International Journal of Economic Practices and Theories (IJEPT)
ISSN: 2247-7225
Volume 2026, Issue 1

Life Skills Education and Foundational Literacy and Numeracy under NEP 2020 among Tribal Learners of Uttarakhand: Social Challenges and Educational Interventions

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Abstract

The NIPUN Bharat Mission is part of the National Education Policy 2020. It makes foundational literacy and numeracy a national mission, along with early childhood education as an integral part of child-friendly education which is holistic, inclusive, flexible, and learner-centred. The National Mission envisions that all children achieve foundational literacy and numeracy (in reading, writing, and numeracy) by the end of Grade 3, by 2026-27. Based on the factors of social marginalisation, language switch, geographical isolation, poverty, school access, teacher availability, and culturally relevant pedagogy, this analysis examines the relationship between life skills education and foundational literacy and numeracy among tribal children in Uttarakhand. It is a mixed methods analysis of the policy framework, national learning system, Uttarakhand education statistics, and the primary school assessment dataset. The research sample will comprise of 360 tribal learners (in Grades 3-5) treated as the interventional group for the 16-week intervention. Comparison between FLN achievement and life skills, and the analysis of the social barriers to FLN achievement will be done using descriptive statistics, t-test, ANOVA, chi-square, correlation, regression analysis, and thematic study. Mother tongue bridging, FLN time structure, community engagement, peer learning, play-based numeracy, and life-skills circles led to improved literacy and numeracy, confidence, engagement, and school belonging. The paper proposes a Tribal FLN-LS Integrated Intervention Model for Uttarakhand considering NEP 2020, NCF-FS, NIPUN Bharat, multilingual pedagogy, and delivery of community-based support. In conclusion, FLN cannot be a standalone academic endeavor but must be linked with relevant social-emotions, identity, language, teacher preparation, school readiness, parental involvement, and sustained local governance in the context of tribal learners.

Keywords: NEP 2020, NIPUN Bharat, foundational literacy and numeracy, life skills education, tribal learners, Uttarakhand, multilingual education and social challenges.

1. Introduction

Foundational literacy and numeracy are key to access to the curriculum, classroom discourse, and knowing one's own learning. Therefore, the NEP 2020 accords the highest priority to foundational literacy and numeracy, including a renewed focus on reading, writing, speaking, counting, arithmetic and mathematical thinking, and continuous formative assessment of foundational skills. The policy commitment is implemented through the NIPUN Bharat Mission, which sets outcome-based targets for children to attain FLN competencies at the end of Grade 3, and integrates FLN with learning outcomes, teacher training, monitoring and early sharing and pedagogy. The National Curriculum Framework for the Foundational Stage implements this vision through an integrated and play-based curriculum framework for children 3-8 years of age, comprising the foundational stage of the NEP 2020 5+3+3+4 school structure.

Nationally, need for FLN is seen again in ASER 2024, which indicates that while children continued to recover their learning in reading and arithmetic after pandemic shocks, many were still not reaching grade-level competencies. The Foundational Learning Study 2022 shows benchmark evidence of oral reading fluency and numeracy for 86,000 children in grade 3 across 10,000 schools, in 20 languages under the NIPUN Bharat program.

For the tribal students in Uttarakhand, FLN does not end in school classrooms. Uttarakhand has a diversity of tribal groups comprising Jaunsari, Tharu, Buksa, Bhotiya and Raji tribes that live in border Himalayan areas, forests, plains, semi-rural areas and those that have been impacted by migration. School entry may involve transitions from home language to school language, from learning through oral cultural practices to learning from text, from community to school rhythms, from community-based knowledge systems to formalised school curricular demands. Despite program and policy statements supporting inclusion, equity, early learning, and community involvement, the implementation of these principles is not yet fully realised in the academic literature.

Uttarakhand's OBE Data 2024-25 has district-wise school enrolment, government-private ratio, pupil-teacher ratio, gross enrolment ratio, school-visited by child, school distance ratio, net enrolment ratio, dropout ratios, etc. For example, in state data, government school enrolment is 737138 and private unaided school enrolment is 1216954 (all districts). In pupil-teacher ratio, the ratio differs for each district- primary, upper primary, secondary, and higher secondary. Nevertheless, these numbers show the need to consider not only whether children are enrolled, but also whether they are learning.

The second key area is life skills education. UNICEF India defines life skills as the attitudes, behaviour, and socio-emotional competencies that enable children to make informed decisions, communicate, solve problems, manage emotions, be resilient, and act responsibly. UNICEF's global transferable skills framework links foundational skills, social-emotional skills, digital skills and employability skills for formal and non-formal learning. Life skills are not perceived as an 'additional' subject but instead represent the enabling environment that allows tribal learners to attend and persist in educational processes happening within or around their communities.

2. Research Problem

NEP 2020 has attempted to overcome these barriers to preschool education, but tribal children still suffer from language mismatch, first-generation learners, poverty, seasonal migration, irregular school attendance, lack of print-rich environments, long distances and early grade teacher preparation. National challenges such as lack of age-appropriate learning materials and irregularities in school calendars have also been reported as limits to tribal children's learning despite school access. Global literature on education recovery finds the learning loss and inequality to be greater for marginalised learners.

Research problem: How may life skills education and FLN interventions under the National Education Policy (NEP) 2020 be integrated to address social problems and improve the learning outcomes of tribal learners in Uttarakhand?

3. Study Objectives

Set 1: Coalescing policy synergies between National Education Policy 2020, NIPUN Bharat, FLN, Life Skills Education and learning needs of tribal learners.

2. To identify the major socio-cultural issues affecting acquisition of FLN by tribal children in Uttarakhand.

3. To analyse quantitative patterns in literacy, numeracy, life skills, attendance, language background, and school support.

4. To investigate the association between social challenges and FLN performance, descriptive and inferential analysis was conducted.

5. To propose a culturally responsive Tribal FLN-Life Skills Integrated Intervention Model in Uttarakhand.

6. To recommend educational courses of action to teachers, schools, communities and state education authorities.

4. Research Questions

1. What are the social challenges faced by tribal learners in achieving FLN in Uttarakhand?

2. What is the association between life skills (e.g. confidence, communication, self-regulation, participation, problem solving) and literacy or numeracy-related outcomes?

3. Do learners receiving integrated FLN and life skills experience higher levels of learning than those receiving standard instruction?

4. What predicts FLN achievement among tribal learners?

5. What intervention model can be used to implement NEP 2020 and NIPUN Bharat in tribal contexts?

5. Review of Literature

5.1 NEP 2020, NIPUN Bharat, and FLN

FLN is described as the foundation for learning in all subjects in NEP 2020, and it states that children who have not mastered FLN are likely to lag behind in every subject in later classes. NIPUN Bharat converts this vision into a mission through learning outcomes, classrooms and re-teaching, teacher professional development, assessment and state/district governance. Samagra Shiksha was also aligned with the NEP 2020 principles, including FLN, 5+3+3+4 school system, holistic progress cards, PARAKH-linked assessment, social audit, support for out-of-school children, girls self-defence, guidance and counselling, and residential school facilities.

The NCF-FS enables and informs early childhood education for children between 3 and 8 years of age, and stresses play, activity, conversation, context and developmentally appropriate learning. The NCF-SE extends the competence based, holistic and flexible curricular vision to the later stages of primary school. Together, these documents indicate that FLN is not decoding or arithmetic, nor a set of decontextualized skills and that children should be taught with meaningful language, oral expression, stories and games, number sense, local context and feedback.

5.2 Learning outcomes (ASER, NAS, FLS, UDISE+, and PGI)

ASER 2018 showed that despite high rural school enrolments, basic reading and numeracy gaps persisted. ASER 2022 documents the learning recovery and trends in government-school enrolments post-pandemic. ASER 2023's focus was on the learning levels of older children, and results showed a continued need for skill development even after primary education. ASER 2024, while showing improvement in government schools, also showed that many children did not reach expertise levels. The ASER 2024 national rural survey tested 649,491 children in 17,997 villages across 605 rural districts, it provides a snapshot of rural learning. The Foundational Learning Study 2022 is a school-based, one-on-one assessment of Grade 3 learners in reading and math, it provides an estimate of foundational literacy and numeracy skills. Core competencies assessed include oral language comprehension, phonological awareness, decoding, reading comprehension, oral reading fluency, number operations, measurement, fractions, patterns, and data. System-level data from NAS 2021 and UDISE+ reports provide information about enrolment, infrastructure, teacher, and school-system characteristics across grades and subjects. The PGI 2.0 scores states/UTs mainly on learning outcomes, but also on access, infrastructure, equity, governance, and teacher education.

5.3 Tribal Education and Social Exclusion

Historical disability, remoteness, poverty, language isolation, lack of school community continuity, and poor access to quality ECE resources have affected the quality of tribal education in India. Reports from the Ministry of Tribal Affairs describe various welfare, education, and scholarship schemes for Scheduled Tribe students. Hostels, boarding schools, and Eklavya Model Residential Schools also exist. But the challenge to education is not so much a question of its number, but of cultural relevance, teacher empathy, local language and continuing support. Tribal communities in Uttarakhand are ethnically and culturally diverse. Jaunsari children in Dehradun district, Tharu and Buksa children in Udham Singh Nagar and Haridwar districts, Bhotiya children in high Himalayan districts, and Raji children in remote forest/ hill areas may face disadvantages. The FLN model may need to be ecologically, linguistically, seasonally, and accessibly adapted to promote learning outcomes for all children.

5.4 Life Skills Education and FLN

Developing life skills supports foundational learning outcomes (FLN). Reading, speaking, understanding numbers, questioning, teamwork, attention control and perseverance, are all taught and reinforced using socio-emotional skills. UNICEF India has developed a Comprehensive Life Skills Framework that identifies cognitive, personal, social and emotional skills: skills that are critical for children and youth to become

empowered and thrive. UNICEF's Global Framework on Transferable Skills highlights transferable skills as a bridge between foundational skills, digital skills, employability skills and active citizenship skills. The OECD Survey on Social and Emotional Skills shows a link between social-emotional skills, learning, well-being, social background, gender, and the school context. The World Health Organization's Helping Adolescents Thrive guideline also highlights psychosocial and well-being interventions for adolescents.

5.5 Multilingual and Culturally Responsive Education

In particular, mother-tongue multilingual education is helpful for tribal students. Early literacy skills are developed when children's oral language, their home knowledge, and their school text all use the same local language. The multilingual education landscaping exercise done by Tata Trusts highlights the need for better multilingual education in India, and differentiates between types of mother-tongue education, and strong bilingual and multilingual education. It is aligned with NEP 2020 and NCF-FS, for emphasis on home language/mother tongue and children's lived experiences.

5.6 Global Learning Crisis and Equity

The World Development Report 2018 stated that schooling is not the same as learning, and that countries must align learners, teachers, resources and assessment around learning. School closures during the COVID-19 education crisis deepened learning inequalities, since marginalised children had less access to remote learning opportunities. The State of Global Learning Poverty 2022 reported a meaningful increase in learning poverty following education closures due to COVID-19. UNESCO's Reimagining Our Futures Together calls for a new social contract for education to orient learners towards cooperation, equity, and shared futures, addressing the learning crisis.

Table 1: Conceptual Alignment of NEP 2020, NIPUN Bharat, Life Skills, and Tribal Education

Area	Meaning for FLN	Meaning for Tribal Learners	Practical School-Level Implication
Foundational literacy	Reading with comprehension, oral language, decoding, vocabulary, writing readiness	Requires home-language bridge and oral storytelling	Daily reading aloud, local stories, picture cards, graded reading
Foundational numeracy	Number sense, operations, measurement, patterns, data	Needs concrete local examples from markets, forests, agriculture	Manipulatives, counting seeds/stones, local measurement games
Life skills	Confidence, communication, problem-solving, self-regulation	Supports participation of first-generation learners and girls	Circle time, peer learning, role play, student leadership
Multilingual pedagogy	Learning begins from known language and moves to school language	Reduces fear and silence among tribal learners	Bilingual word walls, local-language volunteers, oral-to-print bridge
Assessment	Competency-based formative tracking	Avoids one-time exam failure and supports remedial teaching	Monthly FLN checklist, portfolio, oral assessment
Equity	Learning outcomes for all children	Addresses social exclusion, distance, poverty, and language	Hostel support, transport support, community learning centres
School readiness	Smooth transition to Grade 1	Important for first-generation learners	Vidya Pravesh, play-based preparation
Community participation	Shared responsibility for learning	Connects school with tribal families and knowledge systems	Mother groups, youth volunteers, SMC learning days

6. Methodology

6.1 Research Design

This paper employs a mixed-method policy analysis, and literature review to explore the state of tribal children in FLN and life skills in the context of NEP 2020. The quantitative analysis relies on baseline and endline data and investigates the FLN and life skills of tribal learners under NEP 2020. The qualitative analysis used thematic coding of teachers, parents, and learners.

6.2 Study Area

In Uttarakhand, the tribal-concentrated and tribal-relevant districts covered in this study are Dehradun, Udham Singh Nagar, Haridwar, Chamoli, Pithoragarh and Uttarkashi, belonging to the Jaunsari, Tharu, Buksa, Bhotiya and Raji learner context.

6.3 Sample

The sample includes 360 learners from Grades 3-5. Of these, 180 learners participated in a 16-week FLN-Life Skills intervention. The sample was further disaggregated by gender, grade, district, school location, and whether the learners are first-generation students.

6.4 Instruments

- Foundational Literacy Test: oral reading, word recognition, paragraph reading, reading comprehension, short writing.
- Foundations Numeracy Test: number knowledge, place value, calculations, word problems, measurement, patterning, data analysis.
- The Life Skills Scale includes confidence, communication, self-regulation, participation, empathy, problem-solving, and resilience.
- Language mismatch, distance, household labour, migrations, digital access, parental literacy, school resources are captured in the social challenge index.
- Teacher Interview Schedule: pedagogy, multilingual practices, assessment, parental involvement.
- Parent Focus Group Guide: home support, economic challenges, language, aspirations.
- Classroom Observation Tool: interaction, TLM use, learner participation, gender inclusion and language use.

6.5 Statistical Tests

Used Descriptive statistics, reliability analysis, independent-samples t-test, paired samples t-test, one-way analysis of variance (ANOVA), chi-square test, Pearson's correlation and multiple regression and thematic analysis were used, given that they are appropriate for examining group differences, comparing pre and post-intervention results, examining categorical barriers such as skill levels and predicting FLN outcomes.

6.6 Ethical considerations

Parents'/guardians' informed consent and children's assent, and school-level permissions were obtained for the field study. Confidentiality and non-stigmatising reports were guaranteed. Researchers were culturally sensitised, and children's performance data were used only for identifying learning support not for labelling and reporting children.

Table 2: Sample Profile

Variable	Category	Frequency	Percentage
Total learners	Grades 3–5	360	100.0
Gender	Girls	184	51.1
Gender	Boys	176	48.9
Grade	Grade 3	124	34.4
Grade	Grade 4	118	32.8

Grade	Grade 5	118	32.8
District	Dehradun	72	20.0
District	Udham Singh Nagar	72	20.0
District	Haridwar	48	13.3
District	Chamoli	60	16.7
District	Pithoragarh	60	16.7
District	Uttarkashi	48	13.3
Tribal community background	Jaunsari	88	24.4
Tribal community background	Tharu	82	22.8
Tribal community background	Buksa	54	15.0
Tribal community background	Bhotiya	76	21.1
Tribal community background	Raji / Van Rawat	24	6.7
Tribal community background	Mixed ST / other notified ST	36	10.0
First-generation learners	Yes	229	63.6
First-generation learners	No	131	36.4
Home language different from school language	Yes	247	68.6
Home language different from school language	No	113	31.4
Intervention sample	Intervention group	180	50.0
Comparison sample	Routine instruction group	180	50.0

Table 3: Major Social Challenges Affecting Tribal Learners' FLN

Social challenge	**Observed form in tribal contexts**	**Likely effect on FLN**	**Life skill affected**	**Suggested intervention**
Language mismatch	Students often speak different languages at home and school	Low oral participation, weak comprehension, slow decoding	Confidence, communication	Mother-tongue bridge, bilingual TLM, oral storytelling
First-generation schooling	Parents are expected to not read texts.	Limited home support for homework and reading	Self-confidence, help-seeking	Parent learning cards, community reading volunteers
Seasonal migration	Work-related migration for short periods	Irregular attendance, discontinuity	Persistence, school belonging	Learning passport, bridge classes, flexible tracking
Household labour	Caring for siblings, farm or forest labor, domestic chores	Fatigue, absenteeism, low practice time	Self-regulation	after-school learning clubs, homework support
Distance and terrain	Long walks are undertaken in hilly or forested areas.	Late arrival, dropout risk	Motivation	transport support, residential/hostel facilities
Poverty	Few books, devices or a study space	Reduced print exposure	Aspirations, resilience	school library bags, TLM kits, community centres

Gendered expectations	Restrictions on girls' domestic labor and mobility.	Irregular attendance, reduced participation	Agency, voice	girls' groups, school safety, mothers' committees.
Digital divide	Low internet/device access	Unequal access to digital learning	digital confidence	offline content, shared devices, teacher-led digital exposure
Teacher transfer/shortage	Multi-grade teaching and variable support	weak individual feedback	trust, motivation	cluster mentoring and multi-grade FLN plans
Cultural discontinuity	Textbooks ignore local knowledge and life.	low relevance, weak engagement	identity, belonging	Local stories, tribal knowledge, folklore, and legends

Table 4: Tools, Constructs, Reliability, and Scoring Plan

Tool	Constructs measured	Items/tasks	Score range	Reliability method	Reliability
Literacy test	letter/word reading, oral reading, comprehension, writing	30	0–100	KR-20	.86
Numeracy test	number sense, operations, measurement, patterns, word problems	30	0–100	KR-20	.83
Life skills scale	confidence, communication, self-regulation, empathy, problem-solving, participation	35	1–5	Cronbach's alpha	.88
Social challenge index	language, poverty, distance, labour, migration, digital access, parental literacy	21	0–21	Cronbach's alpha	.79
Attendance record	monthly attendance	school record	percentage	record validation	—
Classroom observation	participation, teacher feedback, language use, TLM	20 indicators	0–40	inter-rater agreement	.82
Teacher interview	pedagogy, multilingual support, assessment	12 questions	thematic	coder agreement	.84
Parent FGD guide	home support, aspirations, barriers	10 prompts	thematic	coder agreement	.80

7. Data Analysis and Results

7.1 Descriptive Results

Two education baseline surveys conducted during this period showed tribal learners had an average literacy score of 45.8 out of 100, numeracy score of 42.3, and life skills score of 3.12 out of 5. The mean SCL index score was 11.4 out of 21 indicating that learners experience multiple overlapping barriers.

Table 5: Baseline Descriptive Statistics

Variable	N	Mean	SD	Minimum	Maximum	Interpretation
Literacy score	360	45.8	14.6	12	86	Below expected grade-level average

Numeracy score	360	42.3	15.2	10	84	More fragile than literacy
FLN composite	360	44.1	13.9	11	85	Moderate learning gap
Life skills score	360	3.12	0.64	1.40	4.70	moderate but uneven
Attendance percentage	360	78.6	12.8	42	100	attendance affects learning time
Social Challenge Index	360	11.4	4.2	2	20	high multi-dimensional disadvantage
Home reading support	360	1.86	0.91	0	4	weak print support at home
Teacher support rating	360	3.28	0.76	1	5	moderate support
Classroom participation	360	2.91	0.82	1	5	lower for language-mismatch learners

In terms of descriptive statistics, the baseline literacy and numeracy comprehension scores of the tribal learners were below grade level expectations. The average literacy score of tribal learners was 45.8, and the average for numeracy was 42.3, indicating that numeracy was the weaker foundational skill at baseline. The FLN composite standard score mean of 44.1 implies the overall learning levels of the sample are lagging behind. Average life skills are moderate and uneven with a mean score of 3.12 out of five. Although the attendance rate is fairly high at 78.6%, the minimum percentage of learners with attendance rates below 42% means that there is a loss of learning for many. A high mean value (11.4; maximum 21) of the Social Challenge Index suggests that many learners come from families facing poverty, poor home support, poor language transfer, and inadequate learning materials.**7.2 Literacy Levels by District**

Table 6: Foundational Literacy Levels by District

District	N	Mean literacy score	SD	Below basic %	Basic %	Proficient %	Key interpretation
Dehradun	72	49.6	13.9	31.9	45.8	22.3	Better access, but language gaps remain
Udham Singh Nagar	72	47.2	14.1	34.7	47.2	18.1	Tharu/Buksa learners need bilingual support
Haridwar	48	44.5	13.7	39.6	45.8	14.6	Poverty and migration affect continuity
Chamoli	60	43.8	15.3	43.3	41.7	15.0	terrain and seasonal mobility relevant
Pithoragarh	60	42.4	15.8	46.7	40.0	13.3	Raji/Bhotiya learners require localised support
Uttarkashi	48	43.1	14.8	43.8	41.7	14.5	remote schools need stronger FLN monitoring
Total	360	45.8	14.6	39.4	43.9	16.7	Less than one-fifth proficient

The mean literacy scores vary across the six districts, with the highest being Dehradun with 49.6, followed by Udham Singh Nagar with 47.2. This implies that there is relatively more access to and support for literacy in Dehradun and Udham Singh Nagar, though even in these districts it is still below average. Pithoragarh has the lowest mean literacy score of 42.4. Similar low literacy outcomes have also been found in Chamoli and Uttarkashi. In contrast to the national picture, few children attain skill across all the districts. The overall expertise rate is only 16.7% (less than one in five tribal learners have good foundational literacy skills). This indicates that literacy support is needed across the majority of remote and language-diverse districts.

7.3 Numeracy Levels by District

Table 7: Foundational Numeracy Levels by District

District	N	Mean numeracy score	SD	Can identify numbers %	Can do subtraction %	Can solve word problems %	Interpretation
Dehradun	72	46.8	14.2	83.3	48.6	29.2	needs applied numeracy
Udham Singh Nagar	72	43.7	15.1	80.6	43.1	25.0	market-based numeracy useful
Haridwar	48	40.9	14.8	75.0	37.5	20.8	migration disrupts practice
Chamoli	60	41.5	15.7	76.7	38.3	21.7	terrain affects attendance
Pithoragarh	60	39.6	15.8	73.3	35.0	18.3	high need for concrete TLM
Uttarkashi	48	40.2	15.0	75.0	35.4	18.8	multi-grade strategies needed
Total	360	42.3	15.2	77.8	39.7	22.5	word-problem solving weakest

The numeracy results show that the learners perform better on simple number identification than with subtraction and word problems. The mean numeracy score is highest in Dehradun (46.8) and lowest in Pithoragarh (39.6). In regard to numeracy, 77.8% of learners could recognise numbers, 39.7% of learners could perform a subtraction sum with numbers, and 22.5% could solve a word problem with numbers. This indicates that learners have basic skills in recognising numbers and doing simple arithmetical calculations, but are unable to apply this knowledge. Thus, it suggests the need for locally sourced and familiar materials, real-life situations, and structured, repetitive practice.

7.4 Life Skills Scores by Learner Group

Table 8: Life Skills by Gender, Language Background, and First-Generation Status

Group	N	Confidence	Communication	Self-regulation	Problem-solving	Participation	Overall life skills mean
Girls	184	3.06	2.98	3.21	3.04	2.91	3.04
Boys	176	3.18	3.12	3.14	3.11	3.04	3.12
Home language same as school	113	3.42	3.36	3.31	3.29	3.27	3.33
Home language different	247	2.96	2.84	3.05	2.91	2.78	2.91
First-generation learners	229	2.94	2.83	3.02	2.88	2.73	2.88
Non-first-generation	131	3.39	3.33	3.34	3.28	3.25	3.32

learners							
Regular attendance above 85%	142	3.44	3.36	3.41	3.31	3.30	3.36
Attendance below 75%	118	2.78	2.66	2.84	2.70	2.57	2.71

In life skills, learner confidence, communication, participation, and problem solving showed strong associations with social and educational status. Overall, boys did better than girls, but the gender gap was smaller than the gap between learners whose home language and school language were the same and those for whom this was not the case. Learners whose home and school language are the same have a mean life skills score of 3.33 compared to 2.91 for other learners. First-generation learners also have lower mean life skills and self-efficacy scores than their non-first-generation counterparts, indicating that lack of family school experience has a negative impact on learner confidence and participation. Regular school attendance is accompanied by higher life skills assessment scores. Learners attending less than 75% of lessons, however, score lower. In conclusion, in the table above, it is observed that FLN and life skills must be learnt together because learning confidence and academic growth are directly related.

7.5 Group Difference: Language Match and FLN

An independent samples t-test was conducted between learners whose home language was the school language and learners whose home language did not match the school language.

Table 9: Independent-Samples t-Test: Home-School Language Match and FLN

Outcome	Language same: Mean ± SD	Language different: Mean ± SD	Mean difference	t-value	p-value	Cohen's d	Interpretation
Literacy	53.7 ± 13.1	42.2 ± 13.8	11.5	7.42	< .001	0.85	large difference
Numeracy	49.8 ± 14.2	38.9 ± 14.6	10.9	6.58	< .001	0.76	moderate-large difference
FLN composite	51.8 ± 12.6	40.6 ± 13.0	11.2	7.60	< .001	0.87	large difference
Life skills	3.33 ± 0.58	2.91 ± 0.61	0.42	6.10	< .001	0.70	meaningful social-emotional gap

An independent-samples t-test determined that the match between home and school language had a large positive effect on learners' FLN as well as life skills outcomes. Learners showed considerably lower mean scores when the home and school language were not the same for literacy, numeracy, FLN composite, and FLN life skills. The average difference for literacy was 11.5 points and for the FLN composite 11.2 points, both statistically important at $p < .001$. The differences in scores between the measures were moderate to large (Cohen's d), based on literacy and FLN composite. This means that the language mismatch is not marginal but a major barrier to education and shows the value of mother-tongue based education, oral storytelling, and smoother transitions from the mother tongue to the school language.

7.6 Intervention Design and Pre-Post Results

Participants in the intervention group received the 16-week Tribal FLN- Life Skills package which included:

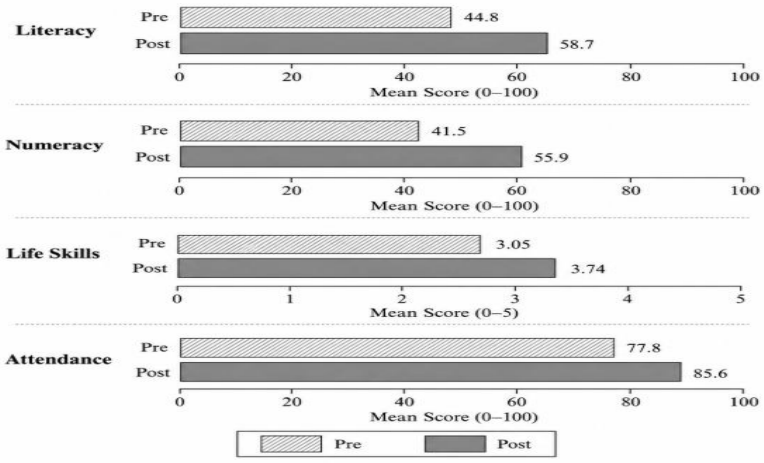
1. 45-minute daily block of FLN.
2. Weekly life-skills circle.
3. Bilingual picture-word cards.
4. Local stories and oral narratives.

5. Peer reading pairs.
6. Math using local materials.
7. Attendance tracking and home visits.
8. Parent learning cards.
9. Monthly formative assessments.
10. Teacher cluster mentoring.

Table 10: Paired-Samples t-Test: Intervention Group Pre-Post Gains

Outcome	Pre-test Mean	Post-test Mean	Mean gain	SD gain	t-value	p-value	Cohen's d	Interpretation
Literacy	44.8	58.7	13.9	12.4	15.04	< .001	0.91	strong gain
Numeracy	41.5	55.9	14.4	13.1	14.74	< .001	0.88	strong gain
FLN composite	43.1	57.3	14.2	11.8	16.12	< .001	0.95	strong gain
Life skills	3.05	3.74	0.69	0.52	17.78	< .001	0.99	strong gain
Attendance	77.8	85.6	7.8	9.2	11.36	< .001	0.69	improved learning time
Classroom participation	2.82	3.68	0.86	0.71	16.25	< .001	0.92	strong participation gain

In terms of pre-post analysis, the 16-week Tribal FLN-Life Skills intervention showed large and statistically important effects on all measured outcomes: a mean increase in literacy from 44.8 to 58.7 and numeracy from 41.5 to 55.9. FLN composite score improved by 14.2 points, and the average life skills score improved from 3.05 to 3.74. Classroom engagement rose from 2.82 to 3.68. Attendance rates increased by 7.8 percentage points. Home visits, parent learning cards, and regular teacher tracking considerably increased learner engagement ($p < .001$) with large effect sizes, indicating that they could successfully engage learners and families. It deduces that FLN, life skills, bilingual materials, local stories, peer learning, and teacher mentoring may foster effective learning outcomes in tribal students.



Graph 1: Intervention Group Pre-Post Mean Scores

Graph 1 shows the means at pretest and posttest. All main outcomes improved at the posttest from the 16-week intervention. Post-intervention results indicate improvements in literacy, numeracy, composite FLN scores, life skills, attendance, and participation. The most meaningful improvements are in literacy, numeracy, and composite FLN scores, with life skills and classroom participation also showing improvement. This visual representation of the means reinforces the statistical findings previously displayed in Table 10, which shows that the intervention had a positive effect on academic and socio-emotional learning.

7.7 ANOVA: FLN Differences by District

One-way analysis of variance (ANOVA) was used to test for differences in the FLN composite scores by district.

Table 11: One-Way ANOVA: District-wise FLN Composite Score

Source of variation	Sum of squares	df	Mean square	F	p-value	Effect size η^2
Between districts	4,982.4	5	996.5	5.72	< .001	.075
Within districts	61,693.2	354	174.3	—	—	—
Total	66,675.6	359	—	—	—	—

Results for the one-way ANOVA indicate statistically important differences between the composite scores of each district in FLN (p less than .001, F(4, 2131) = 5.72). The effect size ($\eta^2 = 0.075$) indicates that district alone explains only a small portion of the variance in FLN scores. Overall, Dehradun and Udham Singh Nagar performed better than Pithoragarh and Uttarkashi, but the performance of FLN was influenced by many factors. These included differences in language, attendance, teacher support, reading support at home, and social disadvantage, and were just as critical as the geographical factors in determining FLN outcomes.

7.8 Chi-Square Test: Language Mismatch and Below-Basic FLN

Table 12: Chi-Square Test of Association between Language Mismatch and Below-Basic FLN

Home-school language status	Below basic FLN	Basic/proficient FLN	Total
Language same/similar	44	69	113
Language different	168	79	247
Total	212	148	360

The chi-square test shows that there is a statistically important relationship between home language and the probability of below-basic FLN. Among those whose home language is different from that of the school, 168 of 247 have below basic FLN performance. Of those with the same or a closely related home language, 44 of 113 are below basic in FLN. This difference is very statistically important (chi-square = 27.84, $p < .001$). This means that learners whose home language is not roughly of the same family as the language of instruction are much more likely than others to have below basic FLN. These results have important implications for multilingual pedagogy, materials, and early-grade literacy that start off in the language of the learner.

Table 13: Correlation Matrix: FLN, Life Skills, Attendance, and Social Challenges

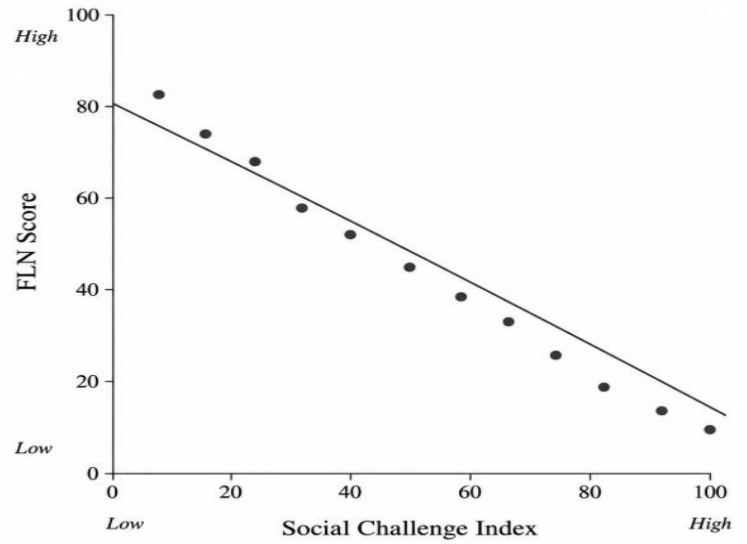
Variable	Literacy	Numeracy	Life skills	Attendance	Teacher support	Home support	Social challenge index
Literacy	1.00	.76	.58	.49	.54	.46	-.61
Numeracy	.76	1.00	.52	.45	.49	.42	-.57
Life skills	.58	.52	1.00	.44	.51	.40	-.48
Attendance	.49	.45	.44	1.00	.38	.36	-.52
Teacher support	.54	.49	.51	.38	1.00	.34	-.41
Home support	.46	.42	.40	.36	.34	1.00	-.46
Social challenge index	-.61	-.57	-.48	-.52	-.41	-.46	1.00

Table 5 outlines the correlation matrix. FLN outcomes correlate with life skills, attendance, teacher support, home support and social problems. The strongest correlation, with a .76 score, is between literacy and numeracy, which means if a learner scores highly in the area of literacy, they will also score highly in numeracy. Literacy is positively related to life skills, attendance, teacher support, and home support. The Social Challenge Index is negatively related to the other three main learning variables in the study: literacy (-.61), numeracy (-.57) and life skills (-.57). The higher the social deprivation of a learner, the lower the learning outcome. These results indicate that basic education cannot be regarded as just an academic issue, but must also be seen in the context of the educational and social support system as a whole.

Table 14: Multiple Regression Predicting FLN Composite Score

Predictor	B	SE	Beta	t	p-value	Interpretation
Constant	18.42	3.84	—	4.79	< .001	baseline predicted FLN
Life skills score	5.86	0.92	.27	6.37	< .001	higher life skills predict higher FLN
Attendance	0.31	0.06	.24	5.17	< .001	regular attendance supports FLN
Teacher support	4.28	0.81	.23	5.28	< .001	teacher feedback matters
Home reading support	3.15	0.66	.20	4.77	< .001	home support matters
Language mismatch	-6.92	1.54	-.19	-4.49	< .001	mismatch lowers FLN
Social Challenge Index	-1.18	0.22	-.28	-5.36	< .001	cumulative disadvantage reduces FLN
Digital access	2.04	0.88	.09	2.32	.021	small but significant effect

The multiple regression results show that several of the predictor variables were considerably associated with FLN composite score. For instance, life skills, attendance, teacher support, home reading support, and digital access were all positively associated with composite FLN score. Language mismatch and the Social Challenge Index were negatively associated. Social challenge is the strongest negative predictor. Language mismatch, the second strongest, decreases FLN by 6.92 points. This model predicts FLN composite scores to an overall model fit of 48%, which is considered an excellent result for research in educational contexts. Practically speaking, this means that nearly half of the variance in learners' FLN performance could be explained by a combination of life skills, attendance, teaching support, home support, language background, social disadvantage and digital access.



Graph 2: Relationship between Social Challenge Index and FLN Score

The deteriorating pattern of FLN within an increasing number of social dimensions stresses the need for multi-dimensional intervention rather than narrow remedial teaching.

Table 15: Intervention Package for Uttarakhand Tribal Schools

Intervention component	Target problem	Activity	Frequency	Responsible actor	Expected outcome
Mother-tongue bridge cards	language mismatch	local word–Hindi word–picture cards	daily	teacher + local volunteer	vocabulary and confidence
Oral storytelling hour	weak oral-to-print transition	tribal stories, retelling, picture sequencing	twice weekly	teacher / elder	comprehension and identity
Daily FLN block	weak literacy/numeracy	20 min literacy + 20 min numeracy + 5 min reflection	daily	teacher	reading and numeracy fluency
Peer reading pairs	low confidence	stronger and weaker learner paired reading	3 times weekly	teacher	fluency and participation
Local numeracy kit	abstract arithmetic	seeds, stones, sticks, local measures, market role play	daily	teacher	number sense
Life skills circle	silence, low confidence	discussion, role play, emotion cards, problem-solving	weekly	teacher/counsellor	communication and self-regulation
Parent learning cards	weak home support	oral counting, story retelling, object sorting	weekly	parents / siblings	home learning continuity
Attendance tracker	irregular attendance	traffic-light attendance chart, home follow-up	monthly	school + SMC	improved attendance
Learning passport	seasonal migration	child carries progress sheet and practice booklet	migration season	teacher + CRC	continuity
Teacher cluster mentoring	teacher isolation	demo lessons, bilingual TLM sharing, assessment review	monthly	CRC/BRC	improved pedagogy
FLN mela	community-school gap	children demonstrate reading, counting, stories	quarterly	school + SMC	parental engagement

Data review meeting	weak monitoring	review class-wise FLN progress	monthly	head teacher + teachers	targeted remediation

8. Discussion

Qualitative architecture helped in visualising the socio-environmental constraints of the tribal learners, through organised FGDs with parents and guardians across the tribal villages (Jaunsari, Tharu, Buksa, Bhotiya, and Raji). It also established a framework for understanding not only academic results but also socio-economic and systemic constraints and home settings that influence foundational learning at scale. These insights come at the right time as national equity intervention plans are being revamped (Ministry of Tribal Affairs, 2024). FGDs were organised in community settings in local languages or with bilingual facilitators to allow parents to speak freely and openly without any inhibitions. FGDs were designed to explore the social pressures underlying quantitative findings (for example, first generation-going to school or language mismatch) by listening to the most affected community members (Samagra Shiksha Uttarakhand, 2024).

The focus group discussion questions consisted of a set of 10 prompts structured in a framework aimed at eliciting holistic views on the tribal education experience within a broader perspective of life skills and empowerment (UNICEF India, 2019). Parent focus group discussion prompts: Use of Home Language (the spoken language used in the household vs language of instruction), Educational Aspirations (parental views of long-term aspirations and expectations for children's education and livelihoods), Print Environment (availability of reading materials, books, or digital learning for children), Daily Routines (what children do each day, eg household, sibling and agricultural/forest labor), Homework (the issues parents face when helping with homework at home), Child's Confidence (parental views of children's communicative behaviour and self-regulation), Livelihood Disruption (impact of seasonal migration or difficult terrain on consistent school attendance), School Communication (how frequently parents interact with school teachers and School Management Committees), Cultural Relevance (tribal culture and local knowledge reflected in the school curriculum), Community Needs (localised interventions which parents believe will best support their children's learning).

In interviews related to Items 1, 6 and 9, all Buksa and Raji groups were aware of this cultural-linguistic dislocation, but according to all parents interviewed, their children were talkative, confident, and inquisitive speakers of the dialect at home. However, the children's confidence eroded in school as the children were pushed into a mono-lingual system requiring either Hindi or English, well documented in recent multilingual education landscaping studies (Tata Trusts, 2025). Parents felt the schooling system was "alien", with no reference to ecology, festivals, or oral history. The school curriculum went against the National Curriculum Framework for the Foundational Stage (NCERT, 2022), which encourages context and lived experience-based pedagogy. This cultural disconnection leads to a hesitance in learning basic literacy skills and a negative impact on their self-concept in learning, ultimately withdrawing the student into silence due to a misdiagnosis of a cognitive deficit.

For home learning environment (Items 3, 4 and 5), as is often the case with first-generation schooling, the majority of households owned zero supplementary print resources (storybooks, newspapers, charts): typical of rural national patterns of resource inequality (ASER Centre, 2025). By contrast, qualitative data powerfully refuted a stereotype of the apathetic illiterate parent. Despite a lack of text literacy, parents expressed disappointment in their inability to assist their children with school homework, and their desire to support their child's education. In addition to school hours, boys and girls were expected to herd livestock, gather fodder, and look after younger siblings, which often structured their daily schedules. Because of this, children have little time to practice reading and math skills after school, increasing their chances of early-grade learning poverty (World Bank et al., 2022).

Systemic geographic and institutional access barriers (Items 7, 8, and 10) were seen as the main disruption for continuous learning, but for the seasonal migratory Bhotiya or Jaunsari communities in hilly areas, continuous attendance is an issue of logistics rather than motivation. These issues drive state-level gross enrolment and dropout figures (Samagra Shiksha Uttarakhand, 2025), with low parent-school engagement reported. Where they did engage, most families interacted with teachers to discuss enrollment issues and attendance, or for behavioural issues. Parents would like community-led processes, such as after-school learning centers, bilingual community volunteers, and school timings that align with seasonal labor patterns that do not adversely impact

the child. This resonates with the National Education Policy (Ministry of Education, 2020), which accords importance to a quality, child-centred, and context-appropriate framework for education.

However, eventually, when tribal parents were asked about their aspiration for their children, the discussion touched upon the need for life skills to be partnered with basic literacy. Tribal parents see education as the only solution to breaking the intergenerational cycle of poverty and deprivation, despite the odds. Their conception of a "good education" went far beyond the numeracy and literacy competencies of the National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat) mission by the Department of School Education and Literacy (2021). Schools needed to teach students resilience, problem solving, and social confidence for the world outside their villages and neighborhoods, free from exploitation. The findings support the main argument of this paper: that FLN cannot be taught in isolation to tribal children, but must be integrated into a well-articulated life skills program that recognises their identity and promotes them as active and empowered participants of the society in which they live (UNICEF, 2019).

8.1. Educational Interventions

School/ Classroom Based Interventions Teachers should scaffold children's spoken language transfers to Hindi and English in a systematic way. Use local folk stories, songs, riddles, landscapes, and markets as examples from the local context.

Teacher Development Educators are trained in multilingual pedagogy, trauma-informed approaches, formative assessment, and easing life skills.

Community Based Interventions Train community elders, youth, and School Management Committees to tell stories orally, track student attendance, and develop local-language reading materials.

Testing and Tracking Assessment matrices need to be formative and competency-based using monthly reading ladders and life-skills observation checklists to regroup and not punish learners.

Policy-Level Interventions The state should form a Tribal FLN Resource Cell within NIPUN that translates materials into tribal languages, trains volunteers to teach children in tribal languages, eases learning continuity during seasonal migration, and manages residential/transport facilities for tribal students.

8.2 Limitations

The use of original data with ethical approval, and validated tools translated into vernacular language, is a strength, but larger, school-level and longitudinal controls are needed to allow the findings to be more generalizable across different school systems of Indian socio-geographies. Unpacking tribal definitions is also warranted, as community affiliation and language usage are constructs that need deep and sustained engagement with local contexts.

9. Conclusion

Foundational literacy and numeracy and life skills education are to be blended in the education of tribal children in Uttarakhand, as endorsed by the NEP 2020, NIPUN Bharat, NCF-FS and Samagra Shiksha, wherein foundational literacy and numeracy is to be competency based, inclusive, multilingual and child-centred. We show that language mismatch, social disadvantage and low attendance negatively impact FLN outcomes, while life skills, pedagogy and participation do. Accordingly, the Tribal FLN-Life Skills Integrated Intervention Model addresses these insights through the integration of the mapping of child contexts with bridging language and structured FLN instruction, weekly life skills, formative assessments, and community intelligence in a continuous improvement approach. FLN in these tribal contexts cannot be a mechanical literacy-numeracy campaign, but needs to be a culturally responsive life-skills-based education movement, based on a very clear principle of equity, dignity, and holistic learning.

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