3.38%
Conseil scolaire catholique Francophone du Sud de l'Alberta	93	78	83.87%	0.48%
Conseil Scolaire Centre-Est	56	51	91.07%	0.32%
Conseil scolaire du Centre-Nord	235	183	77.87%	1.13%
Conseil Scolaire du Nord-Ouest	31	26	83.87%	0.16%
Elk Island Catholic	435	368	84.60%	2.27%
Elk Island Public	1097	896	81.68%	5.54%
Fort McMurray Catholic	363	329	90.63%	2.03%
Fort McMurray Public	360	311	86.39%	1.92%
Golden Hills	438	310	70.78%	1.92%
Grand Prairie	520	367	70.58%	2.27%
Holy Spirit	316	254	80.38%	1.57%
Horizon	258	226	87.60%	1.40%
Khalsa School	17	15	88.24%	0.09%
Livingstone Range	216	170	78.70%	1.05%
Medicine Hat Catholic	209	160	76.56%	0.99%
Medicine Hat Public	500	403	80.60%	2.49%
New Horizon Charter	21	21	100.00%	0.13%
Northern Gateway	340	234	68.82%	1.45%
Northern Lights	445	310	69.66%	1.92%
Paliser	393	311	79.13%	1.92%
Peace River & Nampa	246	216	87.80%	1.34%
Peace Wapiti	416	288	69.23%	1.78%
Prairie Land Regional	84	53	63.10%	0.33%
Providence	82	13	15.85%	0.08%
Renfrew	185	50	27.03%	0.31%
Rockey View	1223	1086	88.80%	6.71%
Sherwood Park	25	23	92.00%	0.14%
St. Albert Protestant	440	364	82.73%	2.25%
West Mount	60	56	93.33%	0.35%
Wetaskiwin & Windfield	273	201	73.63%	1.24%
Wild Rose	420	328	78.10%	2.03%
Total	**21,976**	**16,176**	**73.62%**	**100.00%**

Chapter 3: Socio-demographic Characteristics of Children

At a Glance

- 87.96% of the children were between 5 years 2 months and 6 years 1 month old.
- Boys outnumbered girls by a small margin (50.2% vs. 49.8%).
- 19.11% of the children had their first language reported as non-English, with Punjabi being the most common language outside of English.
- 10.30% of children in Anglophone schools/classes were in French immersion.
- 2.67% of children repeated kindergarten, most of whom (75.46%) were over 5 years 11 months.
- 2.92% of children were of Aboriginal ancestry.

This chapter takes a closer look at the information provided on page 1 of the questionnaire, mainly in terms of the characteristics of the child population being surveyed.

3.1 Demographic Characteristics

Age: In Alberta, the starting age for children entering Kindergarten varies and is at the discretion of the individual school authorities – public, separate, independent, Francophone, etc. Provincial funding is available for virtually all school authorities who operate Kindergartens and begins in the year prior to Grade 1 entry. Grade 1 entry age also varies as long as children are entering Grade 1 by the time they are six years of age. Thus, the starting age for funding Kindergarten enrolees is anywhere between 4 years 6 months and one day short of 6 years.

Age was the most problematic variable in the data set; many were either too young or too old to be included in the study. Corrections done by Alberta Education helped to increase the number of cases available for analyses to a greater extent, meanwhile, those extreme values either younger than 4 years old or older than 7 years old were excluded from the analysis, assuming that the inclusion of these values could potentially bias the results.

Age of children at the time of teacher assessment (Feb, 2010 – Mar, 2010) was divided into 3-month intervals. The categories are expressed as year-months of age: for example, 5-11 means

age 5 years and 11 months. A large majority of children (87.96%) were between 5 years and 2 months and 6 years and 1 month (Table 3.1). There were 8 children below age 4-10 and 154 children above age 6-5. Because they were few in number, the two age-groups were not treated separately, but were included in the lower and upper age groups for the summary of the dataset. In future analyses, all children less than 4 and older than 7 years will be excluded or treated as missing, based on the fact that it is very unlikely that children as young as 4 and as old as 7 attend kindergarten schools.

Table 3.1: Age Distribution of Children, Alberta 2010

	Frequency	Percent
5-1 and below	730	4.51%
5-2 to 5-4	2,848	17.61%
5-5 to 5-7	3,957	24.46%
5-8 to 5-10	4,204	25.99%
5-11 to 6-1	3,219	19.90%
6-2 and older	1,218	7.53%
Total	16,176	100.00%

NOTE: Months were rounded down for ages less than 15 days, and up for more than 15 days. Therefore, children aged less than 6 years 1.5 months belong to the 5-11 to 6-1 category, and children aged from 5 years 1.5 months to 5 years 4.5 months belong to the 5-2 to 5-4 category.

Sex: Boys outnumbered girls only by a small margin, constituting 50.22% (N=8,123) and 49.78% (N=8, 052), respectively of the valid cases. Females outnumbered males in age 5-7 and below (Figure 3.1).

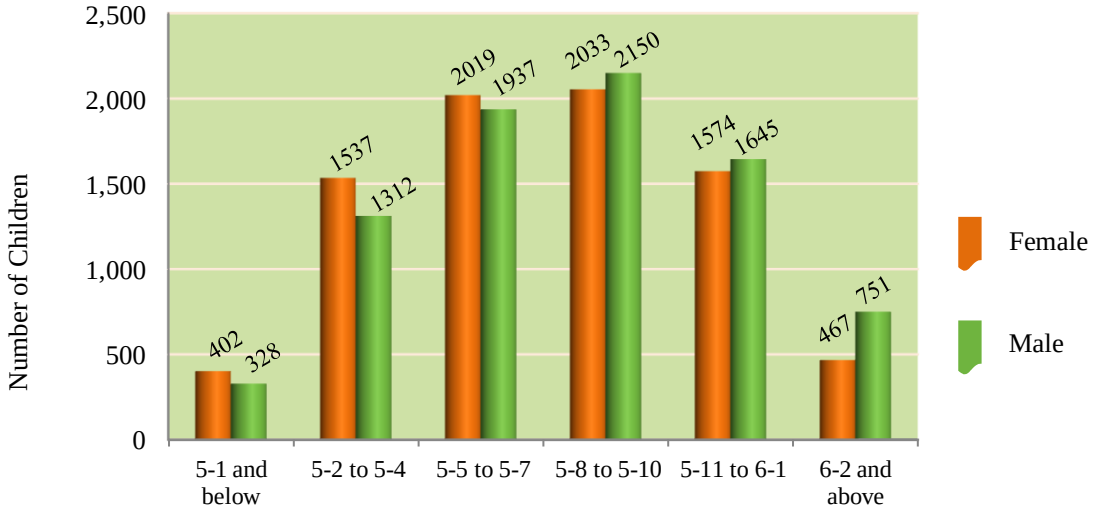


Figure 3.1: Sex Distribution by Age

3.2 Social Characteristics

Child's First Language(s): The Offord's definition of a child's first language refers to the language a child learned first in her/his development, and still can understand (and/or speak). Out of a total of 16,176 children, 13,085 children (80.89%) had English and 211 (1.3%) had French as their first language. A total of 2,880 (17.81%) children had their first language reported as non-English/French (Table 3.2). Punjabi, Arabic, Urdu, and Cantonese were the most common languages reported as child's first language, other than English or French.

Table 3.2 Child's First Language, Alberta 2010

Language	Number	Percentage	Language Code
English	13,085	80.89%	140
Punjabi	313	1.93%	460
Urdu	231	1.43%	650
French	211	1.30%	170
Arabic	202	1.25%	30
Spanish	195	1.21%	540
German	164	1.01%	190
Mandarin	159	0.98%	400
Cantonese	153	0.95%	100
Filipino/Tagalog	149	0.92%	570
Vietnamese	108	0.67%	660
Others	756	4.67%	
Missing	450	2.78%	
Total	**16,176**	**100.00%**	

English/French as Second Language (E/FSL) Status: If English or French is not the first language, it is considered as a Second Language (E/FSL). A total of 2,371 children (14.65%) were considered as ESL, and 158 children (0.98%) were considered as FSL, with a large majority (84.36%) falling into the non-ESL/FSL category (Table 3.3).

Table 3.3: English/French as a Second Language (E/FSL), Alberta 2010

	Number	Percent
Non E/FSL	13,646	84.36%
ESL	2,371	14.65%
FSL	158	0.98%
Total	**16,176***	**100.00%**

*Includes 1 missing case.

French Immersion: The information on French immersion is applicable to only those in Anglophone schools, and not in the Francophone classes/schools. Of the 16,176 children, 1,666 children (10.30%) were reported attending French immersion (Table 3.4).

Table 3.4: Children in French Immersion, Alberta 2010

	Number	Percent
Non-French Immersion	14,506	89.68%
French Immersion	1,666	10.30%
Total	**16,176***	**100.00%***

*Includes 4 missing cases.

Child Repeating Kindergarten: Out of the total number of valid questionnaires, there were 432 (2.67%) children who repeated kindergarten. Most of those who repeated were 5 years 11 months or older (326, 75.46%); only 29 children who repeated kindergarten were under 5 years 4 months (Table 3.6). This raises the question of whether or not to consider the repeaters separately, especially in more detailed analyses involving EDI scores. We will take up this issue again in our discussion of developmental areas, later in this report.

Table 3.6: Child Repeated Kindergarten or not by Age, 2010

	Not Repeated	Repeated	Total
4-2 to 5-1	723	7	730
5-2 to 5-4	2,826	22	2,848
5-5 to 5-7	3,918	38	3,956
5-8 to 5-10	4,165	39	4,204
5-11 to 6-1	3,101	118	3,219
6-2 to 6-4	914	149	1,063
6-5 and up	95	59	156*
Total	**15,742 (97.34%)**	**432 (2.67%)**	**16,176**

Aboriginal Status: Aboriginal status is based on families' "self report", and it is not based on any official records of ancestry. Ninety five percent (15,386) of children were of non-Aboriginal ancestry, whereas only 2.92% (472) of the children belonged to the Aboriginal ancestry (North America Indian, First Nations, Metis, or Inuit) as in Table 3.5.

Table 3.5: Child's Aboriginal Status, Alberta 2010

	Number	Percent
Non-Aboriginal	15,386	95.11%
Aboriginal	472	2.92%
Missing	318	1.96%
Total	**16,176**	**100.00%**

Chapter 4: Children with Special Problems but no Special Needs

At a Glance

- Speech impairment was the most often noted special problem (59.91%) among those reported to have only one type of special problems.
- Very few children with only one type of special problem were reported to have either hearing (0.46%) or visual (1.11%) problems.

We made reference to special needs, earlier in the report. Alberta differs from its other provincial counterparts in terms of special education coding criteria. From the flow chart (Figure 2.2) that was presented earlier, we found that there were 1,072 children in class more than one month with EDI scores reported for at least two areas but were identified as having special needs. These children were excluded from all our analyses, reported in this report. Although some children are not identified as having special needs, they still can have special problems. Our interest here is to identify those children. The question is: if special needs children are taken out, how many children have problems and what are they? Section D of the questionnaire refers to special problems (d1, d2a to d2k, & d3), basing answers on teachers' observation or medical diagnosis and/or parent/guardian information. The focus of this section is on variables derived from d2a to d2k. A schematic presentation of the variables considered is presented in Figure 4.1.

4.1 Special Problems Identified

Of 16,176 children, 2,157 children were identified as having special problems. Figure 4.2 shows some of the problem areas in terms of their percentage distributions. Of those 2,157 children, 1,085 (50.3%) had just one problem, 350 (16.2%) had two problems, 144 (6.7%) had three, 38 (1.8%) had four and 20 (0.9%) had five problems (not shown here). Among those who had only one special problem, the most common problem had to do with speech, 59.9% (650), followed by behaviour problem**,** 13.5% (146). The third most frequent problem was related to learning, 6.5% (71). The largest share to special problems of speech may be partially explained as: of those with speech problems, more than one-fourth (15.6%) had language delay and a large percentage (14%) were E/FSL. Often cited special problems, other than those that are presented in Figure 4.2 included: poor motor control, severe speech/language delay, severe attention

difficulties, occupational therapy, mother's absence due to divorce/death, diabetes, FAS, ADHD, autism, neurological problems, to name a few.

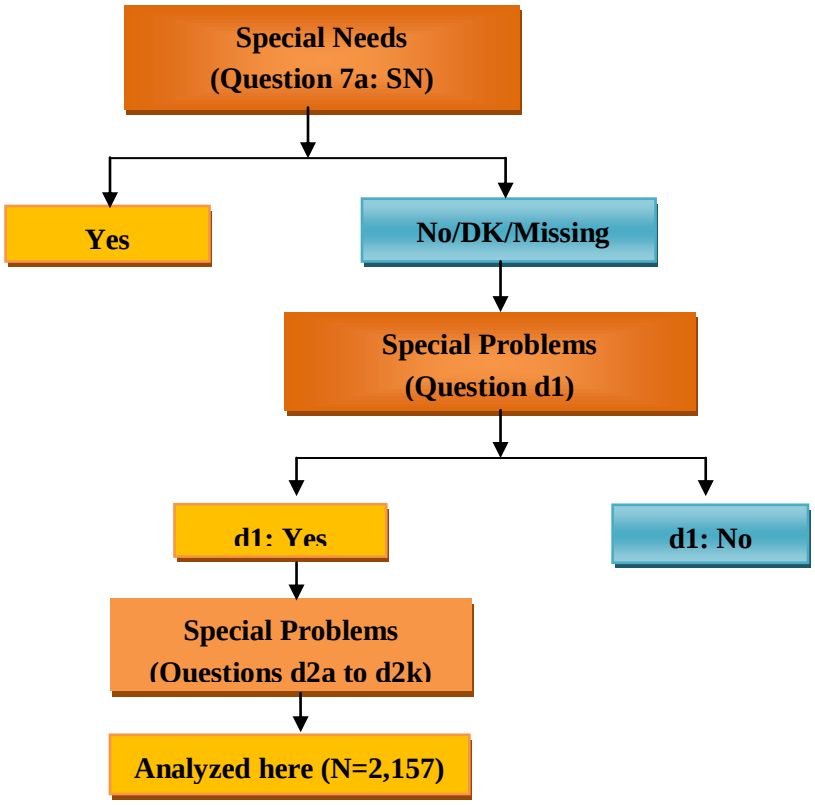


Figure 4.1: The Processes in Arriving at Special Problems

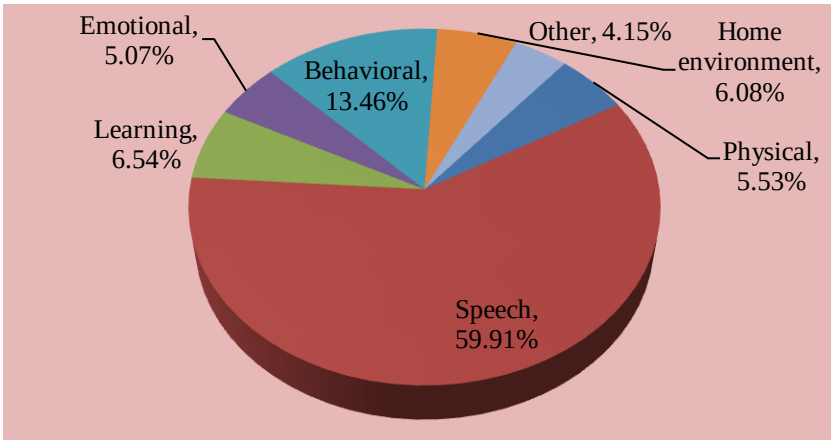


Figure 4.2: Percentage Distributions of Children with Special Problems
(Children with Special Needs are removed)

4.2 Special Problems and EDI Scores

Children who reported to have multiple problems scored significantly lower on all areas, compared to their counterparts with none or just one special problem (Figure 4.3). One-way Analysis of Variance (ANOVA) showed statistically significant differences between the mean scores ($p = 0.000$). The differences are worth noting, especially for the communication and general knowledge area. Although the inclusion of children with special problems in analyses could raise some issues, this finding assures our confidence in treating special needs and non-special needs children separately in all analyses involving developmental areas.

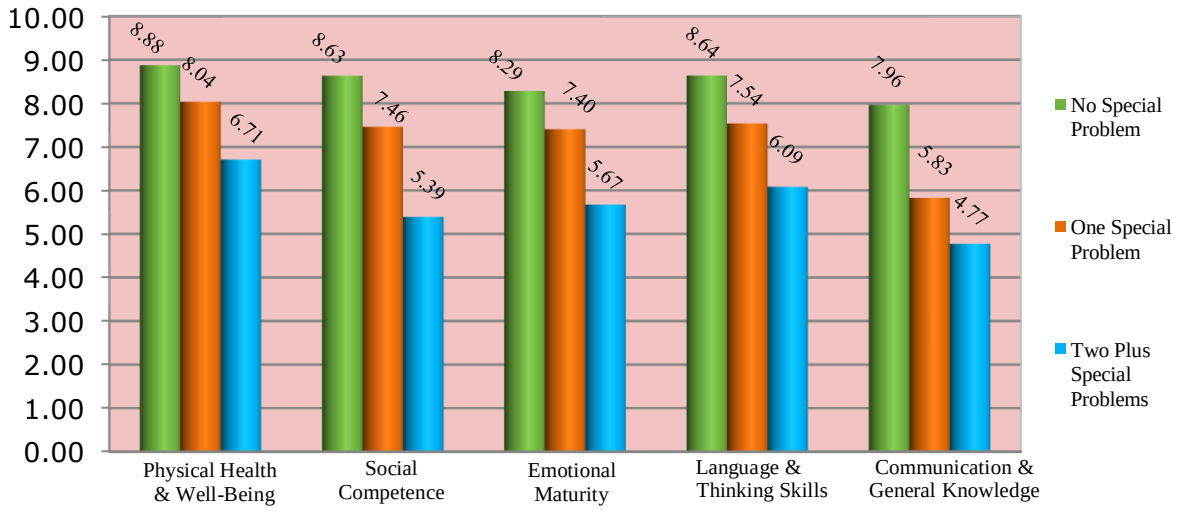


Figure 4.3: Children without Special Problems vs. Children with Special Problems by Areas

Chapter 5: Specific Programs Attended by Children

At a Glance

- Almost 10% of the children were reported to have attended an early intervention program, and 7% attended language or religion classes.
- One fourth of all children (28%) were reported to have attended pre-school or nursery programs.

This chapter is devoted to Section E of the questionnaire that includes additional information on a child's background, specifically to questions 1, 3, and 4. Results based on Question #2 will be presented in the next chapter. Early intervention program includes speech/language therapy, parents' attendance of a parenting program, a Head Start program, a school-based program funded by Mild/Moderate or Program Unit funding, or if child has had similar in-home services. Out of 16,176 children, 1,561 (9.65%) were involved in an early intervention program, 1,152 (7.12%) were involved in language or religion classes, 4,515 children (27.91%) were reported to be in the part-time pre-school/nursery school (Table 5.1). Programs, other than the ones listed above included: Hand-in-Hand, Getting Ready for Inclusion Time (GRIT), Fun with Sounds, and 100 Voices.

Table 5. 1: Early Intervention Program, Language or Religion Classes, Part-time Pre-School/Nursery School, Alberta 2010

Early Intervention	Number	Percent
Yes	1,561	9.65%
No	12,448	76.95%
Missing	2,167	13.96%
Language or Religion Classes	**Number**	**Percent**
Yes	1,152	7.12%
No	9,810	60.65%
Missing	5,214	32.23%
Part-time Pre-school/Nursery School	**Number**	**Percent**
Yes	4,515	27.91%
No	7,395	45.72%
Missing	4,266	26.37%

Chapter 6: Child Care Arrangements by Type of Care

At a Glance

- 28.18% of children were in non-parental care prior to kindergarten entry.
- Centre-based (licensed, profit, or non-profit) child care arrangement was noted as the most frequent type of arrangement (14.27%).
- 9.78% of children were taken care of in other home-based environment (licensed or unlicensed).
- 5.67% of children were taken care of in home-based environment (own home, relatives or non-relatives).

Section E deals with four additional questions, specifically on early intervention programs (Q1), child care arrangements prior to entering kindergarten (Q2a to 2i), and attendance at language and religion classes (Q3) and organized preschool/nursery school (Q4). This chapter presents results on childcare arrangements or analyses of Q2a to Q2i.

Out of 16,176 children, 4,559 children (28.18%) were reported to have been in non-parental care, including centre-based, licensed, for profit and non-profit care centers, home-care (licensed or unlicensed, relative or non-relative), and child's home (relative or non-relative) prior to kindergarten entry (Table 6.1). The table also provides the number of children who attended a certain type of non-parental care during their pre-kindergarten years. A short description of each type of non-parental care arrangement is provided below.

Centre-based and Licensed Care (Profit or Non-Profit): Children in centers operated by parents, a voluntary board of directors, or a non-profit organization such as the YM/YWCA, a college, university, school board, or municipal government for non-profit, or those commercial centers that are private businesses operated by an individual, a partnership, or a corporation are included in this type of care arrangement. Out of 16,176 children, 2,308 (14.27%) children were reported to have attended such canters at the time of the survey.

Table 6.1: Children in Care, Alberta 2010

	Number	Percent
Non-parental care	4,559	28.18%
Centre-based, licensed (profit or non-profit)	2,308	14.27%
Other home-based (licensed or unlicensed)	1,582	9.78%
Own home (relative or non-relative)	917	5.67%
Parental care	7,990	49.39%
Missing	3,627	22.42%
Total	**16,176**	**100.00%**

Note: Multiple types of non-parental child-care were permitted, and the categories cannot add up to the total (i.e., a child could be in more than one non-parental child-care prior to entering kindergarten).

Other home-based (Licensed or Unlicensed): In this type of care arrangement, children are looked after in home-based care, either licensed or unlicensed, in relatives' or non-relatives' home. Out of 16,176 children, 1,582 (9.78%) were reported to be in this type of home-based arrangement.

Own-home (Relative or Non-relative): In this type of care arrangement, children are looked after in their own home either by a nanny, a regular baby-sitter (excluding occasional evenings) who is unrelated to the child, or a relative. Out of 16,176 children, 917 children (5.67%) were reported to be in this type of care arrangement.

Chapter 7: Special Skills and Talents

At a Glance

- Literacy skill or talent was at the top of all special skills or talents, followed by numeracy.
- Music was the least frequent of all special skills or talents (3.8%).
- Other special skills included knowledge of several languages, computer, and drawing.

Section B of the questionnaire, Language and Cognitive Skills (Q1 to Q40), comprises language and thinking skills (b8-b33 or 26 items) and special or exceptional skills (b34-b40 or seven items). The focus here is on the last seven questions, specifically addressing a child's talent that is noticeable to others.

Table 7.1: Children with Skills or Talents in Different Areas, Alberta 2010

	Skills or Talents		
	Yes	**No**	**Missing**
Numeracy	1,544 (9.54%)	14,160	475
Literacy	1,710 (10.57%)	14,027	442
Art	1,389 (8.59%)	14,211	579
Music	613 (3.79%)	14,541	1,025
Athletics/Dance/Drama	1,013 (6.26%)	14,327	842
Problem solving	1,154 (7.13%)	14,365	660
Other areas	383 (2.37%)	14,205	1,591

Note: Multiple skills were permitted. Percent is calculated out of the total valid EDI's (i.e., 16,176)

A child with a special skill/talent is one who demonstrates unique skills that are not expected for his/her age capability/aptitude in an area; that is, a skill or a talent that is greater than the level expected for a typical student. Table 4.1 shows the distribution of children based on their special skills and talents. Compared to any other area, most children demonstrated their skills and talents in literacy (10.6%), followed by numeracy (9.5%). The least frequent area of special skills and talents was music (3.8%). Finally, slightly higher than two percent (2.4.%) of children were reported to have special skills or talents in other areas (e.g., strong vocabulary, speaking two or more languages, drawing, technology, and reading at a level greater than a typical child).

Chapter 8: The Five Developmental Areas

At a Glance

- Girls performed better than boys in all developmental areas as evidenced by the mean and median scores.
- The older the children, the better they are in their average scores on all developmental areas.
- Proportionately fewer children in Alberta fell below the 10th percentile in the areas of social competence (8.96%), emotional maturity (9.29%), and language and thinking skills (7.99%), as compared to their Canadian counterparts.

The focus of this chapter is on sections A, B, and C on the EDI questionnaire. The EDI comprises 103 items or questions on the development of kindergarten children in five broad areas of development as in Table 8.1.[7]

Table 8.1: Sections Constituting the Five Developmental Areas

	Questions/Items	
	Number	**Items**
Section A	**13**	**a2 to a13**
Physical health and well-being	13	a2 to a13, c58
Section B	**40**	**b1 to b40**
Language and thinking skills	26	b8 to b33
Communication & GK	8	b1 to b7 and **c26**
Section C	**58**	**c1 to c58**
Social competence	26	c1 to c25 and c27
Emotional maturity	30	c28 to c57

[7] A Principal Components Analysis (PCA) of the 103 items resulted in five areas and 69 items with a variance of 48.27% with no cross-loading or no loading items (physical health & well-being: 5 items; social competence: 23 items; emotional maturity: 8 items; anxious and fearfulness: 8 items; and language and thinking skills: 24 items). The analysis points to the redundancy of certain items and their validity in EDI (Krishnan, 2011). One of the sub-areas, namely *anxious and fearfulness*, turned out to be a major area explaining 5.33% of the variance and communication and general knowledge area totally disappeared from the five-factor structure (Appendix A1-A5). The factor analysis presented here are based on 2010 results, however, the basic structure remains the same as in 2009. This analysis gave us little confidence in a sub-area analysis. However, an attempt is made to briefly explore the sub-areas in terms of the three groups of children, classified according to their level of difficulty.

8.1 EDI Mean Scores

Table 8.2 shows measures of central tendency and spread of the distributions of scores for the five areas. Generally, most children tend to score very high, as all the summary measures in Table 8.2 indicate. Each distribution is skewed to the left (as is evident from the mean, median, and mode values), and therefore, the usual mean would not be the most useful summary measure to characterize the "typical" score in a particular area; in normal distributions, mean, median, and mode should coincide. However, following the Offord convention, we discuss the scores in terms of means only.

Table 8.2: Descriptive Statistics for the Five Developmental Areas, Alberta 2010

Developmental Area	N	Mean	Median	Mode	Std. Error	Std. Deviation
Physical health and well-being	16162	8.73	9.23	10.00	0.0108	1.37
Social competence	16175	8.42	9.04	10.00	0.0138	1.76
Emotional maturity	16088	8.12	8.33	10.00	0.0113	1.44
Language and thinking skills	16141	8.46	8.85	10.00	0.0135	1.72
Communication skills and general knowledge	16173	7.68	8.75	10.00	0.0201	2.55

8.2 Differences in EDI Mean Scores by Age and Sex

The mean scores for different age groups of children by the five developmental areas are presented in Table 8.3. In general, the higher the age, the higher the mean scores, up to age 6 years and 1 month and with few exceptions after age 6 years and 2 months.

Table 8.3: Mean Scores by Age Group for the Five Developmental Areas, Alberta 2010

Developmental Area	Age Group					
	3-8 -- 5-1 (730)	5-2 -- 5-4 (2,848)	5-5 -- 5-7 (3,957)	5-8 -- 5-10 (4,164)	5-11-- 6-1 (3,219)	6-2 & up (1,211)
Physical health and well-being	8.19	8.46	8.66	8.85	8.94	8.97
Social competence	7.69	8.08	8.32	8.59	8.69	8.69
Emotional maturity	7.69	7.92	8.04	8.21	8.31	8.26
Language and thinking skills	7.50	8.05	8.34	8.62	8.83	8.82
Communication skills and general knowledge	6.46	7.07	7.56	7.96	8.10	8.09

In Table 8.4 are presented three different measures of the mean scores by sex and area of development. In general, girls performed better than boys in all developmental areas. The largest difference between boys and girls was in the area of communication and general knowledge (median scores: 8.13 vs. 9.38), whereas the smallest difference was in the area of physical health and well-being (median scores: 8.85 vs. 9.23).

Table 8.4: Summary Statistics for all Five Areas, Girls and Boys, Alberta 2010

		Physical	Social	Emotional	Language	Communication & GK
Female	Mean	8.89	8.78	8.47	8.66	8.05
	Median	9.23	9.42	8.67	9.23	9.38
	Harmonic Mean	8.63	8.30	8.22	.a	.a
	Geometric Mean	8.78	8.60	8.37	-	-
Male	Mean	8.57	8.07	7.77	8.26	7.31
	Median	8.85	8.65	8.00	8.85	8.13
	Harmonic Mean	8.19	7.25	7.35	.a	.a
	Geometric Mean	8.42	7.76	7.58	-	-
Total	Mean	8.73	8.42	8.12	8.46	7.68
	Median	9.23	9.04	8.33	8.85	8.75
	Harmonic Mean	8.40	7.74	7.76	.a	.a
	Geometric Mean	8.60	8.17	7.96	-	-

Practical applications of the three means – arithmetic, geometric, and harmonic – vary. However, they are presented here in order to draw the attention of readers to the variability in scores and how averages vary depending upon the nature of the distribution.[8] Variability measures are not

[8] Technically, the "average score" is the score that could replace all others. The arithmetic mean is the most common type of average. However, it is a crude measure that is affected by outliers; it doesn't represent data with extreme values. The arithmetic mean of items with scores, say, 3, 4 and 8 is 5. The geometric mean is useful to describe a situation of this sort: most children score 4 on an item, but some score 9 on the same item. Using the example above, the geometric mean would yield a value of 4.579 ($= \sqrt[3]{3 \times 4 \times 8}$). The harmonic mean, unlike the arithmetic mean tends to lean toward the lowest score. The harmonic mean is useful in a situation of this sort: fewer children score high while most children score low; it takes into account the weight by giving a higher weight to those scoring low and lower weight to those scoring high. Using the same example above, the harmonic mean of 3, 4, and 8 is, 4.26 ($= \frac{3}{\frac{1}{3}+\frac{1}{4}+\frac{1}{8}}$). Datasets containing at least one pair of unequal values, the harmonic mean gives the least value, arithmetic mean gives the largest value, and geometric mean gives a value in between the two. The arithmetic mean score of physical health and wellbeing, for example, answers the question: "if all the items had the same value, what would that value be in order to achieve the same total?"; the geometric mean answers the question, "if all the items had the same value, what would that value to be in order to achieve the same product?"; and the harmonic mean answers the question, "if all items had the same value, what would that value to be in order to achieve the same rate?"

attempted here in order to make the interpretation easy for those with little or no statistical background.

8.3 EDI Mean Scores Compared: Alberta and Canada

In Table 8.5, the means, range, and the four percentile boundaries for the five areas are shown. Also presented in the table are the corresponding Updated Norm II (Canada) cut-off values (in red). The interpretation of the percentiles is as follows: the 10th percentile divides the bottom 10% of the data from the upper 90% (i.e., 100-10%); the 25% divides the bottom 25% of the data from the upper 75%; and so on. A comparison of the cut-off values is as follows: in the social competence area, whereas 25% of children in Canada scored at or below 7.31 on a 0 to 10 scale, 25% of Albertan children scored at 7.50 or below on the same scale. Similarly, whereas 10% of Canadian children scored at 5.77 or below on language and thinking styles, the same percentage of Albertan children scored at 6.15 or below.

Table 8.5: Mean, Range, and Percentile Boundaries for Each Developmental Area, Alberta 2010

Developmental Area	Items	Min-Max	Mean		Percentile Boundaries			
					75%	50%	25%	10%
Physical health and well-being	13	0.38 - 10.00	8.73	Canada	10	9.2308	8.0769	7.0833
				Alberta	10.00	9.23	8.08	6.92
Social competence	26	0.19 - 10.00	8.42	Canada	9.8077	9	7.3077	5.5769
				Alberta	9.81	9.04	7.50	5.60
Emotional maturity	30	0.43 - 10.00	8.12	Canada	9.1667	8.3333	7.1667	6
				Alberta	9.17	8.33	7.33	6.17
Language and thinking skills	26	0.00 - 10.00	8.46	Canada	9.6154	9.2	7.6923	5.7692
				Alberta	9.62	8.85	7.92	6.15
Communication skills and general knowledge	8	0.00 - 10.00	7.68	Canada	10	8.75	5.625	4.375
				Alberta	10.00	8.75	5.63	4.38

Thus, Alberta children fell below the 10th percentile Canadian benchmark in all four areas except the social competence and communication skills and general knowledge. For the purposes of this project, the term ‘experiencing great difficulty’ will be used in this and future reports instead of ‘vulnerability’ as originally coined by the Offord Centre for those falling into the 10th percentile. Readers may refer back to our discussion in section 1.2 of this report for the three groups of

children based on the percentile boundaries. We will turn to the three groups of children in section 8.6 that follows.

Table 8.6 shows percentages of children who fell below the 10th percentile in at least one and who fell below the 10th percentile in two or more developmental areas, based on the provincial and national cut-offs. Proportionately more Albertans than Canadian children scored low on at least one area (26.09% vs. 25.40%). The differences in percentages between the two groups of children were much smaller when low on at least two areas were considered (12.49% vs. 12.40).

Table 8.6: Percentages of Children low on at Least one and at Least two Areas

Low	Percentage		
	2009/2010 (Alberta Year II, based on Alberta Year II Cut-offs)	**Canadian (Updated Normative II)**	**2009/2010 (Alberta Year II, based on Canadian Updated Normative II Cut-offs)**
Low in at least **one** area	27.54%	25.40%	26.09%
Low in at least **two** areas	13.78%	12.40%	12.49%

8.4 How do Repeaters Differ in terms of their EDI Scores?

Table 8.7 shows those *experiencing great difficulty* by age groups and area (compared to their own cohort) for all children who repeated kindergarten and those who did not repeat kindergarten. Generally, older children are more likely to be repeating kindergarten. Not surprisingly, children younger than 5-1 years of age are at a greater disadvantage than the older cohorts, in terms of their difficulty in meeting the threshold.

Table 8.7: Frequency and Percentage of Children Experiencing Great Difficulty by Age Group for Each Developmental Area (Compared to Their Own Age Cohort), Alberta 2010*

All	5-1 and low		5-2 to 5-4		5-5 to 5-7		5-8 to 5-10		5-11 to 6-1		6-2 and up		Total	
Area	**Number**	**% within group**	**Number**	**% within group**	**Number**	**% within group**	**Number**	**% within group**	**Number**	**% within group**	**Number**	**% within group**	**Number**	**% within group**
Physical	145	19.86%**	433	15.20%	469	11.85%	384	9.13%	253	7.86%	95	7.80%	1779	11.00%
Social	132	18.08%	338	11.87%	391	9.88%	301	7.16%	204	6.34%	84	6.90%	1450	8.96%
Emotion	110	15.07%	320	11.24%	395	9.98%	331	7.87%	244	7.58%	102	8.37%	1502	9.29%
Language	145	19.86%	333	11.69%	355	8.97%	256	6.09%	144	4.47%	60	4.93%	1293	7.99%
Communication	176	24.11%	513	18.01%	522	13.19%	405	9.63%	279	8.67%	117	9.61%	2012	12.44%
Low on at least 1 area	320	43.84%	979	34.38%	1091	27.57%	944	22.45%	636	19.76%	250	20.53%	4220	26.09%
Low on at least 2 areas	201	27.53%	491	17.24%	545	13.77%	408	9.71%	265	8.23%	111	9.11%	2021	12.49%
Total	730		2848		3957		4204		3219		1218		16176	
No Repeated Only														
Physical	140	19.36%	430	15.23%	465	11.88%	375	9.01%	235	7.59%	57	5.65%	1702	10.82%
Social	130	17.98%	337	11.93%	382	9.76%	299	7.19%	194	6.26%	47	4.66%	1389	8.83%
Emotion	109	15.08%	318	11.26%	387	9.89%	327	7.86%	226	7.30%	63	6.25%	1430	9.09%
Language	139	19.23%	329	11.65%	346	8.84%	251	6.03%	136	4.39%	36	3.57%	1237	7.86%
Communication	170	23.51%	509	18.02%	515	13.16%	399	9.59%	262	8.46%	68	6.75%	1923	12.23%
Low on at least 1 area	313	43.29%	971	34.38%	1074	27.44%	930	22.35%	604	19.50%	161	15.97%	4053	25.77%
Low on at least 2 areas	196	27.11%	488	17.28%	533	13.62%	399	9.59%	245	7.91%	61	6.05%	1922	12.22%
Total	723		2824		3914		4161		3098		1008		15728	
Repeated Only														
Physical	5	71.43%	3	13.64%	4	10.53%	9	23.08%	18	15.25%	38	18.27%	77	17.82%
Social	2	28.57%	1	4.55%	9	23.68%	2	5.13%	10	8.47%	37	17.79%	61	14.12%
Emotion	1	14.29%	2	9.09%	8	21.05%	4	10.26%	18	15.25%	39	18.75%	72	16.67%
Language	6	85.71%	4	18.18%	9	23.68%	5	12.82%	8	6.78%	24	11.54%	56	12.96%
Communication	6	85.71%	4	18.18%	7	18.42%	6	15.38%	17	14.41%	49	23.56%	89	20.60%
Low on at least 1 area	7	100.00%	8	36.36%	17	44.74%	14	35.90%	32	27.12%	89	42.79%	167	38.66%
Low on at least 2 areas	5	71.43%	3	13.64%	12	31.58%	9	23.08%	20	16.95%	50	24.04%	99	22.92%
Total	7		22		38		39		118		208		432	
	5-1 and low		**5-2 to 5-4**		**5-5 to 5-7**		**5-8 to 5-10**		**5-11 to 6-1**		**6-2 and up**		**Total**	

*Based on Updated Normative II cut-offs. **19.86 = (145/730)*100

8.5 The Three Groups of Children Based on Percentile Boundaries

Table 8.8 presents the three categories (developing appropriately, experiencing difficulty and experiencing great difficulty) and the Updated Norm II (Canada) cut-offs by the five areas of development. This information is the basis for our interpretations that follow.

Table 8.8: Updated Normative II (Canada) Cut-off Points

Areas of Development	Developing Appropriately 25-100%	Experiencing Difficulty 10-25%	Experiencing Great Difficulty 10% or below
Physical health and well-being	8.0769<p	7.0833<p<=8.0769	<=7.0833
Social competence	7.3077<s	5.5769<s<= 7.3077	<=5.5769
Emotional maturity	7.1667<e	6.0000<e<=7.1667	<=6.0000
Language and thinking skills	7.6923<l	5.7692<l<=7.6923	<=5.7692
Communication and general knowledge	5.6250<c	4.375<c<=5.6250	<=4.375

Developing Appropriately

For the province as a whole, when percentages for the 'developing appropriately' category were compared across areas of development, all areas except communication and general knowledge reached the threshold of 75%, the percentage was the highest for language and thinking skills (Figure 8.1).

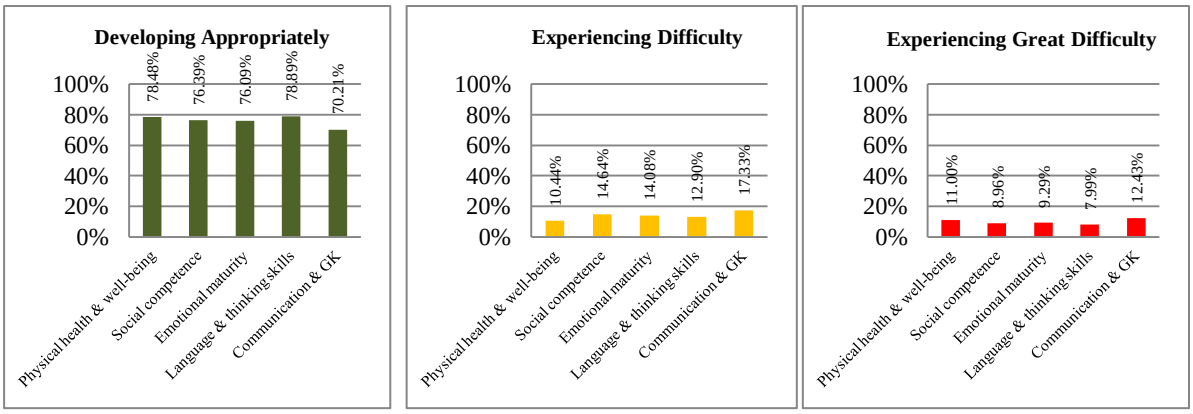


Figure 8.1: The Developmental Areas by Group of Children

Experiencing Difficulty

Communication and general knowledge was the area where most children experienced some difficulty (17.33%) and physical health and well-being was the area where proportionately

fewer children (10.44%) experienced difficulty. The communication and general knowledge area had percentage above the bench mark, the 15% threshold level.

Experiencing Great Difficulty

In Alberta, communication and general knowledge was the area where most children experienced great difficulty (12.43%), followed by physical and well-being (11.00%). In other words, the group that is experiencing great difficulty surpassed the 10% benchmark in the communication and general knowledge and physical and well-being areas.

Chapter 9: The EDI Sub-areas

At a Glance

- **Gross and fine motor skills, overall social competence, pro-social and helping behaviour, and advanced literacy are the sub-areas where most children scored low, regardless of whether or not they belonged to the groups, developing appropriately, experiencing difficulty, or experiencing great difficulty.**
- **The mean for the Experiencing Great Difficulty group was much lower than the national (Updated Normative II) cut-off value for the communication skills and general knowledge area (2.64 vs. 4.38).**
- **Male-female differences were pronounced in sub-area analyses among all the three groups of children; mean scores were consistently higher for females, compared to males.**

9.1 Levels of Difficulty by Sub-areas

Detailed descriptions of children *developing appropriately (DA), experiencing difficulty (ED)* and *experiencing great difficulty (EGD)* (based upon the classification scheme, presented as a horizontal bar with three categories in Section 1.2) are provided for each sub-area in Figures 9.A1 to 9.A5. The focus here is, if children are divided into three groups based on their level of difficulty, how do they differ in terms of mean scores on sub-areas within each developmental area?

The sub-area within physical health and well-being with the largest mean score was noted for physical independence for all the three groups of children.[9] In the social competence area, the sub-area with the largest mean score was for readiness to explore new things, for all the three groups. In the emotional maturity area, the three groups varied in terms of their standing on a sub-area; the largest mean was for anxious and fearful behaviour for those in the EGD group and aggressive behaviour for those in the ED and DA groups.

In the language and thinking skills area, the pattern of differences in means between sub areas was less pronounced; the three sub-areas, basic literacy, interest in literacy/numeracy &

[9] Only the major areas, and not the sub-areas, were affected by the Updated Normative II cut-offs.

memory, and basic numeracy had almost the same mean values within each group. However, for all the three groups, advanced literacy had the lowest mean score in all the three groups of children (DA, 7.19; ED, 2.59; and EGD, 1.07).

There are no sub-areas for the communication skills and general knowledge area. However, the means for the three groups varied from 2.64 for those in EGD, 5.38 for those in ED, and 9.08 for those in DA. The mean for the EGD group was much lower than the national (Updated Norm II) cut-off value (4.375). We acknowledge the fact that the pattern of the factor structure differed from that of Offord Center, in particular for the social competence and emotional areas. Further, Offord Center's sub-area of anxiety and fearfulness emerged as a main area of development in the factor analysis we conducted on the Alberta data (Appendix A). The reader is cautioned in interpreting the results that follow taking these findings into account.

The male-female differences in mean scores for all the three groups of children by sub-areas were also analyzed (not presented here). Mean sub-area scores were consistently higher for girls, compared to boys, for all the areas and among all the three groups.

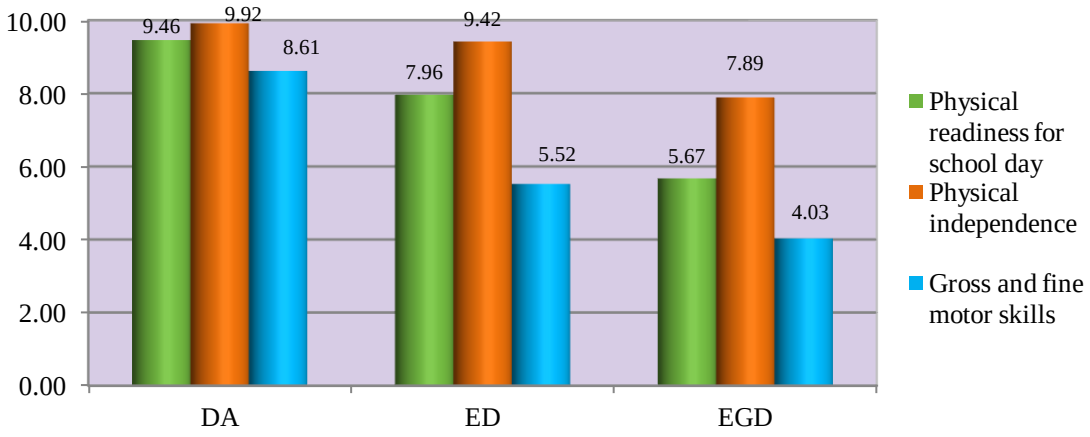


Figure 9.A1: Mean Scores of Children Developing Appropriately (DA), Experiencing Difficulty (ED), and Experiencing Great Difficulty (EGD) in Physical Health and Well-being Sub-areas

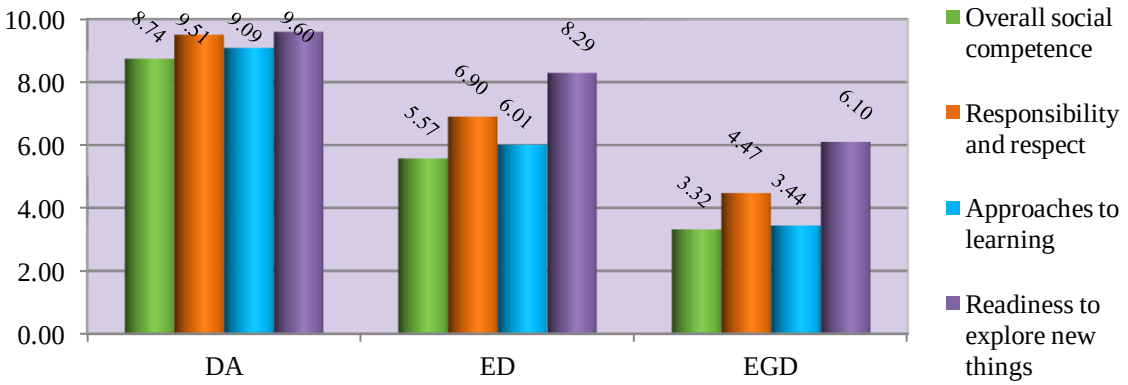


Figure 9.A2: Mean Scores of Children Developing Appropriately (DA), Experiencing Difficulty (ED), and Experiencing Great Difficulty (EGD) in Social Competence Sub-areas

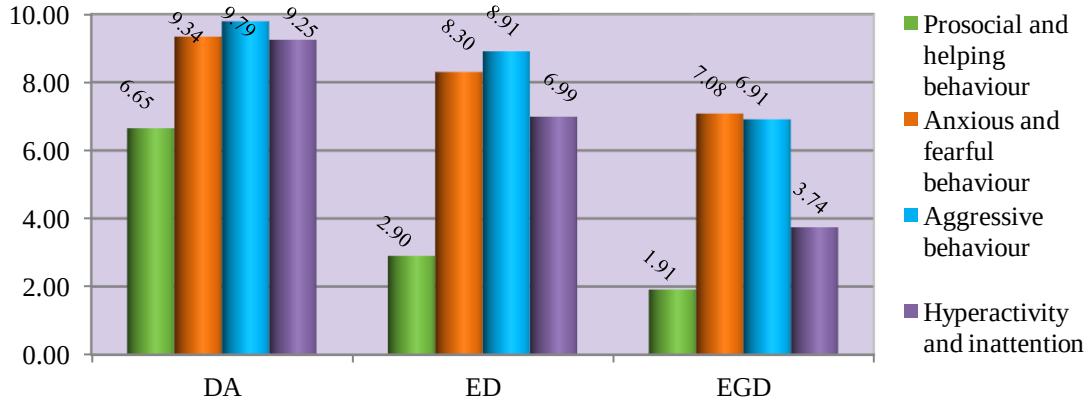


Figure 9.A3: Mean Scores of Children Developing Appropriately (DA), Experiencing Difficulty (ED), and Experiencing Great Difficulty (EGD) in Emotional Maturity Sub-areas

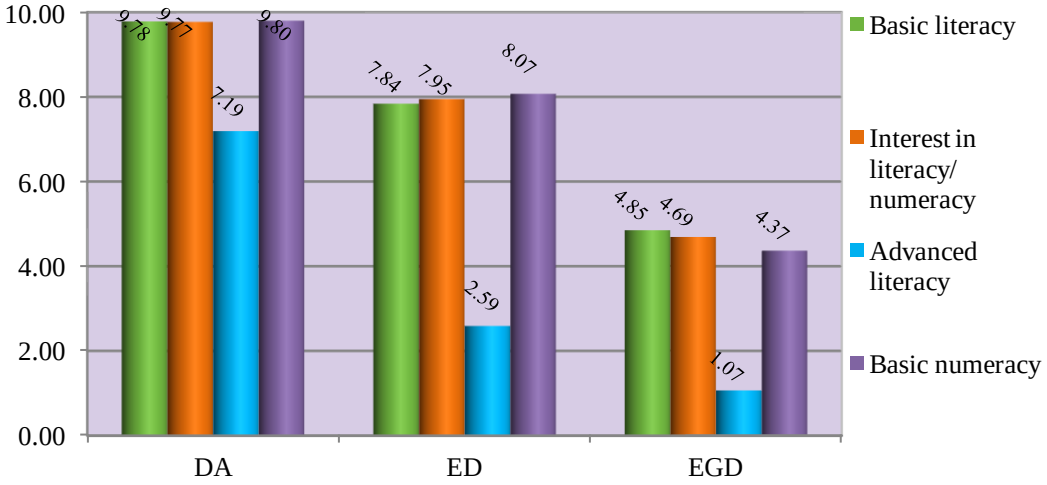


Figure 9.A4: Mean Scores of Children Developing Appropriately (DA), Experiencing Difficulty (ED), and Experiencing Great Difficulty (EGD) in Language and Thinking Skills Sub-areas

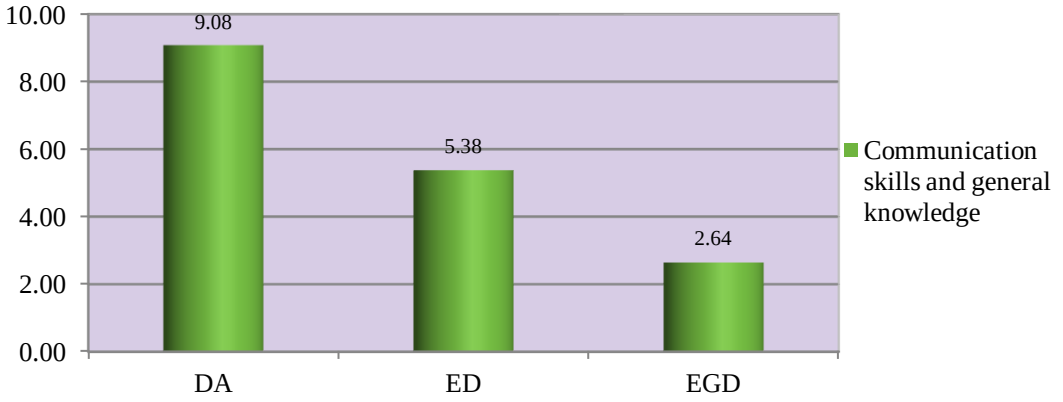


Figure 9.A5: Mean Scores of Children Developing Appropriately (DA), Experiencing Difficulty (ED), and Experiencing Great Difficulty (EGD) in Communication and GK Sub-areas

Chapter 10: Discussion and Conclusion

Limitations

The differences between the national and provincial EDI scores may be due in part to differences in children's backgrounds (e.g., age and sex), impacting their performance. However, the scope of this project and lack of information at the national level limit our ability to explore this. Further, social desirability bias may have influenced teacher ratings of children's skills and talents by way of under-or over-estimating EDI scores.

Redefining the EDI Concepts

Development of a child does not depend solely on the child. It is a by-product of the socio-economic fabric of the community and family, and to a greater extent, the capacity and willingness of schools and teachers to accommodate the child's varying needs. This raises the question whether such derived concepts as *experiencing great difficulty* based on child-centered ratings are appropriate to fully understand development.

Key Lessons Learned

- This being the second report of this kind, the representation has improved, however, community profiles of EDI information are only beginning to emerge. Such information could identify and assess gaps in community level outcomes.
- The introduction of parental consent information in 2010 identified some gaps in participation rates across geographical areas.
- Of the 103 items falling into the five different developmental areas that are currently in use, there were many that fell into more than one area, as in 2009. This raises questions on reliability of developmental areas the way they are conceptualized and reported currently.
- There can be teacher bias, which needs to be addressed in future projects of similar nature, perhaps by supplementing information based on other forms of data collection.
- There can be reliability issues when reporting rates and percentages due to small number of cases for categories such as age and aboriginal status.
- In the case of variables, such as child care arrangement prior to kindergarten, multiple care arrangements made it difficult to draw firm conclusions.

- Aboriginal status can only be used as a proxy measure of ethnicity since it was based on families' "self report", it would have been much more reliable if based on official records on ancestry.

Conclusion

This report was based on analyses of the 2010 data. The reader is advised to refer to the 2010 Micro database report for questions on variable structure, the EDI Guide for details on sections, and the EDI questionnaire for sections and variables within. The present report can be used to generate new knowledge that may be presented at different geo-political units or at the community level so that the findings can be more reflective of population-based EDI scores.

Glossary

Aboriginal: Whether or not a child belongs to a North American Indian, Métis, or Inuit as determined from families' 'self report', and not based on any official records on ancestry.

Alberta cut-offs: It is the 2010 Alberta baseline 10th percentile cut-off values. The domain specific cut-off values are 6.92, 5.60, 6.17, 6.15, and 4.38 for physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication and general knowledge, respectively. If, for example, the 10th percentile value for the physical domain for a community is 6, it means that, on average, 10% of children in the community score lower than the 10th percentile Alberta cut-off, 6.92.

Arithmetic mean (also called 'mean'): It is the number we get when all scores are added together, and then divided by the number of children contributing data. The arithmetic mean of items with scores, say, 3, 4 and 8 is 5. The arithmetic mean is the most common type of average. However, it is a crude measure that is affected by outliers; it does not represent data with extreme values.

Communication and general knowledge: As a domain in the EDI, it consists of 8 items and has no sub-domains.

Domain missing: A domain is said to be missing for individual children if **more than 25% of questions** in the domain are either blank or with "Don't Know" responses. If, for example, the 13-item physical domain has no values entered in three or more items, the domain is considered invalid or missing.

Early Development Instrument (EDI): A teacher-completed survey of 103 questions to assess kindergarten children's development in five general domains: physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge. In addition, some demographic information is collected as part of the EDI survey. As a population-based measure, it has been used across Canada and internationally.

Early intervention program: A program that either a child (e.g., speech/language therapy, Head Start) or a parent attended (e.g., parenting program).

Emotional maturity: As a domain in the EDI, it comprises 30 items and has four sub-domains: pro-social and helping behaviour, anxious and fearful behaviour, aggressive behaviour, and hyperactive and inattentive behaviour, each of which has 8, 8, 7, and 7 items, respectively.

English as a Second Language (ESL): A child, whose first language is a language other than English, has an ESL status.

French immersion: A program in which kindergarten students are introduced early to French language through immersion in an Anglophone school, that is, the main language of the school remains to be English.

Geometric mean: The arithmetic mean of items with scores of 3, 4 and 8 is 5. However, it is a crude measure that is affected by extreme values such as 8 in this example. Using the example, the geometric mean would yield a value of 4.579 ($= \sqrt[3]{3 \times 4 \times 8}$).

Harmonic mean: The harmonic mean, unlike the arithmetic mean, tends to lean toward the lowest score. The harmonic mean is useful in a situation of this sort: fewer children score high while most children score low; it gives a higher weight to those scoring low and lower weight to those scoring high. The harmonic mean of 3, 4, and 8 is, 4.26 ($= \frac{3}{\frac{1}{3}+\frac{1}{4}+\frac{1}{8}}$). In datasets containing at least one pair of unequal values, the harmonic mean gives the least value, arithmetic mean gives the greatest value, and geometric mean gives a value in between the other two.

Language and cognitive development: As a domain in the EDI, it comprises 26 items and has four sub-domains: basic literacy, interest and memory, complex literacy skills, and basic literacy and numeracy, each of which has 8, 5, 6, and 7 items, respectively.

Median: The numeric value separating the higher half of a sample from the lower half. The *median* of a finite list of numbers can be found by arranging all the observations from the lowest value to the highest value and picking the middle one. If there is an even number of observations, then there is no single middle value; the median is then usually defined to be the mean of the two middle values.

Mode: The mode of a set of data is the value in the set that occurs most often.

Multiple Challenge Index (MCI): The MCI scores are based on challenges in **nine or more sub-domains**. The MCI is expressed as "existence of multiple challenges" (=1) and "no multiple challenges" (=0). In contrast to the cut-offs for the domains, the cut-offs for the sub-domains are not based on the normative (provincial or national) sample. They are based on the teacher's actual responses on the questions/items. The physical independence sub-domain (within the physical health and wellbeing domain) has four items: independence in washroom habits, established hand preference, well coordinated, and sucks thumb, with each of the four items representing a skill generally mastered by 4-year-old children. Because the items are scored Yes = 10 and No = 0, a "challenge" score for the physical independence is set at lower than 9.99 and would be given to a child when the teacher responded 0 to **all of the four skills**.

Percentile: A score in and of itself is difficult to interpret. If a child scores 6 out of a possible 10 on an item that measures "shyness", 10 being very shy, how do we know how shy he is compared to his peers? If, on the other hand, we know that the 10^{th} percentile value of his score is 6, and then we would say, on average, 10% of the children in his class score lower than him. The 10^{th} percentile is the value below which 10% of the children score. Median (50^{th} percentile) as well as 90^{th} and 10^{th} percentiles provide some idea about the shape and spread of the data.

Physical health and wellbeing: As a domain in the EDI, it comprises 13 items and has three sub-domains: physical readiness for school work, physical independence, and gross and fine motor skills, each of which has 4, 4, and 5 items, respectively.

Principal Components Analysis (PCA): PCA is the most common type of "factor analysis", used when the research purpose is data reduction or exploration. It analyzes a correlation matrix.

Special problem: A child who needs special assistance in the classroom due to chronic physical and/or mental disabling conditions (based on medical diagnosis, teacher observation or parent/guardian information), such as autism, foetal alcohol syndrome, or down-syndrome, as well as problems affecting a child's ability to do school work, such as problems at home, unaddressed dental needs, behavioral problem, and speech impairment.

Special need: A child who needs special assistance in the classroom due to chronic physical and/or mental disabling conditions (based on medical diagnosis, teacher observation or parent/guardian information), such as autism, foetal alcohol syndrome, or down-syndrome following the Alberta Special Education Coding Criteria.

Special skills/talents: A child who demonstrates unique skills/talents that are not expected of children of his/her age in such areas as numeracy, literacy, music, and problem solving. A skill/talent should be reflective of the child's actual performance and not relative to his/her classroom peers.

Social competence: As a domain in the EDI, it comprises 26 items and has four sub-domains: overall social competence, respect and responsibility, independence and adjustment, and readiness to explore new things, each of which has 5, 8, 9, and 4 items, respectively.

Standard deviation: Standard deviation is a widely used measurement of variability or diversity. It shows how much variation or "dispersion" there is from the average (mean, or expected value). A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data are spread out over a large range of values.

Standard error: The standard error or the standard error of the mean of multiple samples is the standard deviation of the sample means, and thus gives a measure of spread. It gives an indication of the likely accuracy of the sample mean, as compared to population mean. The smaller the standard error, the less the spread and the more likely that any sample mean is close to the population mean. The standard error is important to compute because it reflect, on average, how much sampling fluctuation a measure will show if used with another random sample drawn from the same population.

Updated Normative II cut-offs: It is the Canadian 10^{th} percentile cut-off values, based on N = 174,799. The domain specific cut-off values are 7.0833, 5.5769, 6.0000, 5.7692, and 4.3750 for the physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication and general knowledge, respectively. If, for example, the 10^{th} percentile value for the physical domain for a community is 6, it means that, on average, 10% of children in the community score lower than the 10^{th} percentile Canadian cut-off, 7.0833. Previously, it was referred to as Normative II cut-offs and was based on N = 176,201. The domain specific cut-off values were 7.0833, 5.5769, 6.0000, 5.7692, and 4.2857 for the physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication and general knowledge, respectively.

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Appendix A The Structure of the EDI: A Principal Components Analysis

At a Glance

- 69 items gave a clean structure, accounting for 48.27% of the total variance.
- A comparison of the PCA structures between 2009 (N=7,938) and 2010 (N=16, 176) data yielded the following results:
  - Items in 2010 but not in 2009

Imaginative play (Qb4)	0.424
Temper tantrums (Qc46)	0.514

  - Items in 2009 but not in 2010

Well coordinated (Qa08)	0.437
Cooperative (Qc03)	0.580
Eager new toy (Qc19)	0.330
Eager new game (Qc20)	0.335

As currently conceived, the Early Development Instrument (EDI) includes 103 questions that a teacher can use to rate a child's behavior in five areas of development: physical health and well-being, emotional maturity, social competence, language and cognitive development, and communication and general knowledge. We analyzed the underlying structure of the EDI areas using the 2010 Alberta data, within a multivariate framework, the Principal Component Analysis (PCA) (Krishnan, 2011). The PCA reduces a complex set of variables into a set of fewer uncorrelated components to explore the nature of the component structure underlying the Alberta EDI data. Only children who were in class more than one month, had no special needs, and had scores missing in no more than one developmental area were included in the analysis (N = 16,176).

Based on the original number of area (five) published by the Offord Centre and a Screeplot, a decision was made to restrict the components into five. Varimax rotation was performed on 103 items, 75 items, 70 items, and 69 items, successively dropping items that either had no loadings or loadings on a unique component. The variance explained by the clean five component solution was 48.27%. The loadings of the retained 69 items on the five principal components are shown in Tables A1 to A5, alongside the 103-item domains of Offord. The tables provide a comparison of the components and the five areas in terms of their structures and the numbers of items in each area. As seen from the tables, the pattern of the principal components differed from that of Offord's, in particular for the social competence and emotional areas. For example, whereas the social competence area emerged with almost the

same number of items, the items themselves varied (Table A2). Given this, the assessment of social and emotional areas may be especially challenging in terms of their stability across populations.

To conclude, two major findings were obtained. First, the PCA results indicated that one-third of the EDI items might be theoretically but not necessarily empirically useful in understanding early child development. Second, the PCA of the Alberta 2009 and 2010 EDI data showed meaningful, although different from the Offord's own patterns. Therefore, caution should be taken when interpreting the areas, and in particular those that comprise social and emotional areas. These and other important issues need further exploration.

A Comparison of Offord's Five Domains and the PCA's Five Components, Alberta 2010

Table A1: Physical Health & Well-being

Offord (13 items)	**PCA (6 Items)**	
Physical Health & Well-being	**Component #4**	**Loadings**
Proficient at holding pen (Qa09)	Proficient at holding pen (Qa09)	.723
Manipulates objects (Qa10)	Manipulates objects (Qa10)	.810
Climbs stairs (Qa11)	Climbs stairs (Qa11)	.832
Level of energy (Qa12)	Level of energy (Qa12)	.728
Overall physical (Qa13)	Overall physical (Qa13)	.824
Dressed inappropriately (Qa02)	Imaginative play (Qb4)	.424
Too tired (Qa03)		
Late (Qa04)		
Hungry (Qa05)		
Washroom (Qa06)		
Hand preference (Qa07)		
Sucks thumb (Qc58)		

Note: Rows shaded in purple color indicate items common to both Offord and PCA

Table A2: Social Competence

Offord (26 Items)	**PCA (23 Items)**	
Social Competence	**Component #1**	**Loadings**
Follows rules (Qc05)	Follows rules (Qc05)	.700
Respects property (Qc06)	Respects property (Qc06)	.693
Self-control (Qc07)	Self-control (Qc07)	.737
Respect for adults (Qc09)	Respect for adults (Qc09)	.672
Respect for children (Qc10)	Respect for children (Qc10)	.715
Accepts responsibility (Qc11)	Accepts responsibility (Qc11)	.702
Takes care of materials (Qc16)	Takes care of materials (Qc16)	.612
Follow class routines (Qc24)	Follow class routines (Qc24)	.571
Adjust to change (Qc25)	Adjust to change (Qc25)	.479

Overall social/emotional (Qc01)	Gets into fights (Qc37)	.617
Gets along with peers (Qc02)	Bullies or mean (Qc38)	.659
Plays with various children (Qc04)	Kicks etc (Qc39)	.605
Self-confidence (Qc08)	Takes things (Qc40)	.576
Listens (Qc12)	Laughs at others (Qc41)	.555
Follows directions (Qc13)	Restless (Qc42)	.709
Completes work on time (Qc14)	Distractible (Qc43)	.660
Independence (Qc15)	Fidgets (Qc44)	.670
Works neatly (Qc17)	Disobedient (Qc45)	.768
Curious (Qc18)	Impulsive (Qc47)	.775
Eager new toy (Qc19)	Difficulty awaiting turns (Qc48)	.730
Eager new game (Qc20)	Can't settle (Qc49)	.669
Eager new book (Qc21)	Inattentive (Qc50)	.617
Independent solve problems (Qc22)	Temper tantrums (Qc46)	.514
Follow simple instructions (Qc23)		
Tolerance for mistakes (Qc27)		

Note: Rows shaded in purple color indicate items common to both Offord and PCA

Table A3: Emotional Maturity

Offord (30 Items)	**PCA (8 Items)**	
Emotional Maturity	**Component #3**	**Loadings**
Help hurt (Qc28)	Help hurt (Qc28)	.786
Clean up mess (Qc29)	Clean up mess (Qc29)	.760
Stop quarrel (Qc30)	Stop quarrel (Qc30)	.800
Offers help (Qc31)	Offers help (Qc31)	.807
Comforts upset (Qc32)	Comforts upset (Qc32)	.862
Spontaneously helps (Qc33)	Spontaneously helps (Qc33)	.776
Invite bystanders (Qc34)	Invite bystanders (Qc34)	.772
Helps sick (Qc35)	Helps sick (Qc35)	.858
Upset when left (Qc36)		
Gets into fights (Qc37)		
Bullies or mean (Qc38)		
Kicks etc. (Qc39)		
Takes things (Qc40)		
Laughs at others (Qc41)		
Restless (Qc42)		
Distractible (Qc43)		
Fidgets (Qc44)		
Disobedient (Qc45)		
Temper tantrums (Qc46)		
Impulsive (Qc47)		
Difficulty awaiting turns (Qc48)		
Can't settle (Qc49)		
Inattentive (Qc50)		
Seems unhappy (Qc51)		
Fearful (Qc52)		

Worried (Qc53)		
Cries a lot (Qc54)		
Nervous (Qc55)		
Indecisive (Qc56)		
Shy (Qc57)		

Note: Rows shaded in purple color indicate items common to both Offord and PCA

Table A4: Language & Cognition

Offord (26 Items)	**PCA (24 Items)**	
Language & Cognition	**Component #2**	**Loadings**
Interested in books (Qb09)	Interested in books (Qb09)	.375
Interested in reading (Qb10)	Interested in reading (Qb10)	.516
Identifies letters (Qb11)	Identifies letters (Qb11)	.676
Sounds to letters (Qb12)	Sounds to letters (Qb12)	.705
Rhyming awareness (Qb13)	Rhyming awareness (Qb13)	.633
Group reading (Qb14)	Group reading (Qb14)	.587
Reads simple words (Qb15)	Reads simple words (Qb15)	.639
Reads sentences (Qb17)	Reads sentences (Qb17)	.444
Experiments writing (Qb18)	Experiments writing (Qb18)	.375
Writing directions (Qb19)	Writing directions (Qb19)	.512
Writing voluntarily (Qb20)	Writing voluntarily (Qb20)	.424
Write own name (Qb21)	Write own name (Qb21)	.411
Write simple words (Qb22)	Write simple words (Qb22)	.491
Write simple sentences (Qb23)	Write simple sentences (Qb23)	.355
Remembers things (Qb24)	Remembers things (Qb24)	.584
Interested in Maths (Qb25)	Interested in Maths (Qb25)	.592
Interested in number games Qb26)	Interested in number games (Qb26)	.548
Sorts and classifies (Qb27)	Sorts and classifies (Qb27)	.558
1 to 1 correspondence (Qb28)	1 to 1 correspondence (Qb28)	.620
Counts to 20 (Qb29)	Counts to 20 (Qb29)	.637
Recognizes 1-10 (Qb30)	Recognizes 1-10 (Qb30)	.664
Compares numbers (Qb31)	Compares numbers (Qb31)	.664
Recognizes shapes (Qb32)	Recognizes shapes (Qb32)	.542
Time concepts (Qb33)	Time concepts (Qb33)	.479
Handles a book (Qb08)		
Reads complex words (Qb16)		

Note: Rows shaded in purple color indicate items common to both Offord and PCA

Table A5: Communication and General Knowledge & Anxiety & Fearfulness

Offord (8 Items)	PCA (8 Items)	
Communication & General Knowledge	**Component #5 (Anxiety & Fearfulness)**	**Loadings**
Effective use English (Qb01)	Upset when left (Qc36)	.511
Listens-English (Qb02)	Seems unhappy (Qc51)	.614
Tells a story (Qb03)	Fearful (Qc52)	.804
Imaginative play (Qb04)	Worried (Qc53)	.808
Communicative needs (Qb05)	Cries a lot (Qc54)	.583
Understands on first try what is being said to him/her (Qb06)	Nervous (Qc55)	.692
Articulates clearly (Qb07)	Indecisive (Qc56)	.524
Interested in number games (Qc26)	Shy (Qc57)	.489

Note: No items are common to both Offord and PCA

Appendix B: Analysis of Teachers' Comments on Selected Questions

At a Glance

- Teachers' comments on children's skills and special needs allowed for a better understanding of the existing categories, and in particular, the *other* category.
- Teachers' comments for the *other* category included skills/talents in science & nature, technology & computers, building & constructing, and crafts.
- The majority of teachers' comments on children's special needs/problems were related to physical conditions and cognitive problems.
- The attendance of a wide variety of language and religion classes was reported by teachers.

In Section B (Language and Thinking Skills), Section D (Special Concerns) and Section E (Additional Questions) of the EDI questionnaire, teachers were asked to comment on individual children in terms of special skills, special needs and concerns, type of religion/language class a child attended, etc. A qualitative analysis was undertaken to systematize teachers' comments by identifying themes emerging in them. It should be noted, however, that the identified themes are not based on any established classification system. Rather, the analysis is intended to (a) inform and/or explain the EDI results of quantitative analyses; and (b) generate research questions/hypotheses for future research. Examples of teacher comments are provided to further clarify the meaning of a particular category. It must be acknowledged that there is no clear-cut border among the identified categories, and certain comments can be argued to fit better into a category other than the category it was placed initially. Many times teachers' commented on several aspects of a child's development, making it difficult to assign such comments to a single category/theme.

Special Skills and Talents

Questions #34-40 ask the teacher to identify ('yes', 'no', 'don't know') whether a child demonstrates special skills and talents in a certain area (i.e., numeracy, literacy, arts, music, dance, problem solving). The last question (#40) '*demonstrates special skills or talents in other areas*' asks the teacher to provide further specification of a child's skill/talent identified as 'other'. However, some teachers provided further explanation even if they selected 'yes' for any of questions #34-39. In total, 417 teacher comments on special skills and talents were retrieved from the 2010 EDI data, with a few comments being in French. The following

themes were identified with respect to special skills and talents demonstrated by individual children (Q B):

- Science & nature:
    - *Ability to understand and apply scientific concepts*
    - *Dinosaurs, marine animals*
    - *Extremely strong interest/aptitude for science*
    - *Environmental studies*
    - *Logic puzzles, space, geology*
    - *Scientific mind*
    - *Science, social studies*
    - *Special skills in scientific thinking*
    - *He knows tons about farm machinery and livestock*
    - *Knows an amazing amount of info about flowers*
    - *Knows detailed information about the solar system*
    - *He is interested in palaeontology*
- Technology & computers:
    - *Knows in-depth about motors, gears, machines*
    - *Very knowledgeable about technology and how it works*
- Numeracy & mathematics
- Building & constructing:
    - *He is adept at using construction manipulatives*
    - *He loves to build with lego*
    - *Creative builder – elaborate detail*
    - *Creating 3-d objects with blocks*
    - *Constructing trains and train tracks*
- Crafts
- Literacy:
    - *Exceptional reading skills*
    - *Fluent reader at about a grade 4 level*
    - *Reading and comprehending above a Grade 3+ level*
    - *She is a fantastic story-teller*
    - *Very strong with beginning writing skills*
    - *Writing creative stories*
    - *Can decode very well*
- Language skills & second language:
    - *Fluent in sign language – mom is deaf*
    - *Has paralysed vocal cords yet can speak 3 languages*
    - *Knows 3 languages*
    - *Oral language skills*
    - *Vocabulary and mature speech*
    - *Very verbal and articulate*
    - *Amazing, adult like vocabulary and expressions*

- Communication & leadership:
    - *Very sociable. Demonstrates leadership skills.*
    - *Leadership, teaching skills, interpersonal skills*
- Memory:
    - *Visual memory*
    - *Remembering dates, digits, president's names, facts*
    - *Recites memorized texts*
    - *Recalls information well*
    - *Memorizing chants, poems*
- Problem solving & thinking:
    - *Very good at putting together complex puzzles*
    - *Very mature at solving social problems*
    - *Finds common links to dissimilar events*
    - *At times, demonstrates higher order thinking*
    - *Demonstrates metacognition*
    - *Able to connect new knowledge to personal experience*
- Social skills & social-emotional maturity:
    - *Great friend, caring about others*
    - *Socially very well rounded child*
    - *Socially very kind and caring*
    - *Very socially mature*
    - *Very gentle and compassionate for age*
    - *Extremely positive and socially skilled child*
    - *Highly sensitive to looking after class members*
    - *Exceptional social awareness skills for her age*
    - *He has a social butterfly – great with people*
    - *Outstanding attitude demonstrated daily*
- Interest & inquisition:
    - *Great curiosity*
    - *Very motivated to learn*
- Arts & music:
    - *Voice*
    - *Very responsive to music*
    - *Very good at drama*
    - *Dramatic play: make-believe and role playing*
    - *She draws home interiors like an architect*
- Athletics & dance:
    - *Ballet*
    - *Horseback riding, rodeo*
    - *Gymnastics*
    - *Hockey, golf etc.*
    - *Agility (climbing, monkey bars, etc.)*

Special Problems

Out of the total of 457 teacher comments, the following themes were identified with respect to problem(s) influencing child's abilities to do school as demonstrated by individual children (Q D2):

- Physical condition:
    - *Wears glasses*
    - *Sensory disorder*
    - *Allergies and asthma*
    - *Digestive difficulties*
    - *Hearing impairment*
    - *Occupational therapy*
    - *Sleeping disorder*
    - *Seizures*
    - *Brain injury, brain surgery*
    - *Hemophilia; leukemia*
    - *Eczema*
    - *Club-footed; problems with joints*
    - *Dental problems*
- Cognitive:
    - *Severe receptive-expressive delay*
    - *Speech/language delay; stuttering*
    - *Autism*
    - *Asperger's syndrome*
    - *ADHD, FAS, ADD*
    - *Language comprehension, information processing*
    - *Fine and gross motor delays*
    - *Cognitive delays*
    - *Oppositional defiant disorder*
    - *Focus and attention*
- Behavioral problems
- Emotional:
    - *Anxiety disorder*
    - *Reattachment disorder*
- Age-related:
    - *Premature birth*
    - *Child will not dress or undress without help*

Information on a Diagnosis / Identification by a Doctor or Psychological Professional

In Question D3, teachers are asked '*If the child has received a diagnosis or identification by a doctor or psychological professional, please indicate (see the Guide for codes)'.* The teachers' comments either dealt with assessment either already received by individual children, going to receive, or expressing a need for an assessment. Only a small number of teachers provided codes from the Guide. The following categories were identified:

- cognitive, learning disabilities, ADHD, autism, ADD, FASD
- neurodevelopmental, neurological
- hearing
- vision
- motor skills (fine and gross)
- speech & language, ESL, stuttering
- social behavior
- occupational therapy (OT), physical therapy (PT)
- educational psychology
- psychological, emotional
- family-related problems
- giftedness; academic assessment for placement purposes

Early Intervention Program

In Question E1, teachers were asked whether or not a child attended an early intervention program, and if yes, then teachers were asked to specify the name of the program, if known. In total, there were 1,456 teacher comments about early intervention programs. The following types of early intervention programs were mentioned by teachers most often (Q E1):

- Headstart; ABC Headstart; aboriginal Headstart
- GRIT (getting ready for inclusion today)
- A particular specialist (physiotherapist, psychologist, OT)
- Speech-language therapy; Speech clinic
- Heritage program
- Early education program
- Social/play therapy
- School-based program
- PUF
- Pre-school, Playschool
- Homesteader
- Community options
- Orthophonie; Montessori
- Parents as Teachers
- Providence children's centre

- Renfrew educational services
- REACH (Resources in Early Childhood)
- Salvation Army Bridges program
- Educare
- EEP, ECDP, EPP
- Brighter Beginnings
- Busy bees
- Bridge Program

Language / Religion Classes

In Question E3, teachers were asked whether or not a child attended other language or religion classes, and if yes, then teachers were asked to specify what class, if known. Out of 956 teacher comments, the following types of language and religion classes (or their location) were specified by teachers most often. Some pastime-related classes were also included by teachers in this section (Q E3):

- Religion classes:
    - Mosque; Temple; United Church; Jehovah Witnesses; Pentecostal church; Sunday school; Spanish church; Wee college; Muslim/Islamic studies; Mormon church; Christian Sunday school; Catholic Sunday school.
- Language classes:
    - Vietnamese school; Turkish school; Urdu; Tagalog; Swedish school; Spanish; Chinese school; Russian; Serbian school; Polish; Mandarin; Cantonese; Japanese; Hebrew; Italian; French immersion/preschool; Greek; German school; French; English; Bulgarian; Arabic.
- Pastime classes:
    - Theatre; Dance

Teachers' Comments on Child's Readiness for School

At the end of the questionnaire, teachers were asked to provide any comments they had about individual children's readiness for school. The length of comments ranged from a few words to several sentences to a paragraph. The comments provided by teachers were positive as well as negative, and had to do with a child's family, including parents, siblings, caregivers, etc. behaviour in class, socio-emotional development, physical conditions, the need for further assessment or intervention, language and cognitive development. These comments present a rich source of information for generating further research questions/hypotheses in early child development.