Assessment of Early Childhood Education and Development 2019

A report on Early Learning and Development Standards (ELDS)

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Government of Nepal

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PREFACE

Proper early-year learning and growth of an individual offers a good basis for a person's overall development and well-being throughout life. In view of this, Nepal's government has made investments in education for early child growth. We need to provide the government with recommendations in order to further strengthen ECED centers. For this reason, only the accurate evaluation of children's early learning and development generates evidence to formulate sound policies, identify where additional interventions are needed and explore the issues. Moreover, the assessment will be helpful in identifying children who are struggling for learning, either on individual or group level and preparing evidence for tracking equity and quality. In this context, this research was able to assess the level of preparation of ECED children as per the Early Learning and Development Standards (ELDS) after the ECED intervention, identify the present status of physical and infrastructure met by the ECED centers and generate the evidence-based information for monitoring the performance of ECED children over the period.

Assessment of ECED children was first administrated in 2017 for the first time from Education Review Office (ERO). In all assessments, Early learning and development standards endorsed by government of Nepal and international practices were the foundation for developing the assessment framework. Tools were developed according to the assessment framework. Report of 2018 was breakthrough in reporting the level of development in different stages – struggling, progressing and on-track. This report is further advanced in defining the learning level of students by using Angoff method of benchmarking.

Throughout the process of tool development, test administration, data analysis and report writing, teachers, ECED experts and researchers have contributed in different many ways. I would like to acknowledge the collaboration and participation of UNICEF Nepal by providing financial and technical support. My sincere thanks go to the previous general directors of ERO. I highly appreciate Dr. Dipu Shakya for the technical inputs to finalize the report. I would like to place on record my gratefulness to ERO directors - Anupam Chandra Shrestha, Hari Prasad Aryal, Uttar Kumar Parajuli, Narayan Prasad Jha – section head and staff of ERO including Renuka Adhikari for their efforts and contributions.

Finally, ERO commends this report to education policy makers, programme designers, teachers, educators, community members and researchers for their reference for improving learning and development of ECED children.

Shiba Kumar Sapkota
Director General

Executive Summary

Introduction

Early Childhood Education and Development (ECED) intervention is considered critical as it leads not only to individual benefits through proper support of early brain development, but also to significant social return. In Nepal, the government has made a significant investment in ECED, including establishment and management of ECD centres, development of the Minimum Standards for ECD Centers, the ECED Curriculum and the Early Learning Development Standards (ELDS) and through mainstreaming a year-long ECED programs in the basic education system in 2016.

As the result of such efforts, high ECED access has been realized: the gross enrolment rate of children aged 3 and 4 was 85 % in the academic year of 2018/19. Given such a high access as well as the increased awareness of the importance of education quality, the focus has shifted to the quality of ECED and Early Childhood Development (ECD) outcomes. This report is a third report with a particular focus on the quality and outcomes aspects in the ECED system in Nepal.

Objectives

This ECD report has the following objectives:

1. To understand children's developmental and learning status and identify the proportion and characteristics of children who are at developmental risk.
2. To identify the quality and characteristics of ECED programs as per the management standards.
3. To examine relationships between ECED characteristics and children's development and learning status to generate evidence for program improvement.
4. (Overall Goal) To facilitate informed ECED reforms, including funding allocation, technical assistance and strategic changes.

Methodologies

Two assessment tools were used for this report: the ELDS assessment tool and the ECED management assessment tool. The ELDS assessment tool is the play-based assessment developed by the Education Review Office (ERO) based on the ELDS assessment framework according to the ECED Curriculum and the ELDS. The tool consists of 26 items with 58 sub-tasks, covering the following developmental domains: physical, language, cognitive and socioemotional/cultural domains. Based on the

results of the assessment, children were classified into three development categories: On track, Progressing and Struggling: On track indicates that children in this category are developed well and have achieved skills and knowledge as expected in the ELDS and been ready to study in grade one. Progressing category indicates that children in this category fall behind but are close to the ELDS. With limited support they can meet the standards of ELDS and will be ready to study in grade one. Struggling indicates that children in this category fall far below the ELDS and need significant assistance to come up to the standard and study in grade one.

The ECED management assessment tool is the observation-based assessment developed by ERO based on the Minimum Standards for ECD Centers and the ECED Curriculum. The tool measures infrastructure, health, sanitation, nutrition and security, and operation aspects of ECED programs as well as basic information of programs and their facilitators.

Multi-stage sampling with a mixture of purposeful and random procedures at the different stage was employed. In the first stage, 15 districts from the seven provinces were selected from the list of districts that were not included in the previous two rounds of studies. Purposive sampling approach was employed, aiming to reflect the distribution of ECED programs in the Nepal's geographical regions (Mountains, Hills and Terai). Based on the number of existing ECED programs in the districts, ERO assigned the number of ECED programs in each district to be included although this assignment is not strictly proportional.

In consultation with ERO, the respective Education Development and Coordination Unit (EDCU) selected school based ECED programs. In the selection of ECED programs, EDCU first identified programs which had 12 or more students in Grade one in the connected school to assure enough sample size from each setting. Furthermore, they considered the balance between urban and rural when selecting ECED programs. Most of the invited ECED programs agreed to participate in the school (i.e., overall participation rate is 96%).

In mid-June, EDCU randomly selected up to 12 children studying in Grade one with ECED experience from each school based ECED center. This selection of children from 469 ECED centers resulted in 5229 children who participated in the assessment. The data from these children and ECED programs were collected in June 2019.

Assessment results

According to the ELDS assessment results, approximately two-third of the children were classified as on track in the language, physical, and social-emotional domains. The proportion of on track children was smaller and less than a half in the cognitive domain. Based on the composite score of the assessment, 56% of children were on track while 33% and 11% were progressing and struggling. As children get older, they were more likely to be classified as on track across all domains. However, even when children were older than the ELDS target (i.e., 60 months or older), considerable proportions of children were progressing (26%) or struggling (8%). This finding suggests that children's development and learning can fall behind if they are not exposed to appropriate environment.

In terms of children's backgrounds, although boys were slightly more likely to be classified as on track than girls by one to four percentage points across domains, the differences are small and not statistically significant. Children with Nepali as their mother tongue were more likely to be on track across domains than children who have other language as mother tongue, particularly in the language and social-emotional domains.

The substantial differences in the children's development and learning status were found across provinces and districts. Gandaki province has the largest proportion of on track children, followed by Province 1 and Bagmati Province while Karnali Province shows the smallest proportion of on track children. The difference between in the proportion of on track children between Gandaki Province and Karnali Province is 43 percentage points. While these results imply the existence of gaps in development and learning across provinces, one should over-rely on the results as the sample does not represent provinces. Another important finding regarding the geographical comparison is that Although the physical domain shows the highest proportion of on track children (i.e., least problematic), followed by the social-emotional/cultural domain and then by language domain in many provinces have different trends.

The results from the ECED assessment reveals the issue in the development and use of annual plan and daily lesson plan, which is an important standard of the ECED quality. It was found that 22 % of the programs did not develop the annual plan and daily lesson plan based on the curriculum. The remining 78 % developed the plans, but only 30% fully implemented established plan in the classroom. It is also found that on the ECED Curriculum was not available in 70% of the ECED programs despite the contentious suggestion for the use of the curriculum not only to develop lesson and

activity plans but also to understand what skills and knowledge children are expected to develop according to their age. The vast majority of ECED programs (81%) used Nepali as the main language in the classroom. Although mother tongue of more than a half of the participating children is language other than Nepali, there were only a small number of ECED programs where other language was used in the classroom (6% for English and 13% for Others).

About a half (45%) of ECED programs had the class size of less than 20 children while nearly one third of the programs had 30 or more children in the classroom. There was a wide range of the child to facilitator ratio (CFR): while one facilitator took care of 3 children in some programs, in other extreme cases, one facilitator had to take care of 65 children. Approximately, 20% of ECED programs had CFR of larger than 25:1, suggesting that provision of facilitators was not sufficient to ensure responsive and sensitive interactions with children in one fifth of the ECED programs.

As for the ECED facilitators' characteristics, the study finds that one third of the facilitators had minimal level of educational qualification: Grade 10 or below, while a half of them had educational qualification of Grade 11 or 12 and one fifth of them had higher education (undergraduate or graduate levels) qualification. It is also revealed that the vast majority of the ECED facilitators have taken at least one type of training. Since they are required to take the 16 days basic training as a mandatory program, 95.4 percent of them have taken this type of training. Also, approximately two-third (65%) of the facilitators complied to the recommendation to take both the basic 16 days training and refresher training. Few facilitators took other type of training (e.g., those offered by private institutions) in addition to the basic 16 days training. On average, the ECED facilitators had working experience of 11 years, but the variation is substantial, ranging from one year to the maximum of 22 years.

To examine relationships between ECED characteristics and children's development and learning status, we conducted regression analysis using multilevel mixed models. From the regression analysis, we would like to highlight the following results:

- Full implementation of curriculum-based learning plans is positively associated with all development and learning domains while mere availability of plans and curriculum are not associated with the outcomes.
- Children in English speaking classroom showed higher language domain scores than those in Nepali speaking classroom while children in the classroom with other language have lower physical and language domain scores compared to those in

Nepali speaking classroom.

- A very small positive association is found between the facilitators' education and the status of children's development and learning, especially in the language domain. However, this was not found to be statistically significant.
- The facilitators' ECED training also didn't demonstrate a significant association with children's development and learning. In fact, small negative associations were found between facilitator's training and children's levels across all the domains.
- The experience of facilitators is negatively associated with all the domains. Such negative associations are significant in the cognitive and language domains and marginal in the physical and social-emotional/cultural domains.

While these findings are insightful, one should be aware that these associations do not mean causations. The observational study design with cross-sectional data does not allow for the strong causal inference especially variables for some important confounding factors, such as children's family social-economic-status (SES) and parent's education. The careful interpretation of the results for the policy implications and recommendations for the future study is provided at the end of the report.

Implications

The results of analysis lead to the following policy implications as well as recommendations for the future studies to generate more evidence on the important ECED topics:

- While more than a half of the children are found to be on track, significant efforts are necessary to support progressing and struggling children, particularly among children whose mother tongue is not Nepali.
- There is significant variation across the provinces in terms of which domain of development requires special focus. Therefore, a federal level one-size fits all approach is not likely to be effective, but a more localized response might be better suited to adapt to specific needs.
- While many ECED programs still need encouragement and support to develop learning plans, the support has to ensure that programs fully utilize learning plans.
- Many ECED programs have large class sizes and child to facilitator ratios (CFR). While small class size and CFR are important quality factors, achieving them is a costly practice. More studies need to be done to investigate the influence of large class size and CFR on how sensitively and responsibly facilitators interact with children to guide policy.

- Training for facilitators is the main professional development mechanism but does not seem to be working effectively. This might be due to the trainings' implementation mechanisms, however further studies are needed to develop effective training programs in terms of contents, implementation and ongoing support strategies, and tracking or accreditation systems.

Lastly, the data and methodology in this report are not without limitations. We provide the limitations at the end of the report not only to avoid over-interpretation and over-reliance on the results among readers and but also to guide our future work with improvement to generate more rigorous evidence. Contribution to this improvement process by readers through feedback on this report will be appreciated.

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Abbreviations

ANOVA	:	Analysis of Variance
BS	:	Bikram Sambat
CDC	:	Curriculum Development Centers
CI	:	Confidential Intervals
DoE	:	Department of Education
ECD	:	Early Childhood Development
ECED	:	Early Childhood Education and Development
EDCU	:	Education Development and Coordination Unit
ELDS	:	Early Learning and Development Standards
ERO	:	Education Review Office
EFA	:	Education for All
HSD	:	Honestly Significant Difference
IRR	:	Inter-Rater Reliability
MoE	:	Ministry of Education
MoES	:	Ministry of Education and Sports
MoEST	:	Ministry of Education, Science and Technology
NER	:	Net Enrolment Ratio
NGOs	:	Non-Governmental Organizations
PD	:	Professional Development
PLD	:	Performance Level Descriptors
PPE	:	Pre Primary Education
SDG	:	Sustainable Development Goal
SD	:	Standard Deviation
SE	:	Standard Error
SE	:	Social-Emotional
SES	:	Social-Economic-Status
SSDP	:	School Sector Development Plan
SSRP	:	School Sector Reform Plan
UN	:	United Nations
UNICEF	:	United Nations Children's Fund
UNESCO	:	United Nations Educational, Scientific, and Cultural Organization

1. Introduction

1.1 Background

From the human development perspective, early years of human being, particularly until the age of 5 years, are considered important (UNESCO, 2007; UNICEF, 2014). Neuroscience and development psychology provide compelling evidence for the critical importance of early years. Brain develops as a result of interactions with the environment rather than mere influence by heredity (Shonkoff & Phillips, 2000; McCain et al, 2002). Brain development takes place most rapidly in the first few years of life during which experiences either enhance or diminish innate potential, laying either a strong or a fragile platform for all further development and learning (Phillips & Shonkoff; Winter, 2010). On the one hand, a lack of appropriate stimulation, positive relationships and involvement with children are associated with compromised brain development as well as increased risk for behavioral and emotional problems (Phillips & Shonkoff, 2000; Shonkoff et al., 2012). On the other hand, high quality early childhood development (ECD) interventions are found to improve various domains of children's development and learning (Campbell et al., 2002; Heckman, 2008; Van Huizen & Plantenga, 2015).

ECD intervention is also considered critical from the social economic perspective. For instance, in the United States, high-quality early childhood education and development (ECED) intervention led not only to individual benefits, such as better school achievement, longer grade retention and higher earnings, but also significant social return, including higher tax revenues, lower criminal justice system expenditures and welfare payments (Belfield et al., 2006; Campbell et al., 2002; Heckman, 2006). Furthermore, the positive impacts of high-quality interventions are particularly significant among disadvantaged children (Heckman, 2008; Keys et al., 2013; Peisner-Feinberg et al., 2001; Van Huizen and Plantenga, 2015). As such, high-quality early childhood interventions can reduce poverty and inequity in the society.

Emanating from the human right perspective, ECD intervention is regarded as a part of

the natural repertoire of services that countries owed their citizens. According to the United Nations Convention on the Rights of the Child, children are active social agents, who have a right to survival and development in all aspects of their lives (UN General Assembly, 1989). The convention states that childhood is a special, protected time, in which children must be allowed to grow, learn, play, develop and flourish with

dignity (UN General Assembly, 1989). Thus, ECD services constituted a cornerstone of the social contract, and the government own the fundamental obligation to serve all citizens so that they can thrive and realize their full developmental potentials.

Recognizing the far-reaching implications of ECD from all these perspectives, ECD is among the most important developmental agendas globally. In the 2000 World Education Forum, one of key goals for Education for All (EFA) was related to ECED: "expanding and improving comprehensive early childhood care and education" (UNESCO, 2000, p. 15) with governments being considered to have the responsibility of promoting ECED programs. In the Sustainable Development Goals (SDGs), ECED is not only recognized as the important goal itself as the Target 4.2 aims to ensure "access to quality early childhood development, care and pre-primary education so that they are ready for primary education" (United Nations General Assembly, 2015, p. 19), but also it is identified as a pivotal element for achieving other proposed educational goals (Raikes, 2016). Thus, governments now have the increasing responsibility of serving young children well and are expected to be accountable for their policy.

1.2 Context of ECED in Nepal

In Nepal, the government has promoted and expanded ECED services since the 1950s (Kadel & Mahat, 2011). Then in the 1990s, the government accelerated efforts by implementing ECED programs through the Local Self-Governance Act of 1999, which gave the authority to the local bodies to establish ECED programs with their own resources and grant permissions to establish, and run such programs (World Bank, 2013). The government adopted the goals and strategies of the EFA and developed a strategy paper in 2004 (MoES, 2004). While ECED services had the strong emphasis on academic aspects since the early 1980s, they became more holistic within the EFA framework.

In the School Sector Reform Plan (SSRP): 2009-2015, it is stated that the government will fund one-year ECED programs for children of four year of age, and communities may, however, offer ECED services for children below the specified age, mobilizing their own resources (MoE, 2009). ECE program has been available for children 3 to 4 years but was not compulsory until recently. Under the 8th amendment of Education Act, a year-long ECED programs four-year-old children was mainstreamed under the basic education system in 2016 (MoE, 2016). As the result of such efforts, Nepal has achieved high enrolment rates in ECED; the gross enrolment rate of children aged three and four was 84.7 percent in the academic year of 2018/19 (DOE, 2018).

With a view to promote a comprehensive approach to ECED programs for safeguarding the rights of youngsters, the strategy paper on ECD in 2004 emphasizes the full development of children's physical, socio-emotional, cognitive, spiritual and moral potentials (MoES, 2004). Aiming at maintaining standard in ECED service and facilities, an operation and management guideline has been developed by the Ministry of Education and Department of Education (DOE, 2067 BS). To ensure learning and development standards in all ECD centers; the ECED curriculum and the Early Learning Development Standards (ELDS) spell out what ECED children should know and be able to perform (DOE, 2062 BS; DOE, 2069 BS). The School Sector Reform Plan (SSRP) 2009-15 (MoE, 2009) and the School Sector Development Plan (SSDP) 2016-2023 have also repeatedly pointed out the need to improve quality aspects of ECED programs (MoE, 2016).

ECED program in Nepal is either community or school based in terms of management and operation. Both are designed to meet educational and developmental needs of children with the fund and support from the government and/or community. One managed and operated by the public sector or the government is called ECD centers or ECED program. Further, ECD centers consist of those that are operated under the school system (school-based ECD centers), also called pre-primary education (PPE), and those run by the community (community-based ECD centers). ECED programs run by institutional schools are called institutional PPE. Out of 35,993 ECED/PPE services in the academic year of 2018/2019, the vast majority (23,228) of them were school-based ECD centers while community based ECD centers and institutional PPE had 6,869 and 5,896 programs, respectively.

Regarding the terminology, two terms are found to have been used interchangeably for pre-school program in Nepal. The former policy and plan documents, such as the Early Childhood Development Handbook (Curriculum) (DOE, 2062 BS), the Strategy Paper for ECD in Nepal (MoES, 2004) and the National Minimum Standards for ECD Centers (DOE, 2067 BS), used the term Early Childhood Development (ECD). The SSRP and the SSDP have mentioned it as Early Childhood Education and Development (ECED) (MoE, 2009; MoE, 2016). Following the latter, we will use the term of ECED.

1.3 Context of ECED assessment in Nepal

As the national standard of expectation of what children should know and be able to do, the government of Nepal started to develop the ELDS in 2008 and conducted validation from 2009 to 2011 (DOE, 2069 BS; UNICEF, 2017). Also, the National

Minimum Standards for ECD Centers was established to regulate management and facilities of ECED in 2010 (DOE, 2067 BS). Despite the availability of these standards, the systematic assessment of early learning and development of children and management of ECD centers was not carried out until 2017.

As one-year ECED was included in free and compulsory basic education in 2016 (MoE, 2016), the priority to reflect national status on ECED and young children served by ECED became crucial. Furthermore, under the SDGs, countries have the responsibility to monitor and report where they stand against the indicators for the established targets. One of the indicators for the SDG target 4.2 is "proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being" (United Nations General Assembly, 2017, p. 5). Thus, there was an increasing demand for the assessment of early learning and development by globally accepted domains based on standard framework. Given the context, an initiative for assessing ECED management and early learning and development of children has been initiated by the ERO since 2017. The process for the development and improvement will be described in the section 2.1 in this report.

Utilizing these standards-based assessment tools, there have been two rounds of national studies on ECED. First round of the study was conducted in 2017 with the data collected from 1835 children and 150 ECED centers in 10 districts (ERO, 2017-b). In the following year, ERO conducted the second round of study and collected data from 3675 children and 44 ECED from 15 districts (ERO, 2018). As a continuous effort and upon some improvements on the assessment tool, this report is prepared for the third round of the study.

1.4 Objectives of report

Considering the importance of ECED from human development, social-economic, and human right perspectives, numerous stakeholders, including parents, teachers, and policy makers have been making a significant investment for learning and development of children in ECED. In this regard, understanding what and to what extent children are developing and learning at ECED is one of the important concerns for all parents, policy makers and general public. This study is guided with an inherent interest in generating reliable and objective evidences on how the interventions made for ECED has been working in meeting the desired goals. More specifically, this assessment intends:

a. To better understand individual children's developmental and learning status as

per the ELDS and identify the proportion and characteristics of children who are at developmental risk.

b. To identify the quality and characteristics of ECED programs as per the management standards by auditing the management standard met by the running ECED.

c. To examine relationships between characteristics of ECED programs and children's development and learning status in order to generate evidence for program improvement.

d. (Overall goal) To facilitate informed ECED reforms, including funding allocation, technical assistance, strategic changes, by a) promoting self -realization, b) creating pressure through the outsiders and general public, and c) enforcing legal provision.

1.5 Structure of report

This report is organized in six chapters. The first chapter presents the background and sets the context of ECED assessment in Nepal, followed by the need and objectives of this study. The second chapter deals with the methodology, describing the assessment tools, sample and analysis process. This chapter also describes limitations so that readers would be properly guided on the quality of evidence. The third chapter describes the results of early learning and development standards met by the children after the ECED intervention (i.e., attendance in school-based ECD centers). The ELDS performances have also been presented in relation to some important children's characteristics, such as gender, age, and linguistic background. The fourth chapter presents the ECED characteristics and management standards of ECD. The fifth chapter describes the relationships between ECED characteristics and children's learning/ development status. The last chapter presents major findings and implications.

2. Methodology

2.1 Assessment tools

2.1.1 ELDS assessment framework and tool

Under an international momentum to support ECED, UNICEF initiated work on ELDS in 2002, through a project entitled *Going Global with indicators of child well-being: using a standards approach* (UNICEF, 2017). The ELDS reflects what children should know and be able to do with respect to various domains of child development, including their physical, cognitive, social-emotional and language development (UNICEF, 2017).

In Nepal, ELDS was adopted in 2008 and validation were conducted from 2009 to 2011 by the national working group (UNICEF, 2017). The standards focus on children of age 48- 60 months, which corresponds to the target age of the one-year ECED in Nepal. The standards were developed around the six domains which stem from the values emphasized by the country team: Physical, Social, Emotional, Cognitive, Language, and Cultural development. Despite the comprehensive standards available within the country, Nepal was not effectively utilizing the ELDS till 2017 (Shrestha et al., 2017).

ERO took the leadership to develop the tool to assess the status of ECED children based on the ELDS in 2017 with support from UNICEF Nepal. There were several rounds of consultations with key personnel involved in ECED planning and program implementation. Various national and international literatures sources on assessment of early learning and development were reviewed to develop the assessment framework (ERO, 2017-a; Shrestha et al., 2017). The framework articulates domains of children's learning and development as well as more specific standards from subdomain through tasks relevant to the domain (see Appendix 1). Based on this assessment framework, the ELDS assessment tool was prepared by expert and teacher workshop and had 44 items with some sub-tasks within items at the beginning. Later, it was piloted with over 500 children and analyzed to examine items' objectivity, feasibility and relevancy, which led to some items to be discarded (ERO-b, 2017). Finally, 44 items were reduced to 28 items by a consultation workshop. Children's performance on tasks was scored by oriented enumerators based on observations with standardized administration and scoring procedures. Enumerators scored 2 if children performed a task correctly, 1 if performed partially correctly, and 0 if performed incorrectly or did not respond. Domain scores were obtained by dividing the sum of task scores by maximum possible

scores, which thus, correspond to the percentage of subtasks that the child performed correctly.

In the national ELDS workshop held by ERO, UNICEF and Save the Children in 2019, standard setting was conducted to establish cut-scores on the assessment scale to classify children into three levels of development status (development categories): *On track, Progressing and Struggling.* Cut-score enabled the country to monitor to what extent children in Nepal are 'developmentally on track', corresponding to the global call based on the SDG target 4.2. Also, the tool was scrutinized by the measurement experts and ECED stakeholders through the workshop, which resulted in minor revision of items and administration and scoring guidelines. The revised tool has 26 items with 58 sub-tasks (Appendix 2).

Since the cut-scores established in the 2019 workshop was for the ELDS assessment tool prior to the revision, the revised tool required updated cut-scores. Therefore, ERO and UNICEF held the workshop in 2020 June for the standard setting based on the current ELDS assessment tool. The detailed description of standard setting procedures and established cut-scores will be provided in the section 2.4.2 below.

Despite continuous efforts to develop and improve the ELDS assessment tool, the evaluation of the resulting scores in terms of their reliability and validity have not been reported. Once an assessment tool was developed, it is critical to evaluate the extent to which it actually yields meaningful results in the intended context by gathering evidence of validity and reliability. The absence of such information to date made the past reports that used the ELDS assessment scores questionable in their quality, and it also masks the limitations and space for improvement.

To fill this gap, we conducted analysis on the reliability and validity from various aspects as a separate study. This study provides some evidence for reliability and validity of the ELDS assessment tool. However, it also reveals a few limitations. In brief, the evidence shows high reliability of domain scores1 and supports discriminant validity while there are limitations in their content relevancy, content representativeness and factorial validity. That is, one can be certain that ELDS domain scores consistently measure the four distinct domains of children's learning and development. However, there are some aspects of the assessment framework that are not covered in the assessment

1 Three domains of the ELDS assessment: social, emotional, and cultural, have two or three items, which led to an issue of low reliability. For this practical reason, we combined these three development domains into one domain.

tool, implying that the assessment tool misses some part of children's learning and development in the specified domains. Also, some assessment tasks seemed to be not relevant as an indicator of particular domain of learning and development. Thus, one should be aware that the results of the ELDS assessment tool cannot capture full scope of holistic development of children. While this report provides the informative evidence, one should be advised not to use this report as a sole base of any important decisions, especially when they have high stakes.

2.1.2 ECED management standard assessment framework and tool

Similar to the ELDS, despite the availability of the Minimum Standards for ECD Centers (DOE, 2067 BS), it was not well utilized for systematic assessment. However, the necessity of the assessment of ECED management and facilities quality was recognized. Various ECED stakeholders, such as policy makers, program planners and practitioners, needed a tool to measure the extent to which ECED programs meet the standards. Such information hold providers of ECED programs accountable and assist them in improving ECED programs. Also, there was a demand for the assessment tool for the evidence generation purpose. To effectively support children's holistic learning and development, ECED stakeholders have long been interested in identifying the ECED factors that are associated with children's development. Such an evidence can support effective program improvement.

Recognizing these demands, ERO developed the assessment framework for the assessment of ECED management in 2017 (ERO, 2017-a) based on the National Minimum Standards for ECD Centers (DOE, 2067 BS) and the Early Childhood Development Handbook (Curriculum) (DOE, 2062 BS). The assessment framework for the ECED management has three major domains: Physical Infrastructure/Facilities; Health, Sanitation, Nutrition and Security: and Operation. Within each domain, there are number of specific aspects. This framework provided the foundation to develop the assessment tool.

Table 2.1. The assessment framework for the ECED management.

Management Domains	Specific Aspects	Measurement criteria
Physical Infrastructure/ Facilities	Building, Room of center, Management of Room, Sitting Arrangement, Library and Learning Corners, Management/ decoration of Room, Availability of Learning Materials, Instructional Materials, Learning Play Materials	Each of these aspects will be measured on 4 points rating scales: 3 for meeting ideal standards, 2 for meeting basic standards, 1 for meeting minimum standards. 0 for meeting none of the standards
Health, Sanitation, Nutrition and Security	Health facilities, Sanitation, Management of Day Meal, Safety and Security of Children	
Operation	Regularity, Qualification and Training of Facilitators, Record management	

The ECED management assessment tool consists of two sections. The first section is the background information questionnaire, which includes the questions regarding the name and location of ECED program, medium of language in the class and information of teachers, such as educational qualification, training status, and working experience. The second section consists of twenty indicators which were developed based on the assessment framework for the of ECED management (ERO, 2017-a) (see Appendix 3). Each indicator is scored with the four points rating scale: 3 for reaching to ideal standard, 2 for meeting basic standard, 1 for meeting minimum standards and 0 for meeting none of the standard (below minimum standard). The assessment is conducted based on the observation of ECED programs by oriented enumerators.

2.2 Sample

2.2.1 Selection of sample

From the list of districts that were not included in the previous two rounds of studies, 15 districts from the seven provinces were selected by ERO in March 2019. Purposive sampling approach was employed, aiming to reflect the distribution of ECED programs in the Nepal's geographical regions (Mountains, Hills and Terai) (see Figure 2.1). To obtain more comprehensive information than before, ERO decided to increase the sample size of ECED centers from 300 in 2018 to 500 in 2019. Based on the number of existing ECED programs in the districts, ERO assigned the number

of ECED programs in each district to be included (see fourth column of Table 2.2) although this assignment is not strictly proportional.

Figure 2.1. Sample selection map of Nepal

In consultation with ERO, the respective Education Development and Coordination Unit (EDCU), the district level education office under the Ministry of Education, Science and Technology (MoEST), selected school based ECED programs in early June 2019. In the selection of ECED programs, EDCU first identified programs which had 12 or more students in Grade one in the connected school to assure enough sample size from each setting. Furthermore, they considered the balance between urban and rural when selecting ECED programs. However, as there was no specific rules and criteria in the selection of ECED programs, the EDCU's attempts to balance the sample between urban and rural setting might vary district to district. Most of the invited ECED programs agreed to participate in the school (i.e., overall participation rate is 95.4%) (see Table 2.2).

Table 2. 2. Province and district-wise number of sampled and participated ECED and children

Province	District	% of school based ECED	No. of sampled ECED	No. of participated ECED	No. of participated children
Province 1	Morang	66%	50	48	566
	Solukhubu	90%	20	20	167

Province 2	Saptari	88%	50	50	539
	Rauthat	92%	50	50	600
Bagmati	Sindhuli	86%	35	35	371
	Bhaktapur	46%	35	35	417
	Dhading	90%	30	16	181
Gandaki	Mustang	91%	10	9	69
	Nawalparasi East	75%	40	40	474
Lumbini	Bardia	77%	50	48	559
	Rolpa	88%	20	20	240
Karnali	Mugu	94%	20	10	79
	Jajarkot	88%	20	19	223
Sudur-paschim	Kanchanpur	66%	50	50	526
	Darchula	91%	20	19	218
Total		79%	500	469	5229

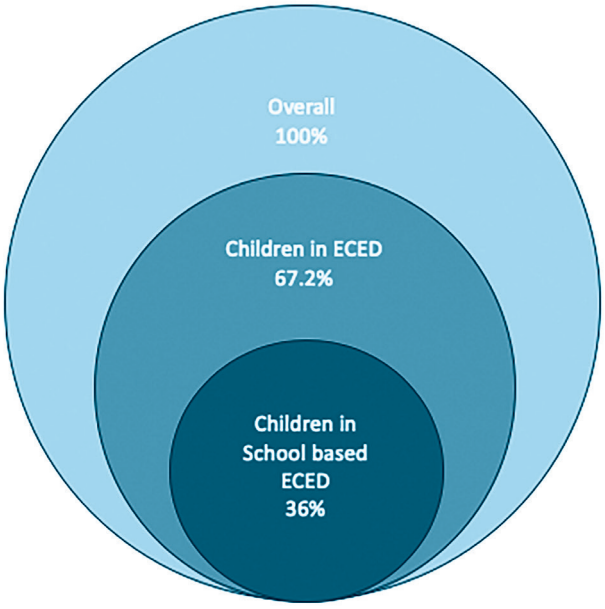
Note: Percentage of school based ECED to all type of ECED services is based on 2019/2020 Flash report I (DOE, 2020).

In mid-June, EDCU selected 12 children studying in Grade one with ECED experience from each school based ECED center. When there were more than 12 eligible children, they were randomly selected. In case where less than 12 students enrolled or presented on the day of assessment, all presented students were included. This selection of children from 469 ECED centers resulted in 5229 children who participated in the assessment. The data from these children and ECED programs were collected in mid-June 2019, which was around two months after children's promotion from ECED to Grade one.

It is important to note that some aspects of ECED management data cannot be well connected to children's data. This is because the ECED data reflect the situations of ECED centers in 2076 when the participated children were already in Grade one. For instance, information on the number of ECED teachers in ECED centers collected in the study may be different from that of 2075 when the studied children were in those settings. Some information, such as the number of children in the ECED class, may be more susceptible to this data collection timing issue compared to other information, such as physical infrastructure and training status of the teachers.

One should also bear in mind that the sample focused only on community school-based ECED programs (ECD centers/Pre-primary classes) and that the selection of districts and ECED centers was not random. First of all, there is substantial number of children who do not have access to ECED/PPE. The national net enrolment ratio (NER) in ECED/PPE was 67.2%, and this ratio was further low in Province 2 (34.1%) in the school year of 2019-20 (DOE, 2020). Also, the current ERO study focuses only on school-based ECED programs, so children in community-based ECED and institutional programs were not covered in the study. Although school-based ECED programs is the major modality, which accounts for 78 % of ECED/PPE national-wide and 79 % in the studied 15 districts, focusing only on this modality makes it impossible to get comprehensive picture of ECED. Thus, the population to which this study can be generalized is only school based ECED programs in the selected districts and children who went to those programs (i.e., 36% of the overall children) but not the entire ECED services and children in Nepal (see Figure 2.2). Furthermore, the extent to which this study can be generalized to such population without bias is limited due to non-random sampling approach. Despite these limitations, the current study can provide insights into the status of ECED centers and enrolled children in Nepal with careful consideration of the sampling issues interpreting the results.

Figure 2.2. The proportion of study population (children in school based ECED) to overall children

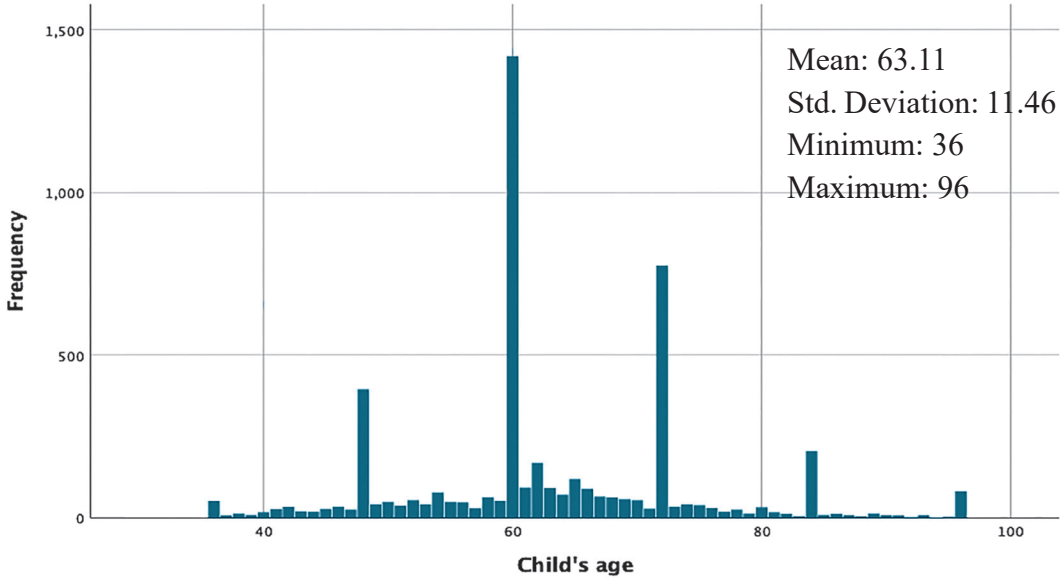


Note: The proportion of children in school based ECED (36%) is calculated as follows based on 2019/2020 Flash report I (DOE, 2020): the proportion of children in any type of ECED (national NER: 67.2%) multiplied by the proportion of children in school based ECED to those in any type of ECED/PPE in participating districts (54.2%).

2.2.2 Summary statistics of sample

We provide descriptive statistics of the studied children. First, Figure 2.3 shows that the current sample includes children with the age ranged from 36 to 96 months with the average being 63.11 months. Less than a half (i.e., 45.3%) of them were in the target age of the ELDS assessment (i.e., 48 to 60 months) at the time of data collection. As the data was collected when the children already moved from ECED to Grade 1, a large proportion (i.e., 44.7%) of the children were over-aged (i.e., 61 to 96 months). Some unnatural and unexpected spikes in the distribution of children's age (e.g., at age of 48, 60 and 72 months) may indicate the possibility of measurement errors.

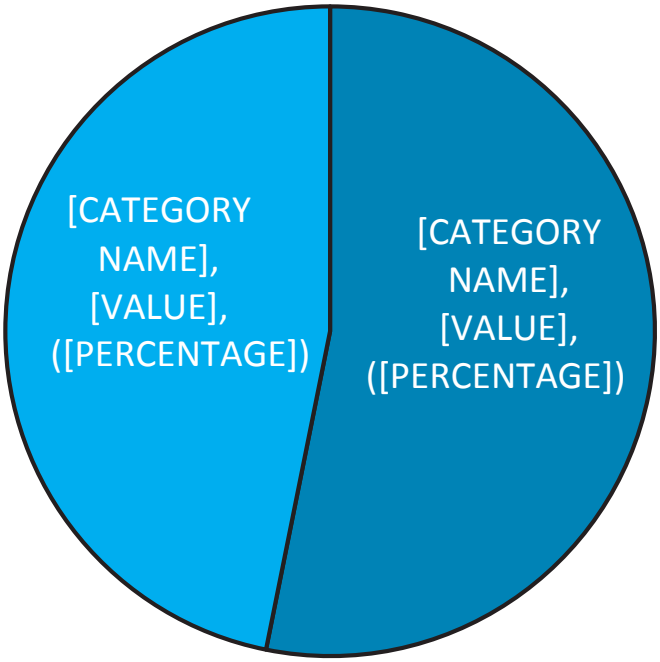
Figure 2.3. Histogram of Children's Age (N=4,994)



Note: As there are 235 missing cases on the variable of age, the sample size is 4,994. The missing cases include 153 cases that were omitted as errors (below 36 months and above 96 months) in addition to initially missing 82 cases.

Figure 2.4 shows that the proportion of female children (53%) is larger than that of male children (47%) in the sample. This information is slightly inconsistent with the distribution of gender in the population (i.e., children who were in school based ECED programs in the selected 15 districts in the school year of 2019/2020): 49.8 percent was female while 50.2 percent was male (DOE, 2020). Thus, in the process of selection of children, female children were slightly oversampled, which might be due to sampling variation at school level and unreported cases of gender.

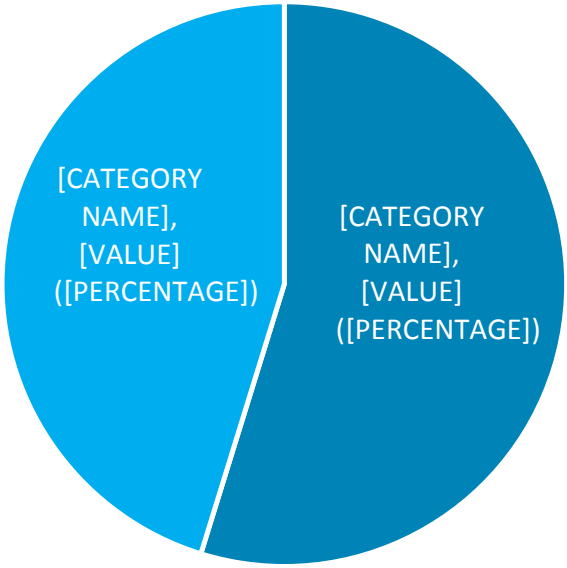
Figure 2.4. Proportion of children by gender (N=5218)



Note: As there are 11 missing cases on the variable of gender, the sample size is 5,218.

Figure 2.5 presents that slightly less than a half (i.e., 45%) of the children spoke Nepali as their mother tongue while the rest of children had other language than Nepali as their mother tongue. There is no available information of mother tongue of the population, and thus, it is not possible to see how representative the sample is against the population in terms of mother tongue.

Figure 2.5. Proportion of children by mother tongue (N = 5179)



Note: As there are 50 missing cases on the variable of mother tongue, the sample size is 5,179.

2.3 Assessment administration

One of the most crucial aspects of data collection to ensure the quality of data is the role of enumerators and their capacity development. To develop the enumerators' capacity for the standardized assessment administrations and scoring, ERO has conducted two days training for trainers at the central level. Then, the central level trainers have conducted 2 days district level training for enumerators in the selected 15 districts. The enumerators were the experienced teachers with bachelor or higher degree. The training program provided the concept of the assessment and explained its importance, assessment frameworks, tools and the administration process in detail. During this training session participants had the opportunity to gain real classroom based experience to assess children's learning and development by visiting some ECD centres, followed by a review and discussion session.

As for the administration of the ECED management assessment, first, a short meeting was held with management/administration staff and/or teachers at the ECED programs to provide the information on the assessment, including its objectives and importance. Since some of the indicators in the assessment require the information provided by the ECED programs in addition to enumerator's observation, enumerators

requested management/administration staff and/or teachers from the ECED programs for as accurate data as possible. The observation was conducted by enumerators with the accompany of management/administration staff and/or ECED facilitators of the centre rather than independently.

As for the administration of the ELDS assessment, enumerators asked ECED teachers/ facilitators for their support to establish a suitable assessment environment to ensure security and comfortableness for the assessed children and avoid distraction. Once such an environment was established, enumerators invited the child and performed some ice-breaking activities with her/him according to the assessment guidelines to develop rapport. Then, enumerators provided some stationary to children for their participation. The ELDS assessment was conducted independently by enumerators without the presence of ECED facilitators and other staff. All the data collection was paper-based. Meaning that enumerators recorded the data on the standardized forms printed in paper. Most of the questions were administrated in one-to-one mode though very few questions were also possible to assess in group. The data collection was monitored by ERO officials in some centres to assure the quality data collection administration.

2.4 Data analysis approach

2.4.1 Data cleaning and merging

The ELDS assessment data and ECED management standard assessment data collected by enumerators were input into data file using the data analysis software SPSS by 23 in 2077 (2020). Data analyst from ERO conducted data coding, recoding to create relevant categorical variables, and merged the two sets of data on the SPSS. Two analysis scrutinized the merged data independently to identify errors in the dataset. Upon the discussion between the analysists and consultation with relevant personals from ERO and UNICEF, some erroneous data were omitted from the dataset for the analysis. The variables that had erroneous values include children's age, the number of ECED facilitators and class size.

2.4.2 Standard setting for development categories

In the national ELDS workshop held by ERO and UNICEF in 2020, standard setting was conducted to establish cut-scores on the ELDS assessment scale to classify children into different development status in a defensible way with expert's judgement on difficulty of the ELDS assessment tasks. In the previous standard setting activity

in the national ELDS workshop in 2019, the panel of ECED stakeholders, which consisted of key personnel involved in ECED planning and program implementation, decided to have three development categories: On track; Progressing; and Struggling. The rational for having three categories rather than binary category of on track or not is that having three categories would facilitate better understanding of development status of children, especially those who fall behind the expected development and learning as per the ELDS, which further leads to adequate and sensitive intervention designing. Conceptually, three development categories are defined as follows:

- **On track** category indicates that children in this category are developed well and have achieved skills and knowledge as expected in the ELDS and been ready to study in grade one.
- **Progressing** category indicates that children in this category fall behind but are close to the ELDS. With limited support they can meet the standards of ELDS and will be ready to study in grade one.
- **Struggling** category indicates that children in this category fall far below the ELDS and need significant assistance to come up to the standard and study in grade one.

We developed performance standards and cut-scores to classify children into these three levels of development categories for the following purposes:

1. To communicate ELDS assessment results in a meaningful way.
2. To identify children who are at risk of not reaching expected developmental and learning outcomes, either on an individual or group level.
3. Assist the policy makers in monitoring the proportion of children who are developmentally on track as per the indicator for the SDG target 4.2.

A standard setting team, consisting of two from ERO and two from UNICEF Nepal, prepared for the workshop in the mid-June. Following a suggestion in the literature (Kane, 1994) that based on democratic values, cut-score should reflect the participation of all the stakeholder groups that have an interest in the standard and resulting decisions, we decided to include 15 to 20 participants from various group of stakeholders, such as Ministry of Education, Science and Technology (MoEST), ERO, Curriculum Development Centers (CDC), local government, NGOs, and ECED facilitators. We also aimed in ensuring participants' diversity in terms of geographical area, organizational background, and educational responsibilities as suggested by the literature (Hambleton, 2001). Finally, based on suggestions of Kane (1994) and Brandon (2004), we tried to ensure that all participants have general knowledge of

ECED and at least a half of them has expertise in ECED and familiarity with the target age children. During the workshop for the standard setting, panelists with expertise in ECED and familiarity with the target age children were expected to share their knowledge to others who do not have the same level of expertise through discussion so that all the participants have clear understanding on target children to establish cut-scores.

Prior to the workshop, we prepared performance level descriptors (PLD) for each domain of children's learning and development. The PLD consists of statements of the knowledge, skills, and abilities of children who would be in each of the development categories. The PLD is important for panelists to complete their tasks of establishing cut-scores and to communicate the meaning of the developmental categories to the public. Based on the conceptual definition of three development categories and the ELDS assessment framework, we articulated the PLD (see Appendix 4).

Regarding the standard setting method, we decided to employ the Angoff method as it has advantaged over other options in terms of quality, feasibility, and sustainability. In the Angoff method, experts were asked to conceptualize a specific borderline (minimally on track and minimally progressing) child they had taught and share such a description with others in the group discussion. They developed a statement of the performance that is expected of children at the borderline of a specified level of competence (performance standard) based on the PLD and experts' statement of particular borderline children. Keeping this child and performance standard in mind, they were directed to independently estimate the proportion of borderline children that would correctly perform each of the ELDS assessment tasks (item rating). After the first round of item rating, experts were provided with actual performance data (i.e., item difficulty) as a reality check to prevent them from misjudging how difficult the item actually was for the children. Also, experts were provided with descriptive statistics of other's rates and directed to discuss on some inconsistencies. After this reality check and discussion, experts were again directed to independently estimate the proportion of borderline children that would correctly perform the task. Based on this second round of item rating, the ratings were averaged across experts for each item and then summed to obtain a panel-recommended raw cut-scores (see Table 2.3). This cut-scores then represent the scores which the panel estimates minimally on track children and minimally progressing children would get, respectively.

Table 2.3. Computed cut-scores for four development domains

Development domain	Minimally on track	Minimally progressing
Cognitive	78.0	59.3
Language	75.7	57.7
Physical	72.9	54.3
SE/Cultural	78.4	60.6

We present results from a number of analysis using these cut-scores in the third chapter. Readers should interpret the results with caution as the established cut-scores are not without limitations in their validity and reliability as we will explain more in depth in the last chapter.

2.4.3 Data analysis approach

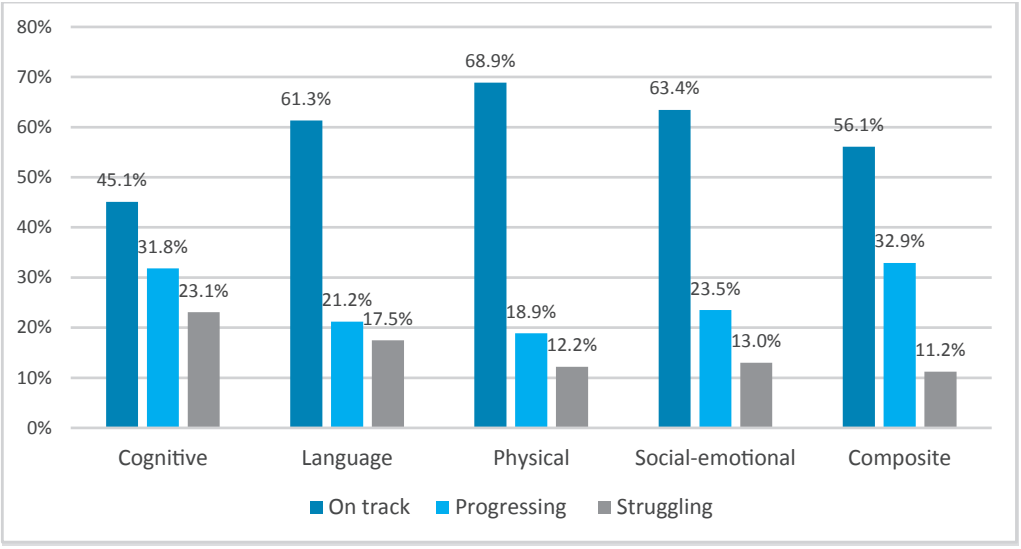
Based on the cleaned dataset, one of the analysts conducted the data analysis using the SPSS version 26. All the analytical procedures were reviewed by the other analysis for the quality check. The results of the analysis were displayed in the following three chapters. In the chapter 3, the results of analysis on children's development and learning status using development categories are provided. In this chapter, the proportion of developmentally on track children in each of four development domains by some important children's characteristics and geographical areas are presented. In the chapter 4, results of analysis on ECED management assessment in four aspects: Physical infrastructure, Classroom materials, Classroom management, and Facilitator's characteristics, are provided. In chapter 5, first, we provide the results of bivariate analysis on the relationship between single ECED management factor and children's development and learning status, measured by raw ELDS domain scores. To see the relationship between each ECED characteristics and management factor and children's development and leaning controlling for other aspects of ECED characteristics and management and some children's characteristics, we also provide the result of multiple regression analysis. Although most of analysis are descriptive, we also provide the results of statistical tests to see if differences or relationships found in the analysis can be generalized to the aforementioned population beyond the current sample.

3. Children's development and learning status

3.1 Children's development and learning status based on development category

Figure 3.1 presents the proportion of children in each development category for four development domains as well as composite ELDS for summary. Approximately two-third of the children were classified as on track in the language, physical, and social-emotional domains. The proportion of on track children was much smaller and less than a half (45.1%) in the cognitive domain. In the cognitive domain, about one third and one fourth of children were in the progressing and struggling category, respectively.

Figure 3.1. Domain-wise comparison of children in each development category (N=5,229)



3.2 Children's development and learning status by their characteristics

This section provides the results of comparison analysis of children's development and learning status by three important characteristics of children: gender, age, and mother tongue.

3.2.1 By gender

Table 3.1 provides the proportion of children who were on track in each development domain by gender with a visual presentation in Figure 3.2. Across domains, the gender-wise difference in the proportion of on track children is small, ranging from 1.1 to 4.0 percentage points difference. In all of four domains, the proportion of on track children is slightly larger among male children than female children. However, statistical tests based on Chi-Square Test suggest that on one hand, in the language and cognitive domain, such small differences are not statistically significant at the 95 percent confidence level, indicating that these differences are not generalized to the population. One the other hand, differences in the cognitive and social-emotional/ cultural domain are statistically significant and thus implies that boys were more likely to be developmentally on track in the cognitive and social-emotional/cultural domain than girls.

Table 3.1. Proportion of on track children for the four domains by gender (N=5,218)

	Cognitive	Language	Physical	Social-emotional /Cultural	Composite	N
Female	43.3%	60.3%	68.5%	62.1%	55.0%	2774
Male	47.3%	62.8%	69.6%	65.1%	57.5%	2444
Difference (Female - Male)	-4.0%*	-2.5%	-1.1%	-3.0%*	-2.5%	

Note: As there are 11 missing cases on the variable of gender so the sample size is 5,218. The asterisk * indicates that the difference is statistically significant at level.

Figure 3.2. Proportion of on track children for the four domains by gender

(N=5,218)

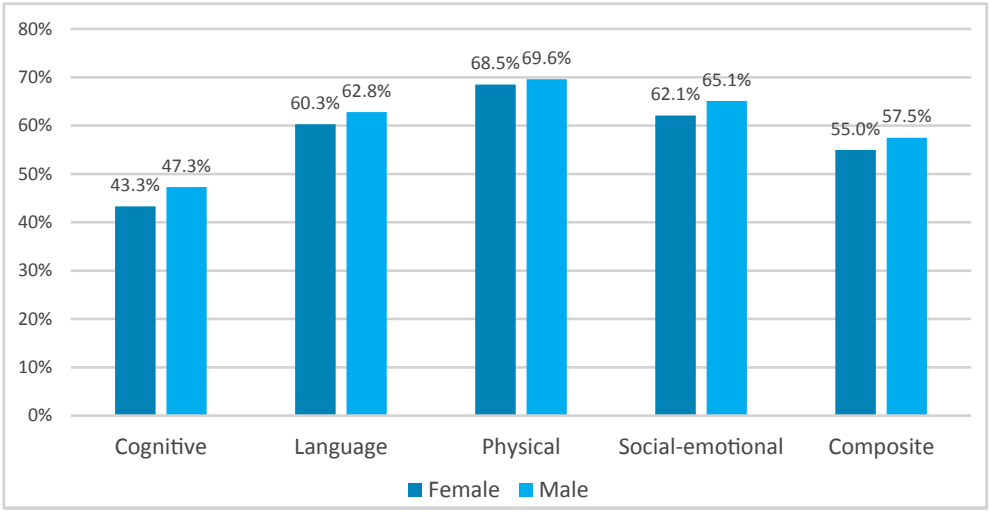
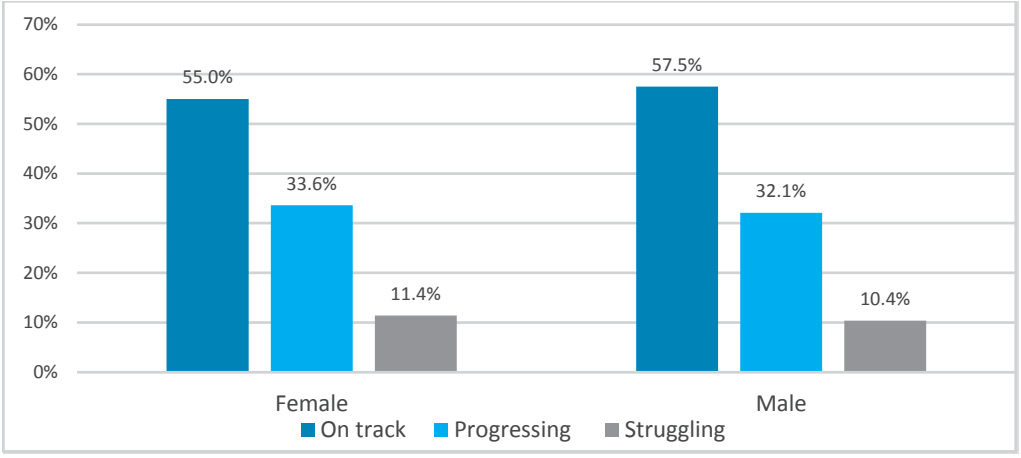


Figure 3.3 shows that the proportion of children in each development category based on the composite ELDS is quite similar between female and male children. This finding indicates that there is no specific gender-wise gap in development and learning status in the studied context.

Figure 3.3. Gender-wise comparison of composite ELDS standard (N=5,218)



3.2.2 By age group (under-age, target-age, over-age)

Table 3.2 provides the proportion of children who are on track in each development domain by the age group with a visual presentation in Figure 3.4. Across domains, the age-wise difference is substantial. Statistical tests indicate that differences between age groups are statistically significant at the 95 percent confidence level in all domains:

That is, as children get older, they are more likely to be on track in all aspects of development and learning.

Table 3.2. Proportion of on track children for the four domains by age group (N=4,994)

	Cognitive	Language	Physical	Social-emotional /Cultural	Composite	N
Under-age	27.7%	46.6%	50.7%	51.7%	40.4%	292
Target-age	38.4%	56.4%	65.1%	59.3%	48.4%	2366
Over-age	53.9%	68.4%	75.5%	69.1%	65.9%	2336
Post-hoc tests	1<2*, 1<3*, 2<3*	1<2*, 1<3*, 2<3*	1<2*, 1<3*, 2<3*	1<2*, 1<3*, 2<3*	1<2*, 1<3*, 2<3*	

Note: As there are 235 missing cases on the variable of age so the sample size is 4,994. Under-age children is those between 36 months or older and below 48 months old. Target-age children is those 48 months or older and up to 60 months old. Over-age children is those over 60 months and up to 96 months old. A series of Chi-square tests for the pair-wise comparisons were conducted. The asterisk * indicates that the pair-wise difference is statistically significant at level.

Figure 3.4. Proportion of on track children for the four domains by age group (N=4,994)

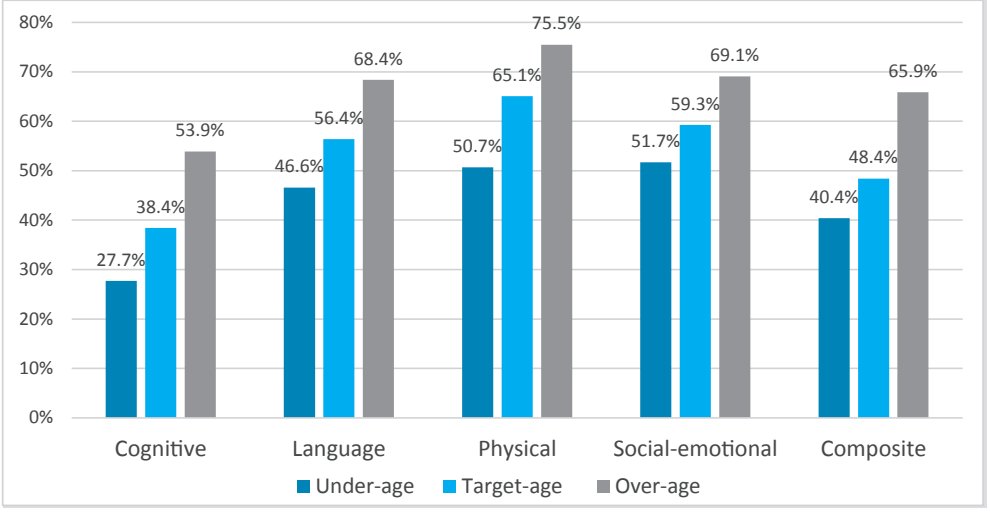
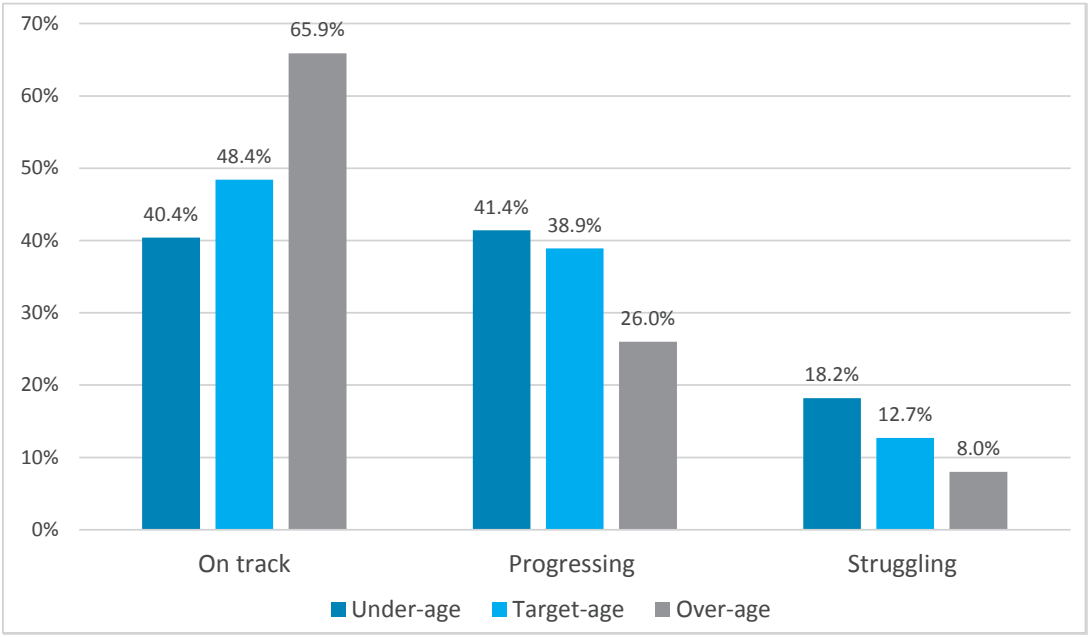


Figure 3.5 shows the proportion of children in each development category based on the composite ELDS. As they get older, not only the proportion of on track children increases but also the proportion of struggling children decreases.

Figure 3.5. Age group-wise comparison of composite ELDS standard (N=4,994)



3.2.3 By mother tongue

Table 3.3 provides the proportion of children who are on track in each development domain by mother tongue of children with a visual presentation in Figure 3.6. Children with Nepali as their mother tongue were more likely to be on track across domains than children who have other language as mother tongue. Such a difference is particularly large in the language domain (7.6 percentage points) and in the social-emotional/ cultural domain (6.6 percentage points).

Table 3.3. Proportion of on track children for the four domains by mother tongue (N=5,179)

	Cognitive	Language	Physical	Social-emotional /Cultural	Composite	N
Nepali	47.1%	65.7%	70.7%	67.3%	60.1%	2342

	Cognitive	Language	Physical	Social-emotional /Cultural	Composite	N
Others	44.0%	58.1%	67.7%	60.7%	53.3%	2837
Difference (Nepali - Others)	2.9%*	7.6%*	3.0%*	6.6%*	6.8%*	

Note: As there are 50 missing cases on the variable of mother tongue so the sample size is 5,179. The asterisk * indicates that the difference is statistically significant at level.

Figure 3.6. Proportion of on track children for the four domains by mother tongue (N=5,179)

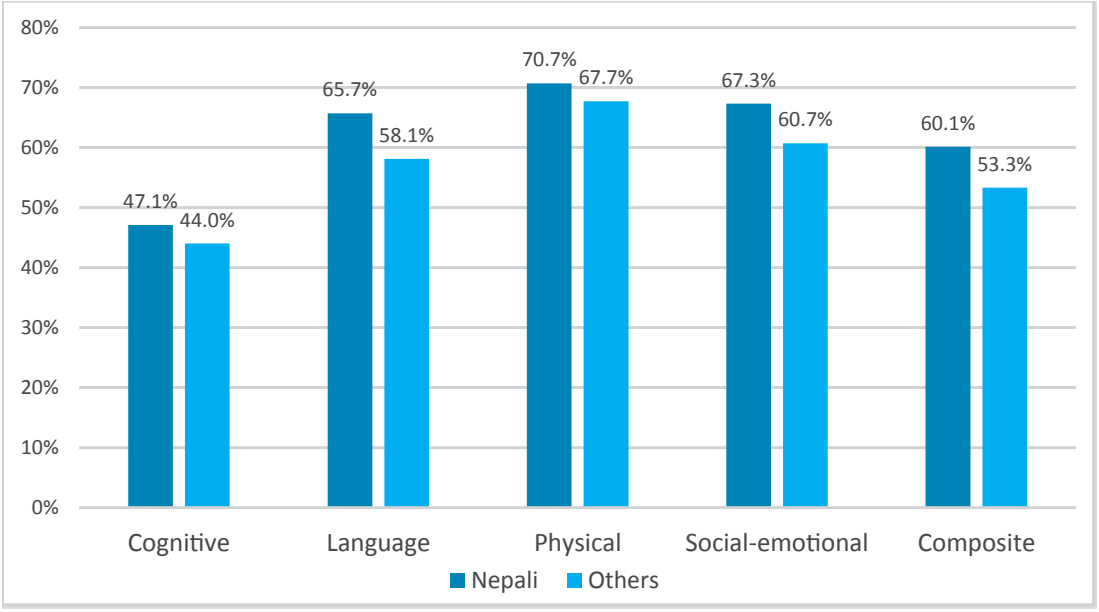
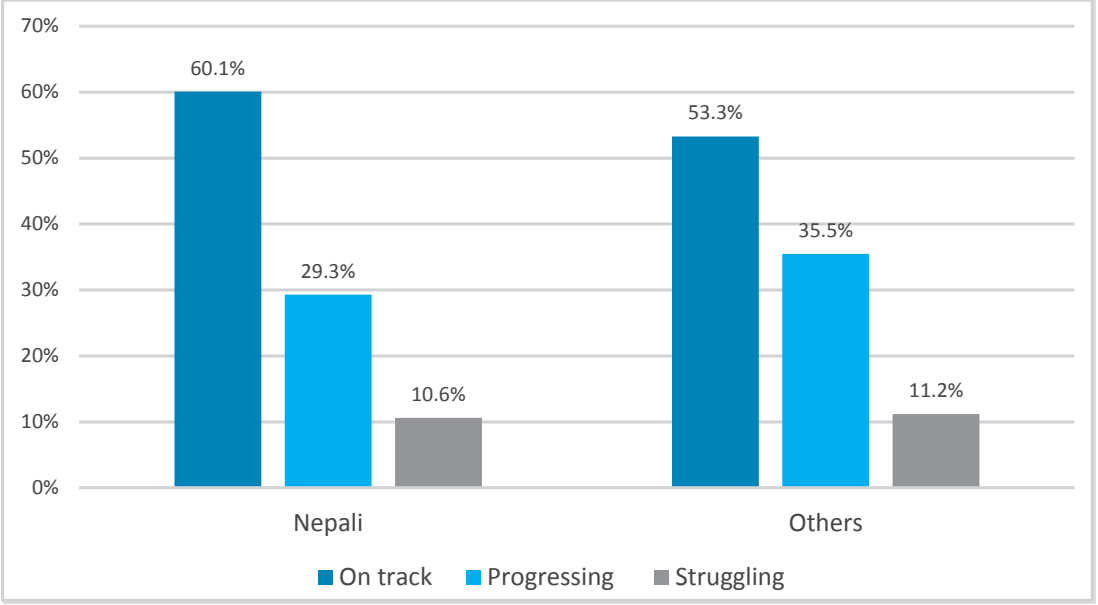


Figure 3.7 shows the proportion of children in each development category based on the composite ELDS by mother tongue. As shown in the Table 3.3, the proportion of on track children is larger among children with Nepali as their mother tongue than others while the proportion of struggling children is similar between the two groups. This finding suggests that the gap in development and learning of children between mother tongue is likely to be filled by providing adequate level of support to children whose mother tongue are not Nepali so that progressing children can brought up to the on track group. As shown in the Table 3.3, the language domain needs a particular attention when it comes to addressing development and learning gap between different

mother tongue groups.

Figure 3.7. Mother tongue-wise comparison of composite ELDS standard (N=5,179)



3.3 Children's development and learning status by geographical areas

The results of analysis below necessitate particular cautions as the sample does not represent the ECED programs in the province. Furthermore, purposive sampling procedure to balance the sample between urban and rural settings might vary across provinces, which led to different level of representativeness of the sample. Thus, readers should refrain from making decisive conclusion based on the results provided below.

Table 3.4 provides the proportion of children who are on track in each development domain by province with a visual presentation in Figure 3.8. The cognitive domain has the smallest proportion of on track children in all provinces. This proportion is particularly small in Lumbini (35.5%), Karnali (31.5%), and Sudur Paschim (35.8%). Although the physical domain shows the highest proportion, followed by the social-emotional/cultural domain and then by language domain in many provinces, some provinces have different trends, such as Gandaki and Lumbini.

Table 3.4. Proportion of on track children for the four domains by provinces (N=5,229)

	Cognitive	Language	Physical	Social-emotional /Cultural	Composite	N
Province 1	50.3%	66.2%	75.6%	73.7%	66.4%	733
Province 2	43.1%	52.5%	60.2%	57.1%	46.0%	1139
Bagmati	51.1%	70.1%	78.4%	68.7%	64.7%	969
Gandaki	65.6%	81.8%	84.9%	85.1%	82.1%	543
Lumbini	35.5%	64.0%	59.4%	55.3%	49.4%	799
Karnali	31.5%	42.7%	49.0%	47.7%	32.8%	302
Sudur Paschim	35.8%	48.4%	69.9%	55.5%	47.6%	744

Figure 3.8. Proportion of on track children for the four domains by provinces (N=5,229)

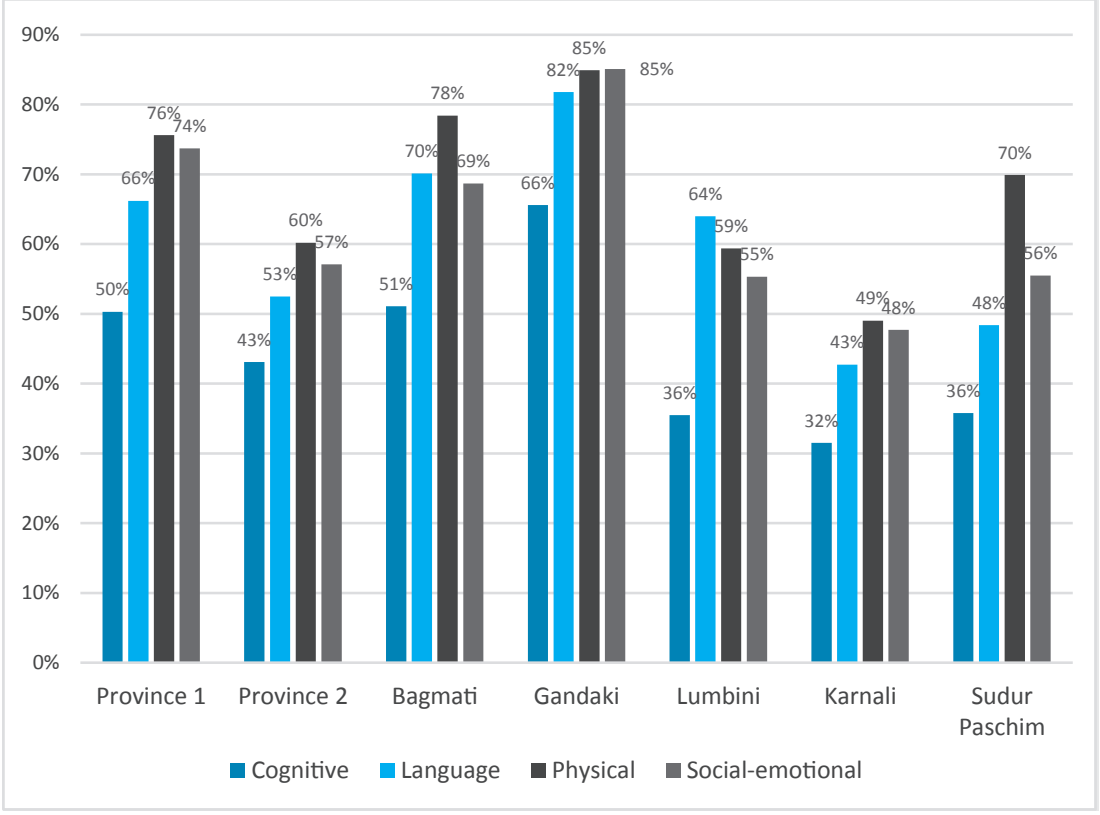
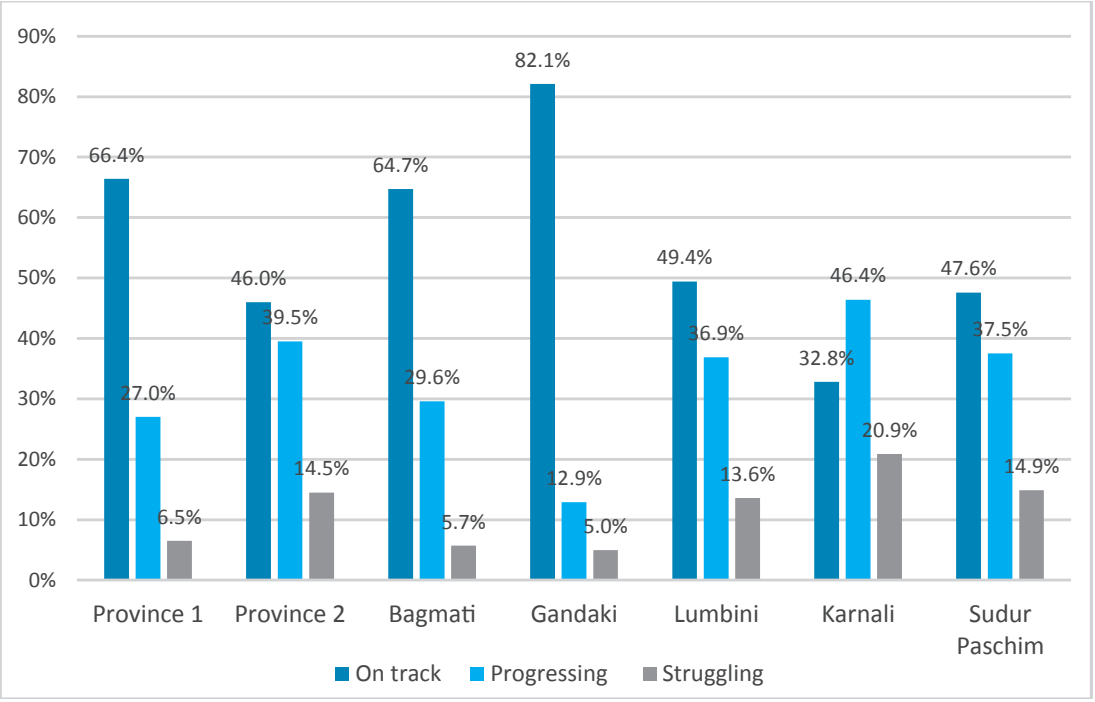


Figure 3.9 shows the proportion of children in each development category based on the composite ELDS by province. Gandaki has the largest proportion of on track

children (i.e., 82.1%) while Karnali shows the smallest proportion of on track children (i.e., 32.8%). In the following four provinces: province 2, Lumbini, Karnali, and Sudur Paschim, significant additional interventions are needed as there are sizable portions of children in the struggling category.

Figure 3.9. Province-wise comparison of composite ELDS standard (N=5,229)



4. ECED characteristics and management standards

4.1 Classroom management:

We analyzed various aspects of ECED classroom management. First, Table 4.1 shows that more than one-fifth (22%) of ECED centre did not meet minimum standard for the Learning Management and Planning quality. In this indicator, the minimum standard is to develop the annual plan and daily lesson plan based on the curriculum, but to be considered basic standard and ideal standard, these plans have to be partially and fully implemented in the classroom, respectively. Thus, it is revealed that 22 percent of the ECED programs did not develop the annual plan and daily lesson plan based on the curriculum. The remaining 78 percent developed the plans, but it is less than one third (i.e., 30.1%) that fully implemented established plan in the classroom.

Table 4.1. Frequency of four levels of standard: Learning Management and Planning quality

	Frequency (%)
Below minimum standard	100 (22.1%)
Minimum standard	89 (19.7%)
Basic standard	127 (28.1%)
Ideal standard	136 (30.1%)
Total	452

Note: As there are 17 missing cases on the variable of the Learning Management and Planning quality, the sample size is 452.

Table 4.2 presents the frequency and percentage of three kinds of language of instructions used in the ECED programs. The vast majority of ECED programs (81.0%) used Nepali in the classroom. While the mother tongue of more than a half of the participating children is language other than Nepali (see Figure 2.5), there are only a small number of ECED programs where other language is used in the classroom (5.9% for English and 13.1% for Others).

Table 4.2. Frequency of Language of instruction (N=458)

	Frequency (%)
Nepali	371 (81.0%)
English	27 (5.9%)
Others	60 (13.1%)
Total	458

Note: As there are 11 missing cases on the variable of language of instructions so the sample size is 458.

Table 4.3 shows the frequency and percentage of ECED programs that had a caretaker and the curriculum. The role of caretaker is to take care of children in various situations in and outside of the classroom in ECED programs. The results in Table 4.3 revealed that only 12 percent of the ECED programs had a caretaker.

The ECED curriculum (DOE, 2062 BS) was developed in 2006, and it has been recommended for ECED programs to utilize the curriculum to design the classroom environment and activities since then. However, it was revealed that less than one third (i.e., 30.7%) of the ECED centers had the curriculum.

Table 4.3. Frequency of the availability of caretaker and curriculum

Standard	Frequency (%)	
	Caretaker	Curriculum
Available	53 (12.0%)	134 (30.7%)
Not available	388 (88.0%)	302 (69.3%)
Total	441	436

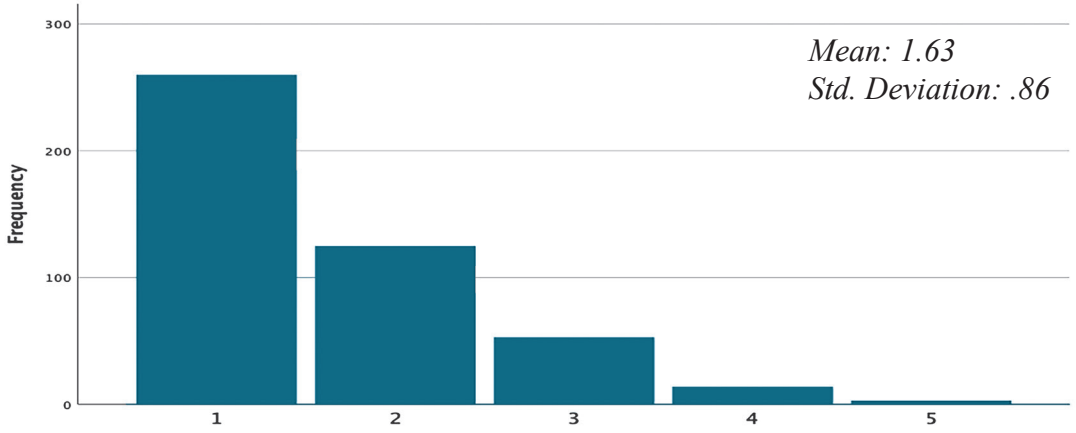
Note: As there are 28 and 33 missing cases on the variable of caretaker and curriculum, respectively, the sample size is 452 and 436, respectively.

Figure 4.1 presents the distribution of the number of facilitators in the ECED programs. More than a half of them (i.e., 57.1%) had only one facilitator. The rest of ECED programs had multiple facilitators in the classroom. It seems that there was a weak relationship between the number of facilitators and the availability of a caretaker in the ECED programs. That is, a caretaker was more likely to be available in the ECED programs that had a larger number of facilitators[2]. However, one should be

2 Statistical tests (i.e., Fisher's exact test and Spearman correlation test) revealed such an association is statistically significant at the 95 percent confidence level.

advised not to interpret this association as causal relationship as it may be spurious correlation due to different factors.

Figure 4.1. Histogram of number of facilitators (N=455)

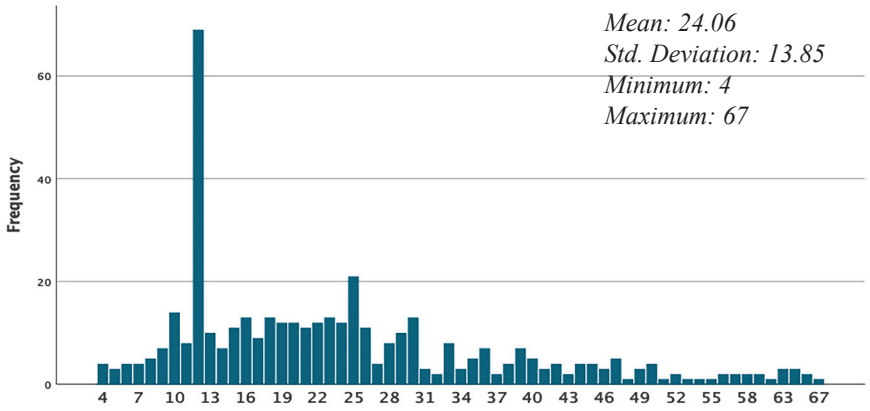


Note: As there are 14 missing cases on the variable of the number of ECED facilitators, the sample size is 455. The missing cases include five cases that were omitted as erroneous values (i.e., 11, 12, 25, and 31) in addition to nine originally missing cases.

Figure 4.2 shows the distribution of the class size in the ECED centers. It reveals that the majority of ECED programs had the class size in the rage from 10 to 30 while there was a small but a sizable proportion of ECED programs that had as large number of children in the classroom as 67. This positively skewed distribution with a wide range has the average of 24 children in the classroom. It seems that there is a weak bivariate relationship between the class size and the availability of a caretaker in the ECED programs. That is, a caretaker was more likely to be available in the ECED programs that had a larger class size[3] although we cannot mitigate the possibility that this association is due to third factors.

3 Statistical test (Welch's t-test) revealed such an association is statistically significant at the 95 percent confidence level.

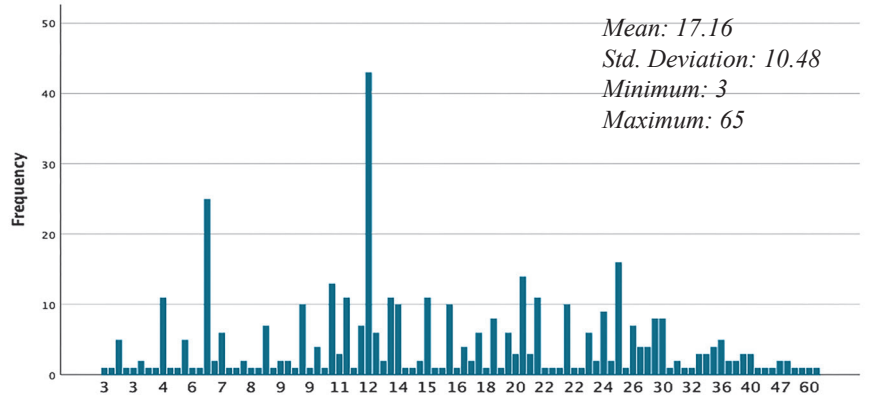
Figure 4.2. Histogram of class size (N=423)



Note: As there are 46 missing cases on the variable of class size, the sample size is 423. The missing cases include 20 cases that were omitted as erroneous values (e.g., 3, 4, and 75 through 331) in addition to 26 originally missing cases.

Figure 4.3 presents the distribution of the child to facilitator ratio in the ECED programs. There is a wide range of the ratio from three to 65: that is, while one facilitator took care of three children in the classroom on average in some ECED programs, in other extreme cases, one facilitator had to take care of 65 children on average. While the average child to facilitator ratio of 17 looked reasonable, one needs a caution since the average value masks the fact that this variable has large variation. It seems that there is no bivariate relationship between the child to facilitator ratio and the availability of a caretaker in the ECED programs, which was supported by statistical test (Welch's t-test) that found no statistically meaningful association.

Figure 4.3. Histogram of child to facilitator ratio (N=418)



Note: The values of child to facilitator ratio was computed by dividing class size by

the number of facilitators. As these variables have a number of missing cases, there are 51 missing cases on this newly constructed variable of child to facilitator ratio, and the remaining sample size is 418.

4.2 Facilitator's characteristics:

We analyzed three characteristics of facilitators in the ECED programs: educational qualification, training status, and their experience as an ECED facilitator. Readers should be aware that while there were multiple facilitators in the classroom in many ECED programs, the analysis presented here only addressed a main facilitator due to the data constraint.

Table 4.4 shows that approximately one third of the main facilitators had minimal level of educational qualification: Grade 10 or below. A half of them had educational qualification of Grade 11 or 12. One fifth of them had higher education qualification (i.e., Bachelor or above degree).

Table 4.4. Frequency of main facilitator's qualification (N=456)

	Frequency (%)
Grade 10 or below	138 (30.3%)
Grade twelve	228 (50.0%)
Bachelor or above	90 (19.7%)
Total	456

Note: As there are 13 missing cases on the variable of facilitator's qualification, the sample size is 456.

Table 4.5 presents the frequency of facilitator's training status. Since the early 2000s, the basic 16 days training program has been delivered by the government as a main professional development (PD) opportunity for ECED facilitators. The basic 16 days training (90 hours) includes mandatory induction training for all newly recruited ECED facilitators. Additionally, ECED facilitators were required to take refresher training a while after the basic 16 days training. The SSDP established the new goals of training provision and states that "One-month intensive training and refresher training will be provided to all ECED/PPE facilitators/teachers" and "for those who have already taken 16 days of related training, two weeks of training will be provided to cover all the ECED/PPE facilitators/teachers over the seven-year SSDP period" (MoE, 2016, p. 74). However, such a month-long training has not been well implemented to date, and the traditional basic 16 days training were also revised to 10 days face to face and 5 days school based action learning modalities. Also, there are other training provided by various private institutions.

Table 4.5 shows that the vast majority of the ECED facilitators have taken at least one type of training. Since they are required to take the basic training as a mandatory PD program, 95.4 percent of them have taken this type of training. Also, approximately two-third (64.5%) of the ECED facilitators complied to the recommendation and have taken both the basic 16 days training and refresher training. It is only two facilitators that took other type of training in addition to the basic 16 days training. As other type of training is mainly provided by private institutions, it is less likely to be available and affordable for the ECED facilitators in school based ECED than those in institutional PPE.

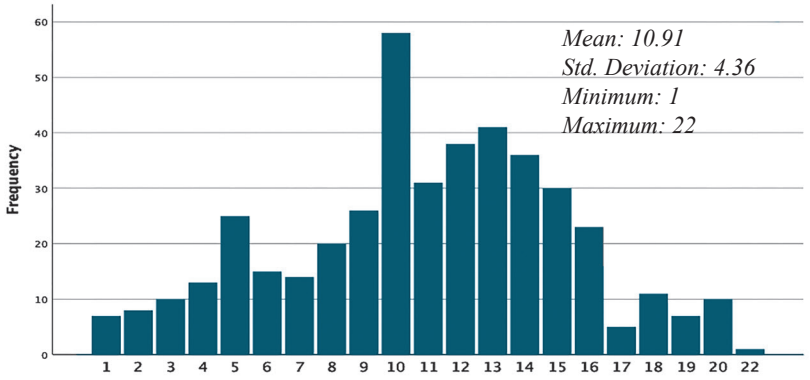
Table 4.5. Frequency of main facilitator's training status (N=456)

	Frequency (%)
Untrained	12 (2.6%)
Basic 16 days training	139 (30.5%)
Refresher 8 days training	9 (2.0%)
Basic and Refresher training	294 (64.5%)
Basic and Other training	2 (0.4%)
Total	458

Note: As there are 13 missing cases on the variable of facilitator's training status, the sample size is 456.

Figure 4.4 shows the distribution of years of ECED facilitators' experience. On average, they worked as ECED facilitators for 11 years. However, the variation is substantial, ranging from one year to the maximum of 22 years.

Figure 4.4. Histogram of main facilitator's experience (N=429)



Note: As there are 40 missing cases on the variable of facilitator's experience, the sample size is 429.

5. Relationships between ECED characteristics and children's' development and learning status

In this section, we analyze the associations between a number of ECED characteristics and children's development and learning status measured by raw ELDS domain scores. First, we look at the bivariate relationship between a single ECED factor and the ELDS domain scores in section 5.1. In addition to cross tabulation, we provide the results of statistical tests to see if any observed differences and associations are meaningful enough to be generalized to the population. Then, we provide the results of multiple regression to see how each of ECED characteristics factors is associated with the ELDS domain scores when accounting for other factors and children's characteristics in section 5.2.

5.1 Cross tabulation between important ECED characteristics and children's' development and learning status

5.1.1. Classroom management and children's development:

Table 5.1 suggests that the difference in children's development and leaning status is not well observed between the two low levels of the Learning Management and Planning quality standard (the below minimum standard and minimum standard): that is, just developing the annual plan and daily lesson plan is not significantly different from having no plans. To be effective in supporting children's learning and development, they have to be implemented in the classroom. Having said that, as the determinant of coefficients is small (i.e., 2% to 4%), this factor may not have a critical influence on ELDS domain scores.

Table 5.1. Learning Management and Planning quality and children's development (N=5065)

	Cognitive	Language	Physical	SE/ Cultural	Composite
Below minimum standard	68.63	71.22	74.27	75.52	72.41
Minimum standard	69.05	73.51	73.37	76.85	73.19
Basic standard	72.99	77.66	77.96	81.09	77.42
Ideal standard	77.73	80.15	80.62	83.67	80.54
	.036	.028	.021	.037	.042

	Cognitive	Language	Physical	SE/ Cultural	Composite
Post-hoc tests	1<2, 1<3*, 1<4*, 2<3*, 2<4*, 3<4*	1<2, 1<3*, 1<4*, 2<3*, 2<4*, 3<4*	1>2, 1<3*, 1<4*, 2<3*, 2<4*, 3<4*	1<2, 1<3*, 1<4*, 2<3*, 2<4*, 3<4*	1<2, 1<3*, 1<4*, 2<3*, 2<4*, 3<4*

Note: As there are 164 missing cases on the variable of the Learning Management and Planning quality, the sample size is 5065. Post-hoc tests for the pair-wise comparisons were conducted using the Tukey's HSD procedure. The value of 1, 2, 3 and 4 indicates the below minimum standard, minimum standard, basic standard and ideal standard group, respectively. The asterisk * indicates that the pair-wise difference is statistically significant at level.

Table 5.2 focuses on the language of instruction. Across all the domains, children in the ECED programs with English as the language of instruction showed higher ELDS scores than those in ECED programs that used Nepali or other language. In comparing children in the ECED programs that used Nepali and those that used other language, the former group showed higher scores in the language, physical, and social-emotional/cultural domains. As for the overall associations, the determinant of coefficients is small across domains, indicating the language of instruction does not account for much of the variance of ELDS domain scores.

Table 5.2. Language of instruction and children's development (N=5114)

	Cognitive	Language	Physical	SE/ Cultural	Composite
Nepali	72.27	76.06	77.42	79.76	76.38
English	81.76	87.69	84.32	87.26	85.26
Others	71.42	71.62	72.75	76.85	73.16
	.014	.025	.014	.016	.023
Post-hoc tests	1<2*, 1>3, 2>3*	1<2*, 1>3*, 2>3*	1<2*, 1>3*, 2>3*	1<2*, 1>3*, 2>3*	1<2*, 1>3*, 2>3*

Note: As there are 115 missing cases on the variable of Language of instruction, the sample size is 5114. Post-hoc tests for the pair-wise comparisons were conducted using the Tukey's HSD procedure. The value of 1, 2 and 3 indicates the Nepali, English and

Others group, respectively. The asterisk * indicates that the pair-wise difference is statistically significant at level.

Table 5.3 and 5.4 provide the cross tabulation and statistical test results for the availability of caretaker and curriculum. Although the availability of caretaker may not directly affect children's development and learning status, the result reveals that there is a significant difference in ELDS scores of all domains between children in ECED programs with and without a caretaker. Looking at the size of differences, the existence of caretaker is particularly important for the cognitive and language domains. The availability of curriculum is also associated with the ELDS domain scores to a smaller degree compared to the availability of caretaker. Similar to the availability of caretaker, it seems that the availability of curriculum matters for the cognitive domain the most. Overall, both of these factors do not explain the variable of the ELDS domain scores as showed by quite small coefficients of determinants.

Table 5.3. Availability of caretakers and children's development (N=4941)

	Cognitive	Language	Physical	SE/ Cultural	Composite
Available	78.48	82.91	81.21	84.09	81.67
Not available	72.35	75.77	76.88	79.63	76.16
	.011	.013	.005	.008	.013
Difference (Available – Not available)	6.13*	7.14*	4.33*	4.46*	5.51*

Note: As there are 288 missing cases on the variable of availability of caretakers, the sample size is 4941. The asterisk * indicates that the difference is statistically significant at α=.05 level.

Table 5.4. Availability of curriculum and children's development (N=4863)

	Cognitive	Language	Physical	SE/ Cultural	Composite
Available	76.19	78.31	78.21	82.76	78.87
Not available	70.99	74.97	76.95	78.64	75.39
	.015	.005	.001	.013	.010
Difference (Available – Not available)	5.20*	3.34*	1.26*	4.12*	3.48*

Note: As there are 366 missing cases on the variable of availability of curriculum,

the sample size is 4863. The asterisk * indicates that the difference is statistically significant at α=.05 level.

5.1.2. Facilitator's characteristics and children's development:

Table 5.5 presents the result of bivariate analysis between facilitator's qualification and children's development. There is significant difference in ELDS scores between children taught by minimally qualified facilitators (Grade 10 or below) and those taught by facilitators with Grade 11 or 12 qualification in all the domains. However, in all but language domain, there is no meaningful difference between children taught by facilitators with Grade 11 or 12 qualification and those taught by bachelor or above degrees. This finding implies that bachelor or above educational qualification may not have an additional value on the performance of ECED facilitators while ensuring that they have Grade 12 level of education is important. However, this relationship is just an association but not a causation and thus, there can be other factors that explain this association4. This relationship will be further investigated with some of important factors being accounted for in the multiple regression in the section 5.2 below.

Table 5.5. Main facilitator's qualification and children's development (N=5096)

	Cognitive	Language	Physical	SE/ Cultural	Composite
Grade 10 or below	69.75	72.87	75.63	77.72	73.99
Grade twelve	73.31	76.44	77.30	80.57	76.91
Bachelor or above	74.62	80.13	78.72	80.58	78.51
	.009	.014	.003	.006	.010
Post-hoc tests	1<2*, 1<3*, 2<3	1<2*, 1<3*, 2<3*	1<2, 1<3*, 2<3	1<2*, 1<3*, 2<3	1<2*, 1<3*, 2<3

Note: As there are 128 missing cases on the variable of facilitator's qualification, the sample size is 5101. Post-hoc tests for the pair-wise comparisons were conducted using

4 For instance, it may be the case that well educated ECED facilitators work in ECED centers with children from well-off families to begin with. It is also possible that well educated ECED facilitators were more likely to take longer or better training or vice versa (i.e., less educated facilitators took more training to compensate for their qualification). If any of these is true, concluding that education qualification up to Grade 12 is important can be misleading.

the Tukey's HSD procedure. The value of 1, 2, and 3 indicates Grade 10 or below, Grade twelve, and Bachelor or above group, respectively. The asterisk * indicates that the pair-wise difference is statistically significant at level.

Based on the results provided in table 5.6, overall there is no significant difference in the ELDS scores between children taught by untrained facilitators and those taught by facilitators with any type and combination of training. The result of the cross tabulation finds that the ELDS scores of children taught by facilitators with the basic 16 days training and other training have much higher scores than other group of children. However, the post-hoc test for the pairwise comparison indicates that this difference is not statistically significant at the 95 percent confidence level. This may be due to the fact that there are only few facilitators in the category of the basic training and other training, which renders statistical power for this comparison analysis quite low. While there are few statistically significant differences between different kinds and combinations of training, it seems that training did not effectively contribute to the improvement of children's development and learning. However, one should not interpret this relationship as causal as it is possible that other factors underlie this association5.

Table 5.6. Main facilitator's training and children's development (N=5101)

	Cognitive	Language	Physical	SE/ Cultural	Composite
Untrained	73.38	79.26	79.65	77.68	77.49
Basic 16 days training	71.20	76.85	76.56	79.28	75.97
Refresher 8 days training	72.96	76.00	74.75	74.21	74.48
Basic and Refresher training	73.15	75.66	77.29	80.26	76.59
Basic and Other training	80.15	89.88	88.89	82.29	85.30

5 For instance, unskilled facilitators might take more or better training to compensate for their weakness. Also, the data does not take into account when they took the training and how long it has been since they took it, which both are important factors when considering the mechanism in which training improves facilitator's performance to support children's learning and development.

	Cognitive	Language	Physical	SE/ Cultural	Composite
	.003	.003	.003	.003	.002
Post-hoc tests	1>2, 1>3, 1>4, 1<5, 2<3, 2<4*, 2<5, 3<4, 3<5, 4<5	1>2, 1>3, 1>4, 1<5, 2>3, 2>4, 2<5*, 3>4, 3<5*, 4<5*	1>2, 1>3, 1>4, 1<5, 2>3, 2<4, 2<5*, 3<4, 3<5*, 4<5*	1<2, 1>3, 1<4, 1<5, 2>3*, 2<4, 2<5, 3<4*, 3<5, 4<5	1>2, 1>3, 1>4, 1<5, 2>3, 2<4, 2<5*, 3<4, 3<5*, 4<5

Note: As there are 128 missing cases on the variable of facilitator's training, the sample size is 5101. Post-hoc tests for the pair-wise comparisons were conducted using the Tukey's HSD procedure. The value of 1, 2, 3 4 and 5 indicates Untrained, Basic 16 days training, Refresher 8 days training, Basic and Refresher training and Basic and other training group, respectively. The asterisk * indicates that the pair-wise difference is statistically significant at level.

Table 5.7 presents the results of analysis on facilitator's experience. The results indicate the interesting trend across development domains. Children taught by facilitators with the shortest experience (i.e., one to eight years) shows the highest domain scores in all the domains while those taught by facilitators with the longest experience (15 to 22 years) have the lowest or second to the lowest domain scores. However, in the middle range, the ELDS domain scores of children taught by facilitators with the experience of the second quartile (nine to 11 years) are lower than those taught by facilitators with the experience of the third quartile (12 to 14 years). Thus, facilitator's experience and children's development and learning status do not seem to have a clear linear relationship.

Table 5.7. Main facilitator's experience and children's development (N=4791)

	Cognitive	Language	Physical	SE/ Cultural	Composite
First quartile (1 to 8 years)	74.21	79.05	78.00	80.64	77.97
Second quartile (9 to 11 years)	71.18	74.95	75.49	78.79	75.10
Third quartile (12 to 14 years)	74.73	76.94	78.98	80.55	77.80

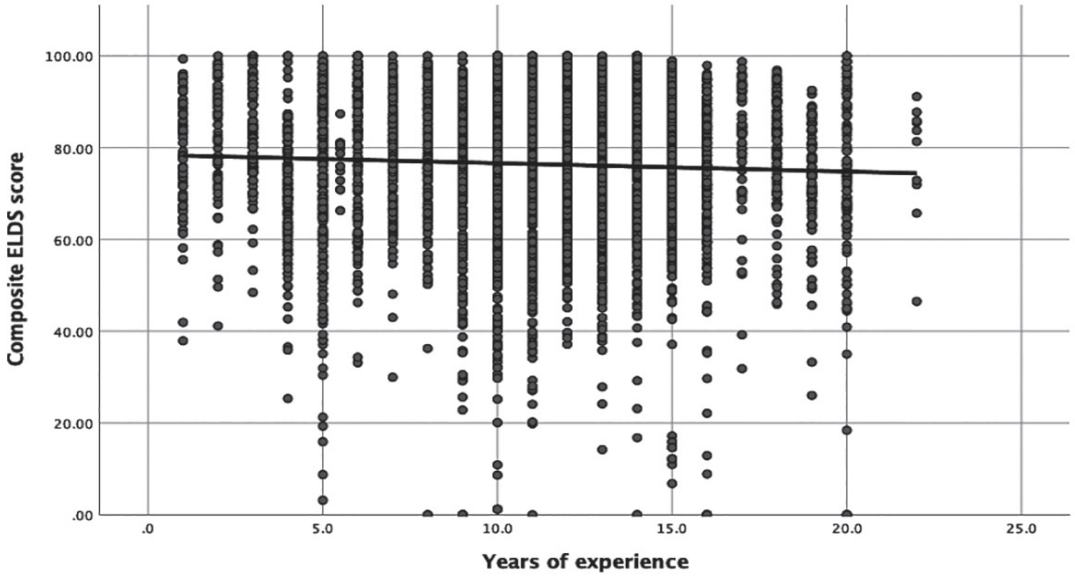
	Cognitive	Language	Physical	SE/ Cultural	Composite
Fourth quartile (15 to 22 years)	69.85	73.63	75.63	78.89	74.50
	.009	.010	.004	.003	.008
Post-hoc tests	1>2*, 1<3, 1>4*, 2<3*, 2>4, 3>4*	1>2*, 1<3, 1>4*, 2<3, 2>4, 3>4*	1>2*, 1<3, 1>4*, 2<3*, 2>4, 3>4*	1>2*, 1<3, 1>4, 2<3*, 2>4, 3>4	1>2*, 1<3, 1>4*, 2<3*, 2>4, 3>4*

Note: As there are 438 missing cases on the variable of facilitator's experience, the sample size is 4791. Post-hoc tests for the pair-wise comparisons were conducted using Tukey's HSD procedure. The value of 1, 2, 3 and 4 indicates the first, second, third and fourth quartile group, respectively. The asterisk * indicates that the pair-wise difference is statistically significant at level.

However, the categorization of the facilitator's experience into four quartiles are somewhat arbitrary. To better understand the association between facilitator's experience and children's development and learning status more precisely, we also visually inspected the scatter plots using the original continuous variable of facilitator's experience instead of the newly constructed categorical variable (see Figure 5.1). First of all, there is no clear trend (both linear and non-linear) between these two variables. Overall, there is a small and negative relationship between facilitator's experience and the composite ELDS scores. The tendencies are quite similar in other domain scores. In short, just having more experience does not necessarily lead to the improvement of the quality of care and education that facilitators provide while this relationship (or the lack of relationship) might be caused by other factors (i.e., selection bias)[6].

6 For instance, skilled facilitators might be able to change their occupation for higher wage, while the unskilled cannot and stay in their career as an ECED facilitator longer. Another possibility is that those with short experience took the training recently so they have fresh memory of what they learned in the training.

Figure 5.1. Two-way scatter plot of facilitator's experience and composite ELDS score



5.2 Regression of children's development on important ECED characteristics

We conducted multiple regression (random intercepts multilevel models) to analyze how each of ECED factors is associated with the ELDS domain scores when accounting for other factors and children's characteristics. We accounted for three important children's characteristics: age, gender and mother tongue.

Table 5.8 shows the results of the regression analysis. As we found in the bivariate analysis above, children's age is positively associated with their ELDS scores in all domains. There are differences in the domain scores between female and male children. Male children have higher scores in all but language domains than female children while they have lower scores in the language domain compared to female children. However, none of these gender-wise differences are statistically significant, suggesting that gender is not a critical factor that affect children's development and leaning status. As for the children's mother tongue, the analysis shows the similar associations found in the bivariate analysis above. Overall, children whose mother tongue was Nepali had higher ELDS scores than others. This difference is particularly notable and statistically significant in the language and social-emotional/cultural domains.

Table 5.8. Regression of children's development and learning status on ECED characteristics

VARIABLES	Cognitive	Language	Physical	SE/ Cultural	Composite
CHILD CHARACTERISTICS					
Child age	.25***	.22***	.25***	0.14***	.21***
Child gender (Male)	.49	-.34	.65	.53	.34
Child mother tongue (Other)	-.85	-1.72**	-.30	-1.88***	-1.25**
CLASSROOM MANAGEMENT					
Learning Management and Planning					
Minimum standard	-.59	2.69	-2.54	.99	.12
Basic standard	2.21	4.65**	1.50	3.97**	3.07*
Ideal standard	6.95***	7.61***	4.67**	6.24***	6.37***
Language of instruction					
English	3.52	7.15**	3.44	3.49	4.40*
Others	-1.36	-3.97*	-5.31**	-2.48	-3.27*
Availability of					
Caretaker	.18	.93	-.79	-.83	.00
Curriculum	2.08	1.49	-1.27	1.73	2.39
FACILITATOR'S CHARACTERISTICS					
Qualification					
Grade twelve	2.01	1.58	1.50	2.21	2.01
Bachelor or above	2.78	3.71*	2.77	1.13	2.78
Training					
Basic 16 days training	-3.05	-3.27	-6.48	-1.03	-3.46
Refresher 8 days training	.62	-2.38	-7.23	-4.68	-3.42
Basic and Refresher training	-.92	-3.04	-5.01	-.41	-2.15
Basic and Other training	-1.63	2.65	1.40	-3.05	-.16
Experience	-.38**	-.50***	-.34*	-.29*	-.37**

Note: *** p<.01, ** p<.05, * p<.10. To address the nested structure of the data (i.e., children are nested in the ECED centers), we employed random intercepts multilevel models. The reference group of the categorical variables are as follows: Child gender (Female), Child mother tongue (Nepali), Language of instruction (Nepali), Caretaker

(Not available), Curriculum (Not available), Qualification (Grade 10 or below), Training (Untrained), Learning Management and Planning (below minimum standards).

Regarding the ECED classroom management, it is found that improvement of the Learning Management and Planning from below minimum standard to ideal standard is positively associated with all domains. This finding indicates that just developing annual plan and daily lesson plan on the basis of curriculum without utilizing them in the classroom (minimum standard) or only partially utilizing them (basic standard) do not substantially assist children's learning and development. It is only when annual plan and daily lesson plan are fully implemented in the classroom (ideal standard) that benefits children.

As for the language of instruction, children show higher language domain scores when English is used in the classroom than when Nepali is used. Interestingly, children in the classroom with other language have significantly lower physical domain score and marginally lower language domain score compared to those in the Nepali speaking classroom. One should be aware that these associations do not mean causations: that is, using English in the classroom does not necessarily guarantee that children's learning and development are better promoted. It is highly possible that other factors related to the use of English in the classroom explain this potentially spurious correlation. It may be also the case that ECED programs with English as the language of instruction attract children with better learning and development status from well-off families to begin with.

The availability of caretaker and curriculum are not associated with any aspects of children's development and learning once other factors are accounted for. However, these findings do not claim that both caretaker and curriculum are not important in ECED programs to support children's learning and development as we discuss in the section 6.3 below.

As for the facilitator's characteristics, their educational qualification is associated with children's development and leaning status to a limited extent. Compared to children taught by facilitators with Grade 10 or below qualification, those taught by Grade 11 and 12 and higher education qualification show slightly higher domain scores. However, most of these differences are not statistically significant. Thus, once some of children's characteristics and ECED factors are accounted for, it is found that educational qualification of facilitators is not a critical factor that underline children's

learning and development[7]. However, one should bear in mind that this is still just a correlation, which may be different from the causal relationship.

Facilitators' training status showed unexpected negative associations with all the domain scores although they are not statistically significant. That is, compared to children taught by untrained facilitators, those who were taught by facilitators with most types and combinations of training had slightly lower domain scores. Although we cannot ensure these small negative associations of training with children's learning and development are free of bias[8], this topic should be further scrutinized as this is the issue with important policy implications.

Lastly, the experience of facilitators is negatively associated with all the domains. Such negative associations are significant in the cognitive and language domains and marginal in the physical and social-emotional/cultural domains. However, one needs to be cautious not to over interpret this finding as it is just an association found with some but not all important factors being controlled for[9].

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7 Some of the confounding factors that were considered above (e.g., training and experience) are accounted for in the multiple regression. However, this analysis still does not exclude the possibility of confounding factors and selection bias. For instance, this analysis cannot eliminate the possibility that well educated ECED facilitators work in ECED centers with children from well-off families to begin with. There are a number of possible factors underling this association, so readers should avoid interpreting this association as a causal relationship.

8 Aforementioned possibility (in the section 5.1) that unskilled facilitators might take more or better training to compensate for their weakness and the possibility that the effects of training faded out after long time are not taken into account in this analysis as well. Thus, it is potentially possible that training was effective to a certain extent for short-term while it is also possible at the same time that training is not effective.

9 One of two possible confounding factors mentioned in the section 5.2 (i.e., training) is accounted for in the multiple regression analysis. However, this analysis cannot eliminate another possibility: that is, skilled facilitators might be able to change their occupation for higher wage, while the unskilled cannot and stay in their career as an ECED facilitator longer. It is also possible that other factors underline this association, and the current data does not allow any decisive conclusion.

6. Findings and implication

6.1 Major findings and implication on children's development and learning status

As we saw in the section 3.1, there are two general findings on children's development and learning status:

- Approximately two-third of the children were classified as on track in the language, physical, and social-emotional domains.
- Less than a half (45%) of the children were classified as on track in the cognitive domain and nearly one fourth (23%) of children were in the struggling category.

As the proportion of children in the struggling category is small in the language, physical, and social-emotional domains, it is expected that the majority (more than 80%) of children are likely to achieve skills and knowledge expected in the ELDS with adequate support. For the rest of the children who are in the struggling category in these three domains, they need to be identified in the classroom so that they can receive individualized support. Classroom or program-based diagnosis or formative assessments would be useful to identify children with such needs. The larger proportion of children in the struggling and progressing category in the cognitive domain indicates that significant interventions are necessary at the large scale rather than individual level support in the classroom.

There are also finding on children's learning and development status by children's characteristics from the section 3.2 as follows:

- There is no meaningful difference in learning and development of children by gender in all domains.
- As children get older, they are more likely to be on track in all development and learning domains while there still is a sizable portion of children in progressing and struggling categories even among over-aged children.
- Children with Nepali as their mother tongue were more likely to be on track across domains than children who have other language as mother tongue, particularly in the language the social-emotional/cultural domains.

As for the absence of the gender-wise difference in the status of children's learning and development, it may be the results of equal ECED opportunities. According to the 2019/2020 Flash report (DOE, 2020), the differences in GER by gender are small

across provinces (i.e., 0.5 to 4.3 percentage points).

The finding from the age-wise analysis that finds a sizable portion of over-aged children in progressing and struggling categories implies that the chronological maturation of children does not necessarily guarantee that they achieve expected skills and knowledge. This finding is consistent with the development theory, such as Bronfenbrenner (1986)'s ecological system theory, that claims children's development and learning is not only the results of chronological development and they can fall behind if they are not exposed to appropriate learning environment. Thus, it is critical to continuously support older children. However, as the evidence shows that later intervention for disadvantage is much more costly than early remediation (Heckman, 2006), improving the ECED program with an aim in ensuring all ECED aged children achieve expected skills and knowledge at the expected timing[10].

As for the gap in learning and development by language, it is questionable if it reflects the actual difference in the development outcomes between children with different mother tongues or it derives from the fact that the ELDS assessment was conducted only in Nepali. The gap is observed particularly in the language and social-emotional/cultural domains. The gap in the language domain is expected as children's mother tongue directly influence the extent to which they have been exposed to the language of the assessment, Nepali. The gap in the social-emotional/cultural domain might be due in part to the fact that the assessment tasks in this domain required (Nepali) language skills in addition to skills and knowledge related to the social-emotional/cultural domain. Thus, this gap may at least partially reflect the difference in their (Nepali) language skills rather than or in addition to social-emotional/cultural skills although the degree of such an influence of language skills in these tasks is unknown. We need to analyze if the language of the assessment affected how children with different mother tongue perform on the assessment, and if so, we need to adjust the assessment so that it can capture the skills and knowledge expected in the ELDS themselves rather than Nepali language skills only. At the same time, policy makers and program planners may need to pay particular attentions to children's mother tongues so that children would not face disadvantage in ECED just because of their mother tongues.

10 As we recognize the individual variation in the pace of development, we do not mean that expected timeline of development, such as the one in the ELDS (DOE, 2069 BS) or curriculum (DOE, 2062 BS), is a sharp deadline for development that influence high-stakes decisions.

The province-wise analysis in the section 3.3 provided the following findings:

- While the cognitive domain is the most challenging domain (i.e., the lowest proportion of on track children) in all provinces, the trend of other domains varies across provinces.
- Gandaki has the largest proportion of on track children (i.e., 82.1%) (based on the composite ELDS) while province Karnali shows the smallest proportion followed by province 2, Sudur Paschim and Lumbini.

Although the physical domain shows the highest proportion of on track children (i.e., least problematic), followed by the social-emotional/cultural domain and then by language domain in many provinces, some provinces, such as Gandaki and Lumbini, have different trends. This finding suggests that the domain of children's development and learning that needs a special focus in designing interventions vary across province, and potentially at lower levels, such as districts and local governments or even at the program level. Therefore, a federal level one-size fits all approach is not likely to be effective in increasing the proportion of on track children holistically.

Looking at the difference in the average learning and development status in general across provinces, the gap is significant. The proportion of on track children in Gandaki is more than double of that of Karnali. As explained above, since the data is not representative at the national level and the degree of representativeness may vary across provinces, it should be avoided to relay strongly on this finding. Having said that, it is likely to find geographical gaps in learning and development even when the representative data is available. Therefore, at the national level, this province-wise difference in children's development and learning status should be taken into account in policy designing to effectively consider target and priority.

6.2 Major findings and implications on important ECED characteristics

The results in the section 4.1 provided the following findings regarding classroom management:

- Nearly one fourth (i.e., 22%) of the ECED programs did not develop the annual plan and daily lesson plan based on the curriculum, while the remaining 78 percent developed the plans, but only less than one third (i.e., 30.1%) fully implemented established plan in the classroom.
- The vast majority of ECED programs (i.e., 81.0%) used Nepali in the classroom, followed by other languages (13.1%) and by English (5.9%).

- Only 12% of the ECED programs had a caretaker.
- Curriculum was available in one third (i.e., 30.7%) of the ECED programs.
- More than a half (i.e., 57.1%) of the ECED programs had only one facilitator while the rest of ECED programs had multiple (i.e., two to five) facilitators in the classroom.
- The majority of ECED programs had the class size in the rage from 10 to 30 with the average being 24 while there were a small but a sizable proportion of ECED programs that had as large number of children in the classroom as 67.
- The child to facilitator ratio has the wide range from three to 65 with the average being 17.

The first point suggests two different problems. First, there still is many ECED programs that need the encouragement and support to develop plans. Then, to ECED centers that developed the plans, it is necessary to go beyond and encourage them in utilizing developed plans in the classroom. Another concern is the possibility that many ECED programs developed the annual plan and daily lesson plan based not on the national ECED curriculum (DOE, 2062 BS) but on something else. The proportion of ECED programs that developed plans (78%) is much larger than that of ECED programs that had the national ECED curriculum (31%) (see Table 4.3). Whether such non-national curriculum-based planning is effective and/or aligned with the national curriculum is unknown. This is an important question that need to be further investigated.

While the mother tongue of more than a half of the participating children is language other than Nepali (see Figure 2.5), the proportion of ECED programs that used language other than Nepali is small (5.9% for English and 13.1% for Others). As a result, almost half (i.e., 49.6%) of children in the ECED programs that used Nepali as language of instruction had other language as their mother tongue, suggesting mismatch between the language used in the classroom and the language that children were familiar with at home. The language of instruction in ECED programs have to be cautiously considered from both equity and quality perspectives as well as taking the issue of alignment to schooling into account.

The majority (i.e., 88%) of ECED programs did not have a particular staff to take care of children in the ECED programs. This finding suggests the possibility that there was lots of burden on ECED facilitators, and children were not adequately taken care. The analysis also reveals that a caretaker was more likely to be available when the ECED programs had more facilitators and when they had a larger class size

regardless of child to facilitator ratio: That is, caretakers do not play a complementing or supplementing role in assisting ECED facilitators' in taking care of children in various situations.

While it has been more than ten years since the ECED curriculum (DOE, 2062 BS) was developed, it is still less than one third (i.e., 30.7%) of the ECED centers that had curriculum. As described above, some of these ECED centers might not utilize the curriculum to design daily activity plans. Thus, it indicates the possibility that classroom environment and activities were not well designed based on the recommendation in the curriculum.

While the majority of ECED programs had the class size in the rage from 10 to 30, there was a small but a sizable proportion of ECED programs that had as large number of children in the classroom as 67. The large class size with few facilitators in the classroom led large child to facilitator ratio in many ECED programs. While the average child to facilitator ratio of 17 looked reasonable, one needs a caution since the average value masks the fact that this variable has large variation and there was significant proportion of ECED programs that had larger child to facilitator ratio than recommended level (i.e., 25:1 or less). As improving child to facilitator ratio is very costly, more studies need to be done to investigate the influence of large child to facilitator ratio on how sensitively and responsibly facilitators interact with children to guide the effective policy.

6.3 Major findings and implications on the relationship between ECED characteristics and children's development and learning status

The multiple regression analysis in the section 5.2 provides the following findings:

- Improvement of the Learning Management and Planning from below minimum standard to ideal standard is positively associated with all domains.
- Children showed higher language domain score when English is used in the classroom than when Nepali is used while children in the classroom with other language have significantly lower physical domain score and marginally lower language domain score compared to those in Nepali speaking classroom.
- The availability of caretaker and curriculum are not associated with any aspects of children's development and learning when accounting for other factors.
- Facilitator's educational qualification does not have significant associations with any domain of children's development and leaning.
- Facilitators' training status showed negative associations with all the domain

scores although they are not statistically significant.

- The experience of facilitators is negatively associated with all the domains of children's development and leaning.

We contentiously repeat the caution that readers should refrain from interpreting any of these findings as causal relationships. As described above, there are numerous explanations that the found associations in the regression analysis are spurious and are confounded by various factors. While we tried to account for as many factors as the data allows, there are still many factors that are considered important but no controlled for, which will be elaborated in the next section as a limitation.

The finding regarding the Learning Management and Planning indicates that it is only when annual plan and daily lesson plan are fully implemented in the classroom that benefits children. As shown in Table 4.1 above, there were many ECED programs that had annual plan and daily lesson plan without fully utilizing them (close to 50%). These ECED programs should be well encouraged and supported so that they are aware of the necessity of implementing what they have prepared and have enough capacity to do so. To assure the implementation of plans rather than mere availability of curriculum and plans, frequent monitoring system needs to be developed so that ECED centers are held accountable and adequately supported.

The finding on the language of instruction necessitates particular caution in interpretation. That is, the use of English or Nepali without considering children's mother tongue or household language is unlikely to guarantee that children's learning and development are better promoted. While the current data did not allow this approach, we need to take into consideration whether the language of instruction at ECED programs match with the language that children feel familiar with so that they feel secure and comfortable. This issue also necessitates the relevant theory of change backed up with more empirical evidence.

Regarding the availability of caretaker, as discussed in the section 4.1, it is not related to child-to-facilitator ratio, and thus caretakers are not to compensate for facilitator's burden to take care of many children. If they are employed in the ECED programs with high child-to-facilitator ratio to assist facilitators in taking care of children and let facilitators focus on learning activities in the classroom, their role can be more effective and important. As for the absence of association of the availability of curriculum with children's learning and development, it is consistent with the finding of the Learning Management and Planning that curriculum and plans do not benefit

children unless they are well utilized in the classroom. Thus, more emphasis should be put on the better utilization of curriculum to design ECED environment and activities as well as assisting facilitator's understand of young children.

As for the facilitator's educational qualification, the results show that compared to children taught by facilitators with Grade 10 or below qualification, those taught by Grade 11 and 12 and higher education qualification show slightly higher domain scores in all domains. However, most of these differences are very small (one to four points) and not statistically significant. Educational qualification may be one of the important factors to ensure the capacity of ECED facilitators. However, raising the required qualification from Grade 10 (i.e., the current recommendation in the SSDP (MoE, 2016)) to higher level of education, such as Grade 12, is not likely to directly lead to the improvement of ECED quality and enhance children's learning and development status. As educational qualification is related to the value as workforce in the job market as well as various other factors, including learnability in training and motivation in work, more research is needed on this topic to carefully guide the effective policy.

The small but consistently negative associations of facilitators' training status with all domains of children's learning and development was somewhat surprising for the following reasons. First, as described in the section 4.2, training has been expected as a main PD opportunity for facilitators to foster knowledge and skills necessary to support children's development and learning. Also, the literature found that training for ECED facilitators is one of the most effective interventions to improve children's development and leaning in various contexts (Howes, 1997; Burchinal et al., 2002; Clarke-Stewart et al., 2002; Ghazvini & Mullis, 2002; Fukkink & Lont, 2007; Raver et al., 2008; Pianta et al., 2014; Early et al., 2017;).

While it is possible that the small negative associations derive from bias in the analysis, there are some logical explanations for them if they capture the true relationships. First, while we asked of type of training that facilitators have taken, we did not collect information on when they took the training. It is possible that they participated in trainings long ago, so the effect faded out, leading to the absence of the associations with children's learning and development outcomes. Also, for training to be effective, training needs to be implemented in the classroom and facilitators should be supported when applying what they learn in the training to the classroom. Unfortunately, to date, there are no mechanisms and policies in Nepal which encourage and support ECED facilitators to apply training content to the classroom or enable

them to receive support in the classroom whenever necessary.

Lastly, the negative associations of experience of facilitators with children's learning and development, particularly in the cognitive and language domains, suggests that working longer as an ECED facilitator does not improve their effectiveness in supporting children's development. While such negative associations may be due to confounding factors, the mechanism in which the long experience does not lead to knowledge/skill accumulation that enable facilitators to better perform but rather hamper their performance should be investigated in depth.

Again, one need to be cautious not to interpret these findings as causal relationships. However, we hope that this report raises the awareness of the problem among various ECED stakeholders and motivates the further studies to seek the effective strategy to support children's development, which we will describe more in the section 6.5.

6.4 Limitations

It is easy to simplify or overstate findings, which can potentially result in misguided actions. To avoid such issues and guide the necessary actions for the future study, we summarize limitations in this report. We classify the limitations in the following three categories: 1) the issues in the assessment tools; 2) the issues in sampling scheme; and 3) data structure.

As we briefly described in the section 2.1.1, the evaluation of the ELDS assessment scores in terms of their reliability and validity had not been conducted. Our new attempts to evaluate various aspects of validity and reliability of the ELDS assessment scores revealed a few limitations.

First, the current ELDS assessment tool has a limitation in content relevancy and content representativeness. Content relevance analyzes whether assessment items are truly indicators of the construct of interest based on logical reviews by content experts and theory (Chatterji, 2003). Content representativeness is about the proportional sampling of assessment items from all possible items of the construct (Chatterji, 2003). Some aspects of children's development and learning that are specified in the assessment framework are not covered in the assessment tool as you can find by comparing the assessment tool (see Appendix 2) to the framework (see Appendix 1). For instance, in the language domain, the aspect of "communicating with others" or expressing language skills are not taped in the assessment tool. Thus, the current assessment tool cannot capture the whole aspects of children's learning and development as specified

in the assessment.

Also, item analysis using item homogeneity index (adjusted item-test point biserial correlation) revealed that the assessment tasks in the cognitive and SE/cultural domains have insufficient level of homogeneity among each other to compose a construct. This finding suggests the possibility that there are multiple constructs within the domain and/or that some tasks are not relevant indicators of the constructs. Factor analysis also suggest the possibility that some tasks are not relevant indicators of the specified domain of children's development and learning and that some tasks are highly correlated so that they suffer from multi-collinearity issues. In short, the evidence does not support the key hypothesis that the variance in item responses is explained by underlying latent constructs, per the established ELDS framework, which thus makes it questionable whether the ELDS domain scores truly measure the specified four domains. Detailed analysis is needed to shed more lights on how to revise the tool.

Furthermore, some important aspects of validity and reliability have not been evaluated due to data constraints. As the ELDS assessment is a play-based and scored based on enumerator's observation, it is critical to ensure that the administration and rating are standardized so that assessment scores are replicable regardless of the enumerators providing the ratings (inter-rater reliability: IRR). The evaluation of IRR among enumerators should be conducted as a part of training before actual data collection starts.

Another issue in the ELDS assessment tool is the validity and reliability of cut-scores that were developed for the developmental categories. To provide convincing evidence that the cut-score does represent the intended performance standard and that the performance standard is appropriate, researchers conventionally call for three pieces of reliability and validity evidence: reliability of the cut-scores, validity of the cut-scores as evidenced by comparability of results between different methods, and procedural validity (Kane, 1994; Peterson et al, 2011). We analyzed two of these three types of evidence (reliability of the cut-scores and procedural validity) for the ELDS assessment cut-scores.

We analyzed reliability of the cut-scores from two perspectives. First, standard errors (SE) in panelists' item rating (inter-judge consistency), which is an indicator of agreement of panelists on expected difficulty of the ELDS tasks for borderline children, was large. In terms of the proportion of SE of cut-score to one standard deviation (SD) of the raw domain score scale, average SEs of cut-scores of the ELDS assessment tool

is double of cut-scores that were rigorously developed as introduced in the literature (Peterson et al., 2011). While it may indicate that the standard setting process reflected the views of the diverse group of stakeholders as recommended, it is also possible that the large SE is an indicator of misunderstanding in the item rating tasks or failure to have a common imagination of borderline children based on the performance standard. We provide the cut-scores with confidential intervals (CI) calculated based on the SE in panelists' item rating (inter-judge consistency) as well as a graphical image of how the large SE influence the consequential data (the proportion of on track children) in Appendix 5.

Another perspective of reliability is intra-judge consistency, which addressed the correlation and agreement between panelists' item rating and actual performance data (task difficulty). The evidence of intra-judge consistency is somewhat mixed. One the one hand, the high correlations were observed, indicating that the ordering of item ratings mirrors the ordering of actual difficulty of tasks, thus suggesting the validity of item rating and resulting cut-scores. On the other hand, item estimate accuracy, which was calculated as the absolute difference between panelist's mean rating and actual difficulty of tasks for a group of children with scores near the cut-scores, was problematic, especially at the minimally progressing borderline. The panelists tended to underestimate the difficulty of the tasks, and this trend was most notable in the physical domain, suggesting the possibility that the panelists did not understand how difficult the tasks were for the borderline children.

The second type of validity evidence is procedural validity, which focuses on the appropriateness of the procedures used and the quality of the implementation of these procedures (Kane, 1994). We focused on the following five parts of the standard-setting procedures that have a direct impact on the plausibility of the standards: 1) Definition of goals for the decision procedure; 2) Selection of panelists; 3) Training of panelists; 4) Definition of performance standard; and 5) Data collection procedures. The analysis found limitations in the appropriateness of the procedures used and the quality of the implementation of these procedures, particularly in the selection of panelist and the definition of performance standard. We planned to ensure diversity in geographical areas, organizational background and educational responsibility as well as ECED expertise in terms of educational qualification, ECED facilitating experience and ECED training status. However, we were not able to assure diversity in geographical areas and organizational background in the selected panelists, which thus led the standards and cut-scores to reflect a narrower perspective and values than

desired. Also, we had less panelists with ECED expertise from their experience than planned, which made the quality of the group discussion and resulting performance standards questionable.

In addition to this, the fact that some participants were not familiar with the ELDS assessment tool, and that we were not able to administer the assessment in front of them during the workshop led panelists to have difficulties in development of performance standards and item rating. As a result, the performance standards were not clear enough, and some panelists had difficulties in understanding and applying them to the item rating task. However, we repeatedly asked the panelists to refer to performance standards as a main source for their item rating so that cut-scores would well represent the intended performance standards.

As suggested by these evidences, the extent to which cut-scores represent the intended performance standard and that this performance standard is appropriate is somewhat limited. Also, the low inter-judge consistencies suggest the uncertainty in the consequential proportion of children in each development category to a certain extent of as shown in Appendix 5. Thus, readers should interpret the results of analysis below with cautions and not rely on these results as a sole basis for any important decisions.

Moving to the second limitation, we provide the summary of the issues in sampling scheme. As we briefly mentioned in the section 2.2.1, the sample for this study has a limited representativeness. While various ECED stakeholders are interested in learning and development status of whole population of children, the data focuses only on children who went to school-based ECED centers, which account for 36 percent of the overall children. Also, a comparative study focusing on different types of ECED programs is important for the issue of equity and equality. However, the current sample does not allow such a comparative study. Furthermore, while the sampling was randomly conducted for the selection of children within the selected ECED programs, non-probability (non-random) approaches were employed when selecting districts and programs within the districts. Thus, this study has a limitation in external validity or the generalizability to the population to an unknown extent. To effectively obtain representative sample with as small sample size as possible, the sampling should employ random approach with carefully pre-computed sample size.

Also, since the ECED data reflect the situations of ECED centers in 2076 when the participated children were already in Grade one, there are some misconnections

in these two data sets. In the chapter 5 for the bivariate and regression analysis on the relationship between ECED factors and children's learning and development, we carefully chose only ECED factors that were unlikely vary over short period of time. However, we were skeptical of variability of some aspects, such as the number of ECED facilitators and class size. Therefore, we decided not to include such factors in the analysis in the chapter 5 although class size and child to teacher ratio are factors that are widely reported as key components of ECED quality (Bowne et al., 2017). If the data is collected at the timing when studied children are still in ECED programs, we can achieve a better connection between children's data and ECED data, which makes more analysis possible with less bias.

The last limitation is due to the structure of the data: observational and cross-sectional with many unobserved variables. This feature of data leads to some limitations in eliminating bias in the analysis and pursuing causal inferences. In an observational study where a selection bias is likely because of the lack of random assignment, it is critical to control for confounding factors to mitigate such a bias. Although it is impossible to account for all confounding factors to eliminate a bias, there are some variables that are conventionally controlled for in studies on children's development and ECED, such as household social economic status, parental engagement, learning and play materials at home, and children's learning and development outcomes before ECED interventions. Controlling for such factors in the study can mitigate a bias if not entirely eliminating it. While this study could include some children's characteristics as control variables, we were not able to account for many of important confounding factors. Therefore, it is highly possible that the results of the analysis are affected by bias rather than reflecting true causal relationships. It should be aimed to collect a wider variety of data, focusing particularly on aforementioned important confounding factors to get close to see how ECED programs causally affect children's learning and development in the future.

6.5 Recommendations for further studies

The careful inspections of limitations in the last section shed lights on how to improve the study. Improving the three aspects of limitations: assessment tools, sampling, and data stricture, will enable us not only to answer the same questions as those addressed in this report in more rigorous way but also to broaden the scope of questions. We conclude this report with describing a few important research topics that are key to guide effective and equitable ECED policy making.

First, we need to investigate the effects of training programs on ECED facilitator's performance and ultimately on children's learning and development outcomes. The preliminary finding from this report and past ERO's reports (ERO, 2017-b; ERO, 2018) consistently imply the ineffectiveness of the existing training programs. However, none of them were able to identify causal effects of training programs. It is also important to figure out the mechanism in which training programs are effective or not. Such a pair of evidence of causal effects of training and their mechanism with a certain degree of internal and external validities would not only attract more attentions of ECED stakeholders to this problem but also guide the effective training program with evidence-informed theory of change.

Another important topic to investigate is the comparison of the quality by ECED program type. As mentioned above, three different types of ECED program have existed in Nepal. As their providers are different and they are aligned to schooling in a different way, they may take different approaches in terms of pedagogy, activity and learning contents. Furthermore, under the context of the Covid-19 pandemic, it is expected that different ECED modalities would emerge in various areas of the country. To ensure children continue their play and learning and the environment is developmentally appropriate for them, it is vital to broaden the scope of the study and include multiple ECED modalities.

While there are limitations in this study, we hope this report raises the various ECED stakeholders' awareness of the importance of ECED as well as problems facing young children in Nepal and those working in ECED programs. Also, we aspire that this study motivates researchers to conduct further research so that we can accumulate more evidence and knowledge to ultimately ensure that all children in Nepal are developmentally on track.

Appendix 1. Assessment Framework for ELDS

Domains	Subdomains	Aspects	Standards	Tasks
Physical development	Physical development	Gross motor skills	• Demonstrate coordination of body parts	• Walk along straight line balancing the whole body • Stretch, bend and touch own feet • Move some steps backward • Jump some steps with both feet • Hop turn by turn on one foot • Crawl on the ground • Climb up/down ladder, slopes, and steps • Lift and carry a small char of their size • Throw and catch small objects from short distance
		Fine motor skills	• Coordinate and use fine motor body-parts • Demonstrate hand-eye coordination • Use tool, instruments, objects with control	• Tear paper or leaves into pieces • Thread various small objects, such as beads • Do up buttons • Click fingers • Color within a boundary • Do simple weaving • Draw lines, circles, and patterns • Fold paper • Cut-and paste small objects • Mold and manipulate wet sand, dough or clay

Domains	Subdomains	Aspects	Standards	Tasks
		Sensory motor skills	• Show reactions and responses to something using senses	• Identify and imitate various sounds • Follow given rhythm • Show a reaction to things with various feelings (smooth vs. rough, hard vs. soft, etc.) • See and distinguish objects far and near using each eye in turn • Respond to different tastes (sweet, sour, bitter, etc.)
	Health and hygiene	Personal hygiene	• Demonstrate health and hygiene behaviors and practices	• Maintain their body, including nose, hand, nail, feet and teeth, neat and clean • Show awareness of dirt vs. clean objects and food • Follow proper toilet practice
		Safe place	• Have understanding of safe practices • Avoid harmful and dangerous objects	• Show awareness of danger of fire, electricity, sharp objects and poisons • Show familiarity with signs of danger and poisons and avoid them
		Food habit	• Have some understanding of health and hygienic food habits and practices	• Follow healthy and hygienic food habits • Avoid bad food habits

Domains	Subdomains	Aspects	Standards	Tasks
Language development	Communication	Listening	• Listen to and respond to properly	• Listen and distinguish common sounds, such as human voices and animal voices • Listen and follow instructions in familiar language • Listen and respond in familiar language • Listen to short story
		Communicating with others	• Speak simple short sentences • Communicate with others, such as familiar peers and adults	• Speak fluently in familiar language using appropriate words with respect to geography, caste and ethnicity, cultures, and community • Participate in conversation in small groups • Ask and respond to questions • Express views and opinions • Talk with elders and younger children according to local norms and values • Wait for their turn and listen to others
	Literacy	Pre-reading	• Demonstrate pre-reading skills	• Interpret the picture and pictorial story • Match letters and words with pictures • Recognize alphabets in Nepali and mother tongue
		Pre-writing	• Demonstrate pre-writing skills	• Draw pictures • Draw and copy patterns • Draw some basic shapes, such as line, half/ full circle • Form some basic alphabets

Domains	Subdomains	Aspects	Standards	Tasks
Cognitive development	Intellectual development	Cognitive skills and learning processes	Explore and investigate Reflect on their learning	Use puzzles for explanation and investigation Use previous knowledge and skills for various day to day situation
		Classification and ordering	Recognize and describe basic geometric and other shapes	Describe familiar geometric shapes, such as squares, triangles, circles
	Cognitive knowledge	Scientific exploration (weather related)	Describe sun, moon, and sky	Name and draw picture of sun, moon, star, and sky
		Living and non-living beings	Know the parts of boy and their functions	Name the parts of boy Differentiate the living and non-living beings
		Scientific knowledge (materials)	Identify and describe everyday materials	Identify utensils of everyday use Identify materials by their quality and property
		Scientific exploration (technology)	Differentiate some technological materials and tools	Name technological devices available in the context
		Scientific exploration (transportation)	Describe type of transportation	Name types of transportation available in the context

Domains	Subdomains	Aspects	Standards	Tasks
		Distance and direction	Recognize and describe distance and direction	Describe distance Properly name direction
		Concept of time	Recognize the concept of time	Name the days of week and months of year
	Mathematics	Numeracy	Recognize and write basic numbers (i.e., 1 to 9)	Recognize and write numbers 1 to 9
		Measurement	Differentiate objects with different length and size	Measure and compare objects with different lengths and size
	Creativity	Creative arts	Create and draw shapes Sketch objects	Draw and describe pictures
		Imagination (i.e., drama and role play)	Use imagination in drama and role play Create music instrument	Create scenario in drama and role play Create rhythm
Social development	Social development	Relationship with peers and adults	Demonstrate relationship with peers and unfamiliar adults	Greet and interact with peers and adults

Domains	Subdomains	Aspects	Standards	Tasks
		Cooperation and coordination	Seek and provide support from/to others	Perform task in collaboration with others
		Responsibility	Take responsibility for own belongings	Involve in ECD center's chores and activities Put own belongings in proper places
		Social behavior	Demonstrate appropriate behaviors with peers and adults	Get along with others while performing tasks
		Self-concept	Demonstrate sense of self Show pride of own existence	Express own likes and dislikes with a reason in choosing things
Emotional development	Emotional development	Emotional expressions	Express emotions according to the situations Show appreciation to others	Recognize and describe own and others' emotions Show appreciations to others with expression, such as clapping hands
		Emotional security and confidence	Demonstrate confidence in new experience	Demonstrate independence in individual and group work
		Self-control and balancing	Demonstrate balances over the emotions	Modify behaviors and expressions of emotions for different situations

Domains	Subdomains	Aspects	Standards	Tasks
Cultural development	Values	Family and community	Follow and value routines and norms of own class and family	Demonstrate an understanding on basic dos and don'ts of their own family/community
		Natural and cultural heritage	Show an appreciation to local rules and cultures Demonstrate respect for natural and cultural heritage	Know particular festivals celebrated in their family and local community Know costumes of Nepali people of their locality Know dome don'ts of in temple, mosques, monastery of the locality
		Nation and nationality	Show respect to Nepali emblems	Identify national flag Knows Nepal's national anthem

Appendix 2. The ELDS Assessment Tool

Education Review Office

Early Learning and Development Standard Assessment Tool

Section A: Background Information

1) Name of ECD center/ school: ……..... School's code no.: .....

2) Name of child: …… ☐ Girl ☐ Boy

3) Child's age: …… month (upto the month of Chaitra 2075)

4) Child's Mother Tongue: ……..

Section B: Learning and Development Standard Assessment

Simple Giude to Enumerator

All the activities of Section B should be conducted personally by the enumerators for the quality and reliability. Before conducting any activities give them instruction and procedure clearly and give example as well. For the management and preparation of the working environment, take help from facilitator. For the operation and assessment of activities, score the point in the given method below.

Please Remember, all the **procedure and instruction** written in bold letters are to be read/ perform by the enumerators as it is. To build the rapport with the children, enumerators are requested to conduct following two activities.

Activity 1: Ask all the children to stand in the semi circle position (U shaped) and demonstrate a clap in any rythum and ask them to follow. Then, with the help of facilitator, practise a rhyme that every child knows.

Activity 2: Request children to stand up collectively and conduct activity by asking to touch nose, raise both hands, raise right foot, raise left foot in a childfriendly tone, and after praising and thank them with clap**, provide a pencil, eraser and sharpner to each.**

Then, **my name is …… I live in……. I am also involved in the teaching young children like you guy. I have come to talk with you and see what kind of games you know hat you can do Every one please perform peoperly what**

you know and tell me.

Now call child separately and ask to perform the activities according to questionnaire and assess and score according to learning and development.

Assessment Questionnaire

S. no. 1. Social Development **Activity:** life skill **Materials:** Non

Procedure and Instruction

- Join hands and greet Namaskar to the children and observe if they reply the greeting or not; then introduce yourself (Name and Address).
- (Join Hand) Namaskar nanu/babu (name of child). (wait for a bit). My name is …… I live in……
- Score according to .

Section B: Learning and Development Standard Assessment	Reply Namaskar without expression or provide other answer	Do not reply

S. no. 2. Sympathetic Development: Self-concept

Activity: Express **Materials:** None

Procedure and Instruction

- Enumerator should ask the name of child, age and name of mother and father.
- **Now I will ask you some questions. Are you ready? …….. Thank you.**
  - ❑ What is your name?
  - ❑ How old are you?
  - ❑ Where do you live?
- Score according to .
- In first question, child can tell their first name or full name, give full score in both conditions. In second and third question, mark according to the table.

Question	Clear answer (2)	Answer with hesitation (1)	Do not response (-)
What is your name?			
How old are you?			
Where do you live?			

S. no. 3. Cognitive Development. **Activity:** Arrange puzzle

Materials: Picture of Dog and its 4 equal dimensional puzzles

Procedure and Instruction

- Enumerators should grab the attention and show the picture of the Dog. Then hand over the pieces of puzzle to the children. Now, ask them to arrange the puzzle according to the picture. Give them 1 minute to complete.
- Today we will play several kinds of games. At first, let's play puzzle. Look at me. (show the picture of Dog) This is dog. Now, I will give you these pieces of puzzle. You have to make a dog from these pieces.
- Score according to .

Materials	Arrange all pieces correctly (2)	Arrange two or three pieces correctly (1)	Could not arrange (0)	Do not response (-)
Puzzle				

S. no. 4. Cognitive Development **Activity:** Numeracy knowledge

Materials: Separate cards of the different pictures of objects with numbers 1, 4, 3, 6

Procedure and Instruction

- Show the pictures to the children and chronologically ask them how many …… are there. Score according the given table.
- **Children, please look at these papers. Here are some pictures.** (Showing them pictures) **How many cars are there? By showing second picture, how many fish are there?** Ask continuously. Score according to .

Materials	Correct answer (2)	Wrong answer (0)	Do not response (-)
First (Car)			
Second (Fish)			
Third (Cow)			
Forth (Cat)			

S. no. 5. Development Activity: Rewriting **Materials:** Pencil and A4 sheet

Procedure and Instruction

- Provide a pencil and A4 sheet to each child to write. Enumerators should show the sheets of straight line (horizontal), semicircle, Nepali and English alphabets क ख A B chronologically and the them to the sign and character in the given paper. **Look, here is written something in the paper. Can you see it? ……. Thank**

you. Now, please draw properly as shown in the paper.

- Score according to .

S.no.	Character/ Alphabet	Written correctly (2)	Not written correctly (0)	Do not response (-)
क A	_____			
ख B				
ग C	A			
घ D	B			
ङ E	s			
च F	v			

S. no. 6. Cognitive Development Activity: Creative Art

Materials: A cart with the picture of a cat without legs, eyes and tail.

Procedure and Instruction

- attention and provide the card with the picture of the cat (cat without legs, eyes and tail). Ask children to draw the missing part of the cat with the pencil. Provide 1 minute for the activity.
  Children, look at this paper. Here is a picture of a cat. But some part of the cat is missing. Look at the picture properly and complete the picture by drawing the missing part of the cat.
- Score according to . Rather than quality, focus if the parts are drawn in the correct place.

Material	Draw in correct place (2)	Do not draw in correct place (0)	Do not response (-)
Legs			
Eyes			
Tail			

S. no. 7. Development: Listening

Activity: Perform according to the direction Materials: None

Procedure and Instruction

- Enumerator should sing the rhyme "फूल फुल्यो रेलीमाई आँगनैभरि". Ask the children to

sing it.

Now I will sing you a song. First listen to the song and sing yourself. (Sing the rhyme)

- Score according to .

Sing all the words correctly (2)	Sing with partial words correctly (1)	Sing incorrectly or say cannot sing (0)	Do not response (-)

S. no. 8. Development: Pre-reading **Activity:** Picture and object identification

Materials: Spoon, Banana, Umbrella and Scissors.

Procedure and Instruction

- Enumerators should show the picture of Spoons, Banana, Umbrella and Scissors one by one as listed in the assessment tool below and ask children to identify the pictures and name them.

  Now, we will play another game. I will show you pictures one by one. Please tell me name of the pictures.
- Score according to .

Pictures	Correct name (2)	Incorrect name (0)	Do not response (0)
Spoon			
Banana			
Umbrella			
Scissors			

S. no. 9. Development: Pre-reading **Activity:** Identify initial letter of the words

Materials: None

Procedure and Instruction

- Enumerators should demonstrate the sample of word "rabbit" first. Then, according to the assessment tool show them the words pot, scale (weight measuring) and pigeon chronologically and ask the first letter of the words.

  Now, we will play the initial alphabet identification game. First I will demonstrate you. You observe. R is the initial letter of the word Rabbit. Now your turn. I will tell the word, you have to tell me the beginning alphabet of the word. The word is Pot ……. Thank you. Next is scale (weight measuring) ……. Thank you. Word is Pigeon …… Thank you.

- Score according to .

Words	Correct alphabet/ sound (2)	Incorrect alphabet/ sound (0)	Do not Response (-)
Pot			
Scale			
Pigeon			

S. no. 10. Development: Pre-reading **Activity:** **Materials:**

Procedure and Instruction

- Enumerator should show the Nepali and English alphabet cards (ख, घ) and (D, B) chronologically and assess.
  Now, lets identify alphabets. I will show alphabets. You answer what those alphabets are. (show ख) ……. Thank you. (show घ) ……. Thank you. (show D) ……. Thank you. (show B) ……. Thank you.
- Score according .

Shown alphabets	Correct answer (2)	Incorrect answer (0)	Do not response (-)
First Nepali alphabet ख			
Nepali alphabet घ			
First English alphabet D			
English alphabet B			

S. no. 11. Development: Listening Comprehension **Activity:** Listen and answer

Materials: Purposive short story

Procedure and Instruction

- Enumerators should read aloud in fair rhyme and sequentially ask questions and score as mentioned in the assessment tool.
- **Now I am going to tell you a story. Listen to the story carefully. Then I will ask you some questions. You have to answer the questions. Ok listen.**
  In one house there were older sister and younger brother. Sister's name was Gta and brother's name was Mahesh. They used to read together.
  - ❑ How many are there in the story?..... Thank you.
  - ❑ What is their relationship?..... Thank you.
  - ❑ What is the name of Geeta's brother?..... Thank you.

- Score according to .

Questions	Correct answer (2)	Incorrect answer (0)	Do not response (-)
How many persons are there in the story?			
What is their relationship?			
What is the name of Geeta's Brother?			

S. no. 12. Physical Development: Gross **Activity:** Materials: None

Procedure and Instruction

- First enumerators must show the activity by hopping for 5 times with any one leg. As shown by the enumerators, ask children to hop 5 times with lifting one leg.
  Now, we will play lifting one leg up game. First I will perform. Observe carefully. First I will hop five times by lifting legs (hop five times). Now, you also hop for 5 times by lifting one leg at one place.
- Score according to .

Performed activity	Hop 5 times correctly (2)	Hop less than 5 times correctly (1)	Hop incorrectly (0)	Do not response (-)
Jump				

S. no. 13. Physical Development: Fine motor **Activity:** Fold paper into equal parts
Materials: A4 sized paper

Procedure and Instruction

- Enumerators should take A4 sized papers and conduct the activity by letting children fold the paper along with them (first horizontal fold and then vertical fold).
  Children now, fold the paper with me. Look at me. Now, along with me you have to fold the paper likewise I did it.
- Score according to . While folding paper difference up to 1 centimeter could be considered as right and provide full score.

Performed Activity	Fold straightly in 4 equal parts (2)	Fold properly in 2 equal parts (1)	Could not fold properly in equal parts (0)	Do not perform (-)
Folding Activity				

S. no. 14. Physical Development: Fine motor **Activity:** shape by joining dots

Materials: Pencil and flagged shaped dotted picture

Procedure and Instruction

- Provide children with a dotted flag picture in quarter sized A4 sheets and a pencil. Then ask them to shape by joining dots. Give 1-minute time.
  I will give you a paper. The paper has a dotted figure of flag. the flag by joining the dots properly.
- Score according to .

Performed Activity	Prepare flag by joining dots properly (2)	Prepare flag by joining dots improperly (1)	Do not join dots completely (o)	Do not perform (-)
Prepare flag by joining dots				

S. no. 15. Physical Development: Gross motor **Activity:**

Materials: Soft ball with 6 to 8 centimeter dimension

Procedure and Instruction

- Show the ball thrown by one person, caught by another. Facilitator and child should be in distance facing each other and the child will pass the ball three times towards enumerator and facilitator catches it. facilitator will throw the ball and the child catches it.
  Now, our turn to play ball. Child, I will throw this ball towards you. Catch properly. Then you too throw the ball toward me similarly, I will catch.
- Score according to .

Performed Activity	Throw 3 times properly (2)	Throw less than 3 times properly (1)	Throw 3 times improperly (0)	Do not perform (-)
Throwing task				
Performed Activity	Catch 3 times properly (2)	Catch less than 3 times properly (1)	Could not catch all 3 times (0)	Do not perform (-)
Catching Task				

S. no. 16. Physical Development: Personal Hygiene

Activity: Follow daily cleanliness activities **Materials:** Non

Procedure and Instruction

- Enumerators should ask children in which condition the personal cleanliness activity is carried out.
  Children in which situation/ condition, do you wash your hand with soap and water?
- Score according to . If said, before taking meal, after taking meal and after going to toilet or said related correct answer

Activity	States 3 situation (like A. before taking meal, B. after taking meal and C. after going to toilet) (2)	States less than 3 situations (1)	States incorrect situation (0)	Do not respond (-)
To follow daily cleanliness				

S. no. 17. Cognitive Development **Activity:** Color Identification

Materials: Red, yellow, blue and green colored cards

Procedure and Instruction

- Enumerators should put red, yellow, blue and green colored paper's pieces in fornt of children. Conduct the activity by sequentially asking the cards; give me red colored cards, put that red paper aside and give me that yellow paper, put that paper in the same place, then give me blue paper.
- **Look here. Here are some papers.**
  - ❑ Give me red colored cards? Thank you.
  - ❑ Give me yellow colored cards? Thank you.
  - ❑ Give me blue colored cards? Thank you.
- Score according to

Materials	Correct answer (2)	Incorrect answer (0)	Do not respond (-)
Red Paper			
Yellow Paper			
Blue Paper			

S. no. 18. Cognitive Development **Activity:** Concept of Time **Materials:** Non

- Procedure and Instruction: Enumerator should tell the day of the assessment. Ask them chronologically; Which day was yesterday? Which day is tomorrow? **Children today is ……. day. Now tell me which day was yesterday? Thank you. Which day is tomorrow?**
- Score according to .

Materials	Correct answer (2)	Incorrect answer (0)	Do not respond (-)
Yesterday			
Tomorrow			

S. no. 19. Cognitive Development

Activity: Identification of means of transportation and communication

Materials: Picture of television and mobile phone in a same paper, Picture of bus and airplane in same paper.

Procedure and Instruction:

- Enumerator should show the paper with the picture of television and mobile phone and another paper with the picture of bus and airplane, then ask about the modes of communication.
- **Children look here. There are two pictures in the paper.**
- (Showing picture of bus and airplane) **for what purpose these are the use? What can we do with them?**
- (Showing picture of television and mobile phone) **for what purpose these are the use? What can we do with them?**
- Score according to the clarity of the use of mode.

Materials	Correct answer (2)	Incorrect answer (0)	Do not respond (-)
Mode of Transportation			
Mode of communication			

S. no. 20. Cognitive Development **Activity:** Knowledge about direction

Materials: Picture of television and bus.

Procedure and Instruction

- Enumerator should put the picture of bus on one side and television on another side of the child and ask what is on the right side? And again, what is on the left

side? Observe the response.

Children, what is on your right side? ……. Thank you. Now what is on your left side? ..…Thank you.

- Score according to .

Direction	Correct answer (2)	Incorrect answer (0)	Do not respond (-)
Right			
Left			

S. no. 21. Cognitive Development

Activity: Information about shape/ quantity and length.

Materials: Picture of different sized (big, medium and small) house and pencil.

Procedure and Instruction

- First enumerators should show the picture of big, medium and small sized houses and ask which house is the biggest and which is the smallest? Likewise, show the picture of long, medium and short pencil. Ask which pencil is is the longest and which is the shortest?

  Children, I will show you picture. (show picture of house) **Which house is the biggest? …. Thank you. Which house is the smallest? ….. Thank you.** (show picture of pencil) **Likewise, which pencil is the longest?..... Thank you. Which pencil is the shortest?..... Thank you.**

- Score according to .

Shape	Correct answer (1)	Incorrect answer (0)	Do not respond (-)
Big			

S. no. 22. Social Development **Activity:** Relationship identification among friends

Materials: Non

Procedure and Instruction

- Enumerator should ask the name of child's friends.

  Children, tell me name of your three friends?

- Score according to .

Tell name of 3 friends clearly (2)	Tell name of 2 or 1 friends clearly (1)	Tell, has no friend (0)	Do not respond (-)

S. no. 23. Emotional Development **Activity:** Identification of emotion

Materials: Pictures with happy or laughing and crying person's face

Procedure and Instruction

- Enumerator should show the picture of happy, normal and sad once and ask children to identify happy face. Similarly, ask them to identify crying face.
  Now I will show you some pictures. (show all three pictures) **Look at these pictures. Now show me which is happy or laughing picture?..... Thank you. Similarly, show my which picture is sad or crying?**
- Score according to .

Emotional Situation	Correct answer (2)	Incorrect answer (0)	Do not respond (-)
Happy			
Crying			

S. no. 24. Emotional Development **Activity:** Empathy

Materials: A picture or event of crying child lying on the floor

Procedure and Instruction

- Enumerator should show picture of crying child lying on the floor
  What will you do if your friend cried as shown in the picture?
- Score according to .

Find out the problem and try to help or express similar intention (2)	Only try to say or say don't do anything (0)	Do not response (-)

S. no. 25. Cultural Development **Activity:** Values and norms **Materials:** Non

Procedure and Instruction

- Enumerator should sing nepali national anthem "सयौ थुँगा फूलका हामी एउटै माला नेपाली". Then let children sing from start or other one stanza and evaluate

accordingly.

Children, listen I will sing the national anthem and then you sing it. सयौँ थुँगा फूलका हामी एउटै माला नेपाली .... now you sing.

- Score according to .

Response	Can sing or say words of second line (2)	Can sing half words with confusion (1)	Can sing less than half words (0)	Do not response (-)
National Anthem				

S. no. 26. Cultural Development **Activity:** Festival **Materials:** Non

Procedure and Instruction

- Enumerator should ask children what kinds of festivals are celebrated in their community or by them?

  Tell me, what are the festivals that are being celebrated in your home or neighbor?

- Score according to

Can name three festivals (2)	Can name 2 or 1 festivals (1)	Can name other than festivals (like marriage, birthday) (0)	Do not response (-)

Thank you for Today.

Appendix 3. Section 2 of the ECED Management Assessment

S.N.	Management Aspects	Indicators of standard	Rating points
1	Building/Hall/ Room	• Runs in own building/hall/room that is clean, bright, properly ventilated and has its compound with adequate space. • Runs in own building/hall/room/ that is clean, bright and ventilated. • Runs in a public or rented room that is clean, bright and ventilated. • Runs in a room/hall/building below the minimum standard.	3 2 1 0
2	Management of compound area	• Has safe and clean, open and free space enough for playing ball for all children with swing, Slide, Seesaw and with gardening. • Has safe and clean, open and free space enough for playing for children. • Has safe and clean open space enough to line up all children • Has no such space and compound area.	3 2 1 0
3	Management of Room/ Hall	• Availability of per child 2 square meter space inside room with 8 feet height. • Availability of per child 1.5 square meter space inside room with 8 feet height. • Availability of a room with enough space to sit 20 children at a time. • Availability of room to sit 20 children together.	3 2 1 0
4	Management of learning and play materials in classroom	• Availability of learning and play materials properly placed in access of all children along with the well display of materials created by children; a well decorated room with additional materials for play and creation for children. Also availability of sand, mud and water near to the classroom.	3 2 1 0

S.N.	Management Aspects	Indicators of standard	Rating points
		• Availability of play and learning materials but not placed properly, children's works are not displayed properly, limited availability of materials for play and creation. • Limited play and learning materials and not managed them properly; children's work are not displayed, lack space for display. • Lacking play and learning materials of any kind, no space for managing them.	
5	Seating arrangement	• Has flexible seating arrangement in well-furnished in chair/table or in bench/ desks of appropriate size or cushions/ mats for individual sitting in well-furnished floor that is appropriate for conducting learning activities in group or individually • Has fixed seating arrangement in mats/wooden plank along with table, desk for individual sitting in well surfaced floor and that is appropriate for conducting learning activities in group or individually. • Has low-level fixed seating arrangement in bench or floor that is not suitable for conducting learning activities • Low level than above standards.	3 2 1 0
6	Availability of learning corner and library	• Manages different learning corners for storytelling, mathematics, role play, creative science, puzzles and building blocks along with space for matching colors and shapes consisting children books, board like wall (at least 3×1.5) and in appropriate height for writing at children height. • Limited learning corners, puzzles, children books having board like wall (at least 3×1.5) and in appropriate height for writing at children height.	3 2 1 0

S.N.	Management Aspects	Indicators of standard	Rating points
		• Lacks learning corner, consist limited puzzles and building blocks and a writing board • Low level than above standards.	
7	Availability of educational and instructional materials	• Availability of children songs, national anthem, pictorials, daily activity schedules, posters, pictures, manuals or guides for at least one for children learning activity. • Availability of children songs, national anthem, pictorials, daily activity schedules, posters, pictures, manuals or guides for at least four types for children learning activity. • Availability of children songs, national anthem, pictorials, daily activity schedules, posters, pictures, manuals or guides for at least two types for children learning activity. • Low level than above standards.	3 2 1 0
8	Decoration of learning activity room/hall e	• Some parts of wall is printed/painted with alphabets/letters, numbers table, diagrams pictures, educational charts, tables and the like. • Some parts of wall is painted/printed with alphabets/letters and number table and other limited learning contents. • Some parts of wall is printed/painted with only number and alphabets/words with low level of decoration. • Low level than above standards.	3 2 1 0
9	Play learning materials	• Availability of all play learning materials in sets as mentioned in National Minimum Standards for ECD Centers 2067 and sufficient to play for each of group of five children. • Availability of all play learning materials at least one-one set as mentioned in National Minimum Standards for ECD Centers 2067.	3 2 1 0

S.N.	Management Aspects	Indicators of standard	Rating points
		• Availability of fifty percent play learning materials mentioned in National Minimum Standards for ECD Centers 2067. • Low level than above standards.	
10	Learning management	• Development of annual plan and daily lesson plan on the basis of curriculum and its fully implementation on classroom. • Development of annual plan and daily lesson plan on the basis of curriculum and its partially implementation on classroom. • Development of annual plan and daily lesson plan on the basis of curriculum but not used on classroom. • Low level than above standards.	3 2 1 0
11	Health service provision	• Availability of first aid box with useful aids and provides trimester general health checkup services (Height, weight, temperature or etc.). • Availability of first aid box with useful aids and provides half-yearly general health checkup services (Height, weight, temperature or etc.). • Availability of first aid box with useful aids and provides health checkup services in the case of illness (Height, weight, temperature or etc.). • Low level than above standards.	3 2 1 0
12	Drinking water and sanitation	• Availability of clean drinking water in individual bottle/glass for each; has clean rest room with soap and adequate water. • Availability of sufficient clean drinking water; has clean rest room with adequate water. • Availability of limited drinking water and rest room. • Low level than above standards.	3 2 1 0

S.N.	Management Aspects	Indicators of standard	Rating points
13	Day meal/tiffin	• Availability of day meal/tiffi n for all from the center with or without contribution of parents. • Availability of day meal/tiffin for all by parents or children themselves. • Availability of day meal/tiffin for only some children. • Low level than above standards.	3 2 1 0
14	Regularity	• Runs regularly at least 4;30 hours a day except leave day and opens 220 days in a year. • Runs regularly at least 4;30 hours a day except leave day and opens 200 days in a year. • Runs regularly at least 4;30 hours a day except leave day and opens 180 days in a year. • Low level than above standards.	3 2 1 0
15	Facilitators	• Grade 10 passed facilitator having basic level training for up to 25 children and provision of regular class by alternative facilitation in the case of absence of main facilitator. • Grade 10 passed facilitator having basic level training for up to 25 children • Grade 10 passed but untrained facilitator. • Low level than above standards.	3 2 1 0
16	Record management	• Has updated individual record of each child's enrollment, daily attendance, progress on learning and development along with activities of center and its demonstration. • Has updated individual record of each child's enrollment, daily attendance, and general records of ECD center's. • Has updated individual record of each child's enrollment and daily attendance. • Low level than above standards.	3 2 1 0

S.N.	Management Aspects	Indicators of standard	Rating points
17	Formation of Management committee and its functioning	• Has formed a full-fledged management committee and holds monthly meeting. • Has formed a full-fledged management committee and holds at least six meeting in a year. • Has formed a full-fledged management committee and holds at least one meeting in a year. • Low level than above standards.	3 2 1 0
18	Enrollment in Grade one with ECD experience	• Children more or equal to 90 percent in grade one • Children more or equal to 80 percent in grade one • Children more or equal to 70 percent in grade one • Children less than 70 percent in grade one • (with experience of ECD center)	3 2 1 0
19	Satisfaction of facilitators on management of center	• Completely satisfied • Generally satisfied • Little satisfied • Not satisfied	3 2 1 0
20	Parent satisfaction	• Completely satisfied • Generally satisfied • Little satisfied • Not satisfied	3 2 1 0

Appendix 4. Performance Level Description of ELDS development categories

Development Category	Performance Level Description
Cognitive domain	
On track	Children can demonstrate basic life and science knowledge, imagination and creativity. They can recognize and classify shapes and colors, recognize and write basic numbers, differentiate and compare length and size of objects.
Progressing	Children can demonstrate limited life and science knowledge, imagination and creativity. They can recognize and classify shapes and colors, recognize and write basic numbers, differentiate and compare length and size of objects with a few mistakes.
Struggling	Children have difficulties in demonstrating life and science knowledge, imagination and creativity, recognizing and classifying shapes and colors, recognizing and writing basic numbers, differentiating and comparing length and size of objects.
Language domain	
On track	Children can listen to and respond properly to familiar language, speak simple short sentences and communicate with others, and demonstrate pre-reading and pre-writing skills.
Progressing	Children can listen to and respond to familiar language with a few mistakes, speak very short sentences and communicate with others, and demonstrate limited pre-reading and pre-writing skills.
Struggling	Children have difficulties in listening to and responding to familiar language, speaking simple sentences and communicating with others, and demonstrating pre-reading and pre-writing skills.

Physical domain	
On track	Children can demonstrate coordination of large muscles for whole body movement and small muscles including hand-eye coordination. They can demonstrate health and hygiene practices.
Progressing	Children can demonstrate limited coordination of large muscles for whole body movement and small muscles including hand-eye coordination. They can demonstrate limited health and hygiene practices.
Struggling	Children have difficulties in demonstrating coordination of large muscles and small muscles including hand-eye coordination and demonstrating health and hygiene practices.
Social emotional domain	
On track	Children can interact with peers and adults to build and maintain relationships, demonstrate sense of self, recognize and express emotions of self and others, respect and follow values of family, community, and nation.
Progressing	Children can occasionally interact with peers and adults to build and maintain relationships, demonstrate limited sense of self, recognize and express emotions of self and others with an occasional difficulty, and show limited respect to values of family, community, and nation.
Struggling	Children have difficulties in interacting with peers and adults to build and maintain relationships, demonstrating sense of self, and recognizing and expressing emotions of self and others. They show minimal respect to values of family, community, and nation.

Appendix 5. ELDS Assessment Cut-Score with Confidence Intervals

Table 1 provides the confidence intervals (CIs) of final recommended cut-scores at 95% confidence level, computed based on the SEs in the panelists' item rating from the first round.

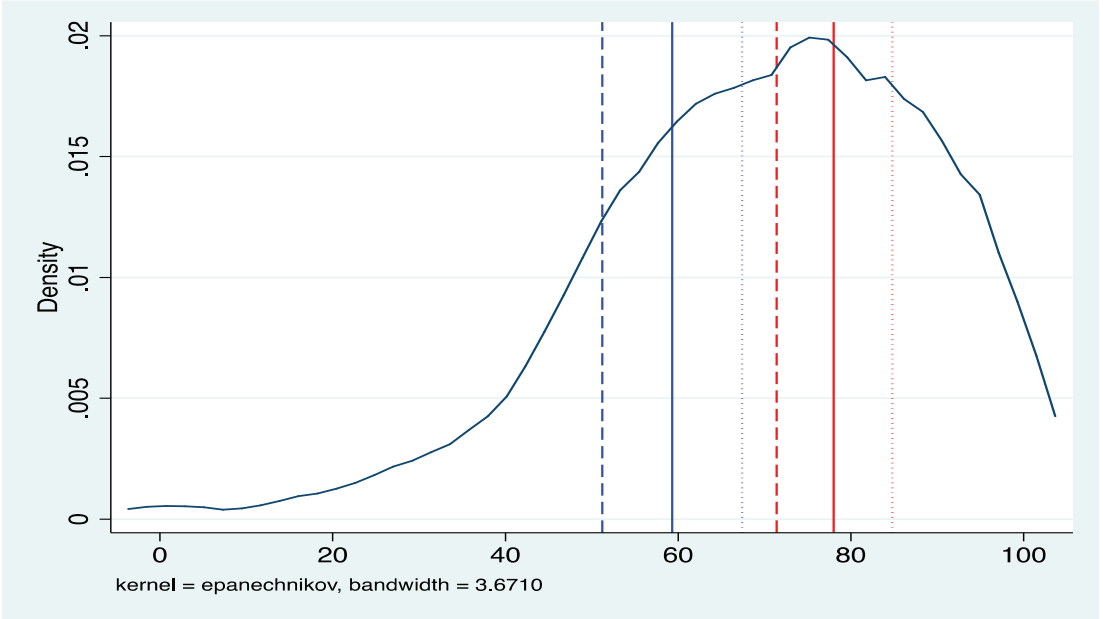
Table 1. Final recommended cut-scores and their confidence intervals.

Development domain	Final recommended cut-scores [Confidence interval]	
	Minimally on track	Minimally progressing
Cognitive	78.0 [71.4, 84.8]	59.3 [51.2, 67.4]
Language	75.7 [70.8, 80.6]	57.7 [50.1, 65.3]
Physical	72.9 [67.7, 78.1]	54.3 [46.6, 62.0]
SE/Cultural	78.4 [74.2, 82.6]	60.6 [53.4, 67.8]

Note: Confidence intervals (CI) are calculated as follows: , where CS is computed cut-scores, z is a z-score at the 95% of confidence level (i.e., 1.96), and SE is Standard errors from the first round of item rating.

As you can see in Graph 1, although the CIs of cut-scores at two borderlines do not overlap each other, SEs are large (i.e., cut-scores not reliable) in a sense that the range of CIs are so wide that the consequential proportion of children in each development category may substantially vary. For instance, when we apply the upper bound of the CI for the minimally on track cut-score of the cognitive domain (the red dot line in Graph 1), the computed proportion of on track children is 23.0%. When moving this cut-score to the lower bound of the CI (the red dash line in Graph 1), the computed proportion of on track children changed to 48.7% (the difference of a 25.7 percentage point). Similarly, when we move the cut-score for the minimally progressing borderline from the upper bound of the CI (the blue dot line in Graph 1) to the lower bound of the CI (the blue dash line in Graph 1), the proportion of struggling children changes from 41.3% to 16.6% (the difference of a 24.7 percentage point).

Graph 1. The cognitive domain scores with cut-scores and confidential intervals.



Note: The blue lines and red lines indicate the cut-scores for minimally on track and minimally progressing borderlines, respectively. Solid lines are final recommended cut-scores for the cognitive domain while the dash lines and dot lines are lower bound and upper bound of the confidence interval at 95%, respectively.

Reference

Belfield, C. R., Nores, M., Barnett, S., & Schweinhart, L. (2006). The high/scope perry preschool program cost–benefit analysis using data from the age-40 followup. *Journal of Human resources*, *41*(1), 162-190.

Bowne, J. B., Magnuson, K. A., Schindler, H. S., Duncan, G. J., & Yoshikawa, H. (2017). A

Meta-Analysis of Class Sizes and Ratios in Early Childhood Education Programs: Are Thresholds of Quality Associated With Greater Impacts on Cognitive, Achievement, and Socioemotional Outcomes?. *Educational Evaluation and Policy Analysis, 39(3), 407-428.*

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development:

Research perspectives. *Developmental psychology*, 22(6), 723.

Burchinal, M. R., Cryer, D., Clifford, R. M., & Howes, C. (2002). Caregiver training and classroom quality in child care centers. *Applied Developmental Science, 6*(1), 2-11.

Campbell, F. A., Ramey, C. T., Pungello, E., Sparling, J., & Miller-Johnson, S. (2002). Early

childhood education: Young adult outcomes from the Abecedarian Project. *Applied Developmental Science, 6*(1), 42–57.

Chatterji, M. (2003). Designing and using tools for educational assessment. Allyn & Bacon.

Clarke-Stewart, K. A., Vandell, D. L., Burchinal, M., O'Brien, M., & McCartney, K. (2002). Do regulable features of child-care homes affect children's development?. *Early Childhood Research Quarterly, 17*(1), 52-86.

Department of Education (DOE). (2018). Flash Report I (2017-2018). Sanothimi Bhaktapur,

Nepal.

Department of Education (DOE). (2019). Flash Report I (2018-2019). Sanothimi Bhaktapur,

Nepal.

Department of Education (DOE). (2020). Flash Report I (2019-2020). Sanothimi Bhaktapur,

Nepal.

Department of Education. (DOE). (2062 BS). Early Childhood Development Handbook

(Curriculum). Sanothimi: DOE.

Department of Education. (DOE). (2067 BS). National Minimum Standards for ECD Centers.

Sanothimi: DOE.

Department of Education (DOE). (2069 BS). Early Learning and Development Standards for
the Children from 48 to 60 Months Old. Sanothimi Bhaktapur, Nepal: Author.
Early, D. M., Maxwell, K. L., Ponder, B. B., & Pan, Y. (2017). Improving teacher-child interactions: A randomized control trial of Making the Most of Classroom Interactions and My Teaching Partner professional development models. *Early Childhood Research Quarterly, 38,* 57-70.
Education Review Office (ERO). (2017-a). Assessing Early Learning and Development
Standards. Assessment Framework for the Assessment of ECD in Nepal Sanothimi, Bhaktapur, Nepal: ERO.
Education Review Office (ERO). (2017-b). A Report on ECD Assessment in Nepal 2017.
Sanothimi, Bhaktapur, Nepal: ERO.
Education Review Office (ERO). (2018). Assessment of Early Childhood Education and
Development 2018: A Report on Early Learning and Development Standards
(ELDS). Sanothimi, Bhaktapur, Nepal: ERO.
Fukkink, R. G., & Lont, A. (2007). Does training matter? A meta-analysis and review of caregiver training studies. *Early Childhood Research Quarterly, 22*(3), 294-311.
Ghazvini, A., & Mullis, R. L. (2002). Center-based care for young children: Examining predictors of quality. *The Journal of Genetic Psychology, 163*(1), 112-125.
Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged
children. Science, 312(5782), 1900-1902.
Heckman, J. J. (2008). Schools, skills, and synapses. Economic Inquiry, 46(3), 289-324.
Howes, C. (1997). Children's experiences in center-based child care as a function of teacher background and adult: child ratio. *Merrill-Palmer Quarterly (1982-)*, 404-425.
Kadel, S., & Mahat, B. M. (2011). Scaling Up Early Child Development in Nepal: Scaling
Up Community- and School-Based Early Childhood Development Centers in Nepal.
Kathmandu, Nepal: Global Economy and Development at Brookings.
Keys, T. D., Farkas, G., Burchinal, M. R., Duncan, G. J., Vandell, D. L., Li, W., Ruzek, E.A.,
& Howes, C. (2013). Preschool center quality and school readiness: Quality effects and variation by demographic and child characteristics. Child development, 84(4), 1171-1190.

McCain, M. N., Mustard, J. F., & Shanker, S. (2002). *Early years study 2: Putting science*
into action. Council for Early Child Development.
MoES. (2004). Strategy paper for early childhood development in Nepal. Kathmandu:
Ministry of Education and Sports, Government of Nepal.
Ministry of Education. (2009). School Sector Reform Plan 2009-2015. Kathmandu, Nepal:
Ministry of Education and Sports.
Ministry of Education. (2016). Education act 8th amendment. Kathmandu, Nepal: Ministry of
Education.
Ministry of Education. (2016). School Sector Development Plan, Nepal, 2016–2023.
Kathmandu, Nepal: Ministry of Education, Government of Nepal.
OECD. (2014). *Does Pre-primary Education Reach Those Who Need It Most? PISA in Focus 40*. Paris: OECD.
Peisner-Feinberg, E. S., Burchinal, M. R., Clifford, R. M., Culkin, M. L., Howes, C., Kagan,
S. L., & Yazejian, N. (2001). The relation of preschool child-care quality to children's cognitive and social developmental trajectories through second grade. *Child development*, *72*(5), 1534-1553.
Phillips, D. A., & Shonkoff, J. P. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. National Academies Press.
Peterson, C. H., Schulz, E. M., & Engelhard Jr, G. (2011). Reliability and validity of bookmark-based methods for standard setting: comparisons to Angoff-based methods in the National Assessment of Educational Progress. *Educational Measurement: Issues and Practice, 30(2), 3-14.*
Pianta, R. C., DeCoster, J., Cabell, S., Burchinal, M., Hamre, B. K., Downer, J., & Howes, C. (2014). Dose–response relations between preschool teachers' exposure to components of professional development and increases in quality of their interactions with children. *Early Childhood Research Quarterly, 29*(4), 499-508.
Raikes, H.A. (2016). Measuring of child development and learning. Paper commissioned
for the Global Education Monitoring Report 2016, Education for People and
Planet: Creating Sustainable Futures for All. Paris: UNESCO.
Raver, C. C., Jones, S. M., Li-Grining, C. P., Metzger, M., Champion, K. M., & Sardin, L. (2008). Improving preschool classroom processes: Preliminary findings from a randomized trial implemented in Head Start settings. *Early Childhood Research Quarterly, 23*(1), 10-26.
Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., McGuinn, L., ... &

Committee on Early Childhood, Adoption, and Dependent Care. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, *129*(1), e232-e246.
Shrestha, K., Pradhananga, D., & Bhattarai, G. P. (2017). Devising a Framework for Assessing Early Childhood Learning and Development in Nepal. *Educational assessment*, 57.
UNESCO. (2007). *EFA Global Monitoring Report. Strong Foundations: Early Childhood Care and Education*. Paris: UNESCO.
UNESCO. (2010). The Dakar framework for action: Education for all: Meeting our collective
commitments. UNESCO.
UN General Assembly. (1989). Convention on the Rights of the Child. *United Nations, Treaty Series*, *1577*(p. 3).
United Nations General Assembly. (2015). Transforming our world: the 2030 Agenda for
Sustainable Development. New York: United Nations.
United Nations General Assembly. (2017). Global indicator framework for the Sustainable
Development Goals and targets of the 2030 Agenda for Sustainable
Development. *United Nations Statistics Division: New York, NY, USA*.
UNICEF. (2014). Early childhood development: The key to a full and productive life.
UNICEF: New York.
UNICEF. (2017). Early Learning and Development Standards and School Readiness:
Evaluation Report. NY: Author.
Van Huizen, T. M., & Plantenga, J. (2015). Universal child care and children's outcomes: A
meta-analysis of evidence from natural experiments. *Discussion Paper Series/Tjalling C. Koopmans Research Institute*, *15*(13).
Winter, P. (2010). Neuroscience and early childhood development: Summary of selected
literature and key messages for parenting. Victoria, Australia: Ministerial Council for Education, Early Childhood Development and Youth Affairs.
World Bank. (2013). Nepal Early Childhood Development: SABER Country Report 2013.
Washington DC: World Bank.