Catalysing Change: A Case Study of NDLI Club as Outreach Model for Education Access in NE India

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Abstract

Amidst the ever-evolving landscape of education, digital libraries have emerged as indispensable resources for democratizing knowledge. The National Digital Library of India (NDLI) stands as a testament to this evolution, offering a vast repository of educational content to learners nationwide. Comprising over 100 million pieces of content, NDLI represents India's commitment to accessible education. This paper explores the strategic role of the NDLI Club initiative, launched in 2021, in fostering education accessibility, particularly in the Northeast region. Leveraging the framework laid out in the National Education Policy (NEP) 2020, NDLI Clubs serve as innovative platforms for activity-based learning, aligning with the educational objectives outlined in the policy. This paper delves into the spatial distribution and contextualization of NDLI Clubs, with a particular focus on the unique dynamics of Northeast India. As of March 31, 2024, 5,505 institutions have embraced NDLI Clubs, engaging 15.4 lakhs of members nationwide. Notably, Northeast India presents distinctive trends, shedding light on the crucial role of government colleges in driving NDLI Club engagement. The conclusion underscores the significance of tailored strategies and regional nuances in educational initiatives, proposing a roadmap for expansion, engagement, and advocacy to democratize education across India's diverse landscape, with specific attention to the northeastern states. This study offers critical insights into the NDLI Club's evolution, providing a blueprint for its continued growth and impact, particularly in addressing the educational disparities prevalent in the Northeast region.

Keywords: National Digital Library of India, NDLI Club, Outreach, User Engagement, Digital Library, National Education Policy 2020

1. Introduction

Throughout history, libraries have seamlessly woven themselves into the fabric of society, serving as invaluable repositories of knowledge. They stand as bastions of learning, democratizing education and ensuring its accessibility to all. As science progresses and socio-economic structures evolve, the landscape of information dissemination undergoes profound shifts. The exponential growth of data and the necessity for instantaneous access underscore the burgeoning demand for digital libraries (Mainka & Khveshchanka,

2012). Crafted to meet the demands of contemporary India, the National Digital Library of India (NDLI) stands as a beacon of the nation's commitment to education accessibility. Serving at the forefront of India's endeavour to establish its largest digital library, NDLI aims to democratize learning for its populace. With over 100 million pieces of content, NDLI provides a singular platform for knowledge dissemination (National Digital Library of India, n.d.).

Like digital libraries worldwide, NDLI grapples with challenges in dissemination, popularization, and user awareness. Since its inception, NDLI, with support from the Government of India, has initiated various efforts to tackle these hurdles. Among these, the establishment of the NDLI Club in 2021 stands out as particularly innovative. Leveraging the launch of the National Education Policy (NEP) 2020, NDLI seized the opportunity to promote its platform and assist educational institutions in implementing key recommendations outlined in the policy. NEP 2020 recommended establishing Topic-centred and Project-based Clubs (Refer to Chapter 1; Clause 4.44; page no. 19 of NEP 2020) (Ministry of Human Resource Development Government of India, 2020) to encourage students with singular interests and/or talents in the classroom by giving them supplementary enrichment material, guidance, and encouragement. Encouragement and support for Topic-centred and Project-based Clubs and Circles will extend from schools to districts and beyond. Recognizing the limitations of physical clubs, NDLI launched the NDLI Club in March 2021 to support institutions in aligning with NEP 2020 goals. Physical clubs require space, manpower, and ongoing maintenance costs. Additionally, geographical barriers impede the exchange of ideas and resources between institutions. In contrast, the NDLI Club offers a digital platform for institutions to establish activity-based clubs, facilitating engagement with NDLI's content. This platform streamlines event organization, report uploading, certificate generation, and facilitates inter-institutional networking, overcoming logistical challenges associated with physical clubs.

In the context of modern digital libraries, especially within the northeast region of India, the implementation of unique outreach strategies holds paramount importance. Given the region's distinct cultural, linguistic, and geographical landscape, traditional approaches to library outreach may not effectively penetrate its diverse communities. Tailored strategies are essential to bridge the gap in access and awareness, ensuring that digital library resources are widely utilized and appreciated. The NDLI Club emerges as a perfect strategic outreach wing for the National Digital Library of India (NDLI) in the North-East. By harnessing the NDLI Club's localized approach and community engagement initiatives, NDLI can effectively connect with individuals and institutions across the region. Through language-specific content, partnerships with local organizations, and culturally relevant events, the NDLI Club can catalyse promoting digital literacy, fostering a culture of learning, and empowering communities in the Northeast with access to valuable educational resources.

As of March 31, 2024, 5,505 institutions have established clubs via the NDLI Club platform, engaging nearly 15.4 lakh members nationwide. The NDLI Club promotes NDLI awareness among students and teachers through activity-based learning, aiming to integrate NDLI into their educational journey. This unique initiative

sets a precedent in digital library services globally. While activity-based learning clubs are common (Cave, 2004; Kuhar et al., 2016; Roberts, 2009), the NDLI Club stands out for its innovative approach. This paper explores the current status and detailed analysis of the NDLI Club database, shedding light on the following objectives.

2. Objectives

This paper aims to investigate and analyze the development, implementation, and impact of the National Digital Library of India (NDLI) Club, with a focus on Northeast India. The specific objectives are:

2.1. Examine Spatial Distribution

❖ Explore the distribution of NDLI Clubs across India, emphasizing Northeast India.

❖ Understand the contextualization and integration of NDLI in the region's educational institutions.

2.2. Analyze Strategic Factors:

❖ Identify and analyze factors driving the expansion of NDLI Clubs in Northeast India.

❖ Conduct a comparative analysis to highlight the region's unique challenges and opportunities.

2.3. Evaluate Outreach Strategies:

❖ Assess the effectiveness of NDLI Club outreach strategies in the Northeast.

❖ Evaluate how these strategies address the cultural, linguistic, and geographical diversity of the region.

2.4. Impact on Digital Literacy and Learning:

❖ Analyze the impact of NDLI Clubs on promoting digital literacy and learning in Northeast communities.

❖ Measure engagement and participation of students and teachers in NDLI Club activities.

2.5. Develop a Roadmap:

❖ Develop a forward-thinking roadmap for the future expansion and enhancement of NDLI Clubs in the Northeast.

❖ Provide recommendations for optimizing the NDLI Club initiative to better serve the region's educational needs.

2.6. Global Context and Innovation:

❖ Position the NDLI Club as an innovative model in global digital library services.

❖ Highlight the unique features of the NDLI Club that distinguish it from other activity-based learning clubs worldwide.

By achieving these objectives, the paper aims to provide a comprehensive understanding of the NDLI Club's role in democratizing education and knowledge dissemination, particularly in the diverse communities of Northeast India.

3.   Methodology

The study has involved several analyses and databases since 2021.

3.1. Databases

The entire analysis within the paper has been performed based on two data sources.

❖   Database of NDLI Clubs deposited at the servers of the National Digital Library of India and from the daily worksheets of outreach officers of the NDLI Club division. Data since March 2021 i.e., inception of the NDLI Club to 31st March 2024 has been considered.

❖   Survey data from the All-India Survey on Higher Education published by the Ministry of Education, Govt. of India (Ministry of Education, n.d.).

3.2. Calculating weightage and determining rankings

The Entropy Weight Method (EWM) is employed in multi-criteria decision analysis (MCDA) to rank criteria objectively. It minimizes subjectivity, accommodates positive and negative deviations, and efficiently manages extensive datasets. Through evaluating the variability and uncertainty of each criterion, it discerns their relative significance in decision-making. (Wu et al., 2022; Zhu et al., 2020). This study used the EWM to determine the ranking of institutional NDLI Clubs, States, and Zones.

3.2.1. Entropy Weight Method (EWM)

This approach evaluates the information content of each parameter and assigns weights, accordingly, aiming to mitigate bias by balancing their contributions. Below are the specifics of the Entropy Weight Method utilized:

3.2.1.1.   Normalization of the Data:

Z-score normalization (Kreyszig, 1979) has been used to normalize the data for each parameter to ensure that they are on the same scale.

$$z = \frac{x - \mu}{\sigma}$$

μ   is the mean of the population.

ó is the standard deviation of the population.

3.2.1.2. Calculate the Information Content (Entropy) for Each Parameter

In information theory, entropy quantifies the information required to describe the microstate of a system, reflecting the uncertainty associated with a random variable. It serves to measure the diversity or dispersion of values within each parameter.

Calculate the entropy (H(X)) for each parameter using the following formula:

$$H(X) = \sum_{i-1}^{n} p(x_i) \, log \, p(x_i)$$

....*Step 1*

H(X) is the entropy of the parameter.

x_i represents each possible value of the parameter.

$p(x_i)$ is the probability of observing the value x_i in the dataset.

3.2.1.3. Calculate the Relative Information Gain (RIG):

The RIG measures how much each parameter contributes to reducing uncertainty in the decision-making process.

Calculate the RIG for each parameter using the following formula:

$$W(X) \; = \; \frac{RIG(X)}{\sum RIG(X_i)}$$

……………Step 2

RIG(X) is the relative information gain of the parameter.

H(X) is the entropy of the parameter calculated in Step 1.

N is the number of parameters.

3.2.1.4. Calculate the Weight for Each Parameter:

The weight for each parameter is determined by normalizing the RIG values. The sum of the weights will equal 1

Calculate the weight (W(X)) for each parameter using the following formula:

$$W(X) \; = \; \frac{RIG(X)}{\sum RIG(X_i)}$$

……………Step 3

W(X) is the weight of the parameter.

RIG(X) is the relative information gain of the parameter calculated in Step 2.

ΣRIG(X_i)is the sum of relative information gains for all parameters.

3.2.1.5. Rank Alternatives:

Once weights are assigned to each parameter, one can calculate an overall score for each alternative by summing the products of parameter values and their respective weights.

Rank the alternatives based on their total scores, with higher scores indicating better performance or suitability.

3.2.2. Determining Correlation between variables

The two-tailed Pearson correlation coefficient (Kirch, 2008) is used to determine whether there is a significant linear relationship between two continuous variables. Below is a formula for calculating the Pearson correlation coefficient (r):

$$r_{xy} = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n \sum x_i^2 - (\sum x_i)^2} \sqrt{n \sum y_i^2 - (\sum y_i)^2}}$$

n is the sample size.

x_i, y_i are the individual sample points indexed with i.

3.2.3. Software Packages

Data analysis and visualization were conducted using a suite of powerful software tools, including **Microsoft Excel 365, IBM SPSS 29.0, Google Cloud Services, and Microsoft Power BI**. These tools provided the necessary capabilities for querying data, creating insightful visualizations, and conducting in-depth analyses.

4. Result and Discussion

4.1. Spatial distribution of NDLI Clubs

The NDLI Club platform was launched in March 2021 since then 5505 institutions have onboarded the platform and formed activity-based learning clubs at respective institutions. Except for Lakshadweep, the
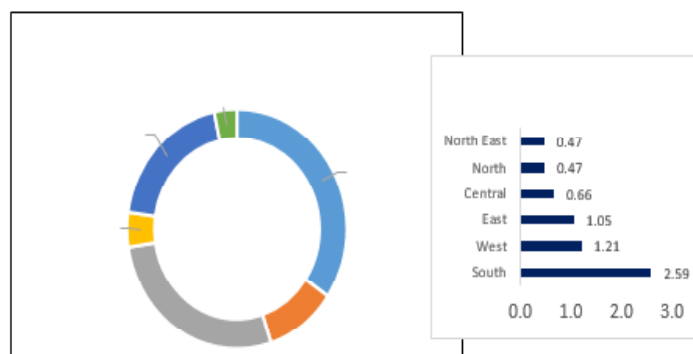

Figure 1: Distribution Pattern of NDLI Clubs and zone-wise ranking.

NDLI Club has its footfall in the rest of 35 states and union territories. To get a spatial view, India's geographical landscape has been divided into six zones: North, South, East, West, Central, and Northeast. While the state of Maharashtra hosts the highest number of NDLI Clubs, the South zone claims the highest percentage of club presence. A detailed distribution pattern is illustrated in Figure 1.

The prevalence of NDLI clubs potentially correlates with a heightened probability of increased user engagement. However, relying solely on club numbers may not offer a robust index, as some clubs may remain inactive for extended periods. Inactivity status indicates either a lack of minimum membership or a dearth of any club activities. NDLI Club executives oversee their respective zones, providing continual support, organizing awareness sessions, and maintaining communication with club officials.

Despite these efforts, a significant number of inactive clubs and a slow rate of club formation may signify a lack of awareness or other challenges hindering the adoption of NEP 2020 recommendations within educational institutions. Notably, the Central and Northeast zones contribute only 5% and 3.2% respectively to the total approved clubs nationwide, signalling a need for focused attention from NDLI, government bodies, and non-government organizations.

4.2. Analysis of NDLI Club's performance and influencing factors

States and UTs were ranked holistically using the Entropy Weight Method (EWM), detailed in the methodology section. Overall ranking was determined by the Overall Score, calculated from three criteria: Number of NDLI Clubs, Club membership, and events organized. Zone-wise distribution is outlined in Table 1, while the overall ranking of states is depicted in Figure

Table 1: Zone-wise distribution of States

East	North-East	Central	North	West	South
West Bengal	Sikkim	Madhya Pradesh	Jammu & Kashmir	Maharashtra	Andhra Pradesh
Odisha	Assam	Chhattisgarh	Ladakh	Goa	Telangana
Bihar	Arunachal Pradesh	Uttar Pradesh	Himachal Pradesh	Rajasthan	Tamil Nadu
Jharkhand	Meghalaya		Uttarakhand	Gujarat	Karnataka
	Manipur		Punjab	Daman & Diu	Kerala
	Tripura		Haryana	Dadar & Nagar Haveli	Andaman & Nicobar Island
	Nagaland		Chandigarh		Lakshadweep
	Mizoram		Delhi		

2. EWM assesses criteria importance in decision-making, especially with varying significance. It offers an unbiased, data-driven approach, reducing individual biases. Ideal for large datasets and multiple criteria, it aids complex decision-making (Zhu et al., 2020). EWM was further used to rank the Zones based on 1.

Number of NDLI Clubs, 2. Number of members in the Clubs and 3. The number of events organised by the Clubs. The South Zone showed the highest overall performance, followed by the East, West, Central, North, and North-East respectively. Comparative overall score of September 2023 and March 2024 are available in Figure 3.

Interestingly, the East, North, and West Zones present an intriguing observation. Although the West Zone contributes approximately 27% and the North Zone nearly 19% of total NDLI Clubs, the East Zone only
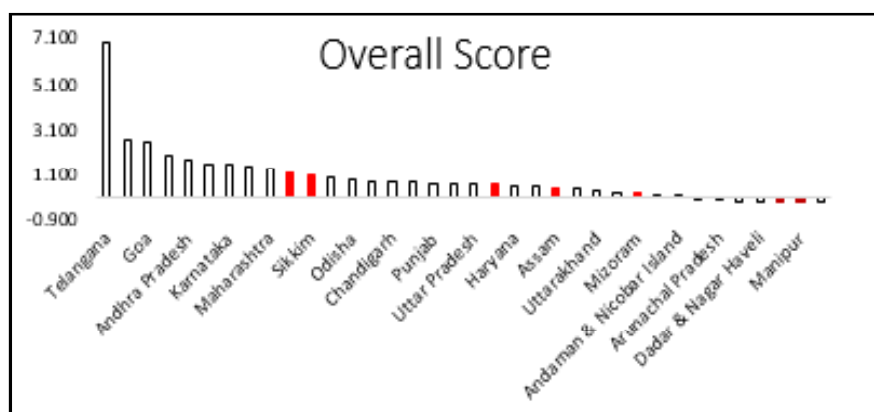

Figure 2: Overall ranking of States and UTs (colour-filled bars representing the states from the Northeast zone).

contributes 10% (see Figure 1). Despite this, the East Zone ranks higher than the West and North zones. Similarly, the number of clubs in Assam is considerably higher than in Meghalaya, Sikkim, and Nagaland but the overall score is much lower than those (see Figure 4). This discrepancy can be attributed to the fact that the number of clubs in a state is not the key determinant of NDLI's outreach program. This study seeks to unravel the underlying factors contributing to this disparity.
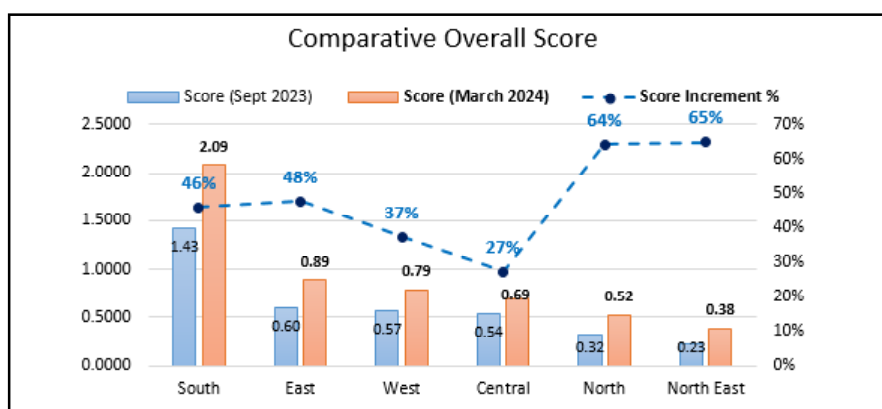

Figure 3: Zone-wise comparison of six months' overall score determined by EWM.

4.3. Influencing factors and future recommendations

From the management point of view, several aspects contribute to the success of an outreach program however, the exploration of all those micro and macro influencers is beyond the limited scope of this paper. This paper will avoid all micro-influences related to any individual's contribution and will try to identify only the major impersonal events, infrastructure and policies that could have scopes to exert major impacts. Influencing factors can be divided into A. Primary Influencer and B. Secondary Influencer based on their nature of impact. Influencers having a direct impact on the growth of NDLI Club will be considered as the Primary Influencers.

4.3.1. Primary Influencers

The primary influencers are the factors that directly impact the effectiveness of outreach activities or initiatives. The recent performance trends of various zones were analysed to ascertain their overall scores
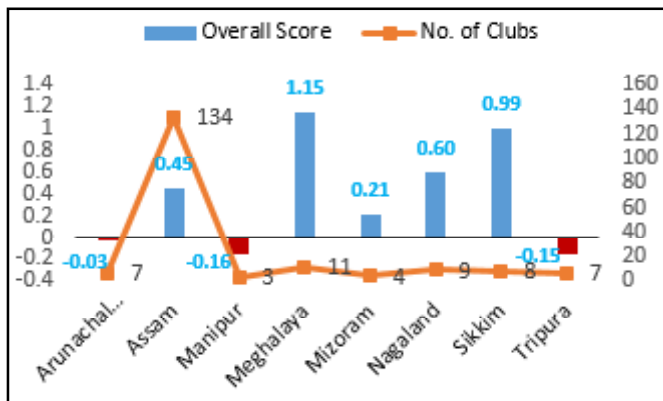

Figure 4: State-wise comparison for Northeast zone

over the past six months. The dynamic landscape of Northeast India's NDLI Club performance unveils an intriguing narrative over the past six months. Figure 3 paints a picture of growth, with overall scores on the rise across all zones. However, what truly captivates is the exceptional surge in the North and North-East zones, boasting impressive increments of 64% and 65% respectively.

Delving deeper into Table 2 and Figure 5, it becomes apparent that this upward trajectory can be attributed to a surge in membership and event participation.

This surge not only signifies a statistical increase but also speaks volumes about the region's vibrant club culture, highlighting a commendable level of vitality and activity. Such progress is not just a statistic but a testimony to the region's burgeoning enthusiasm for knowledge dissemination and community engagement.
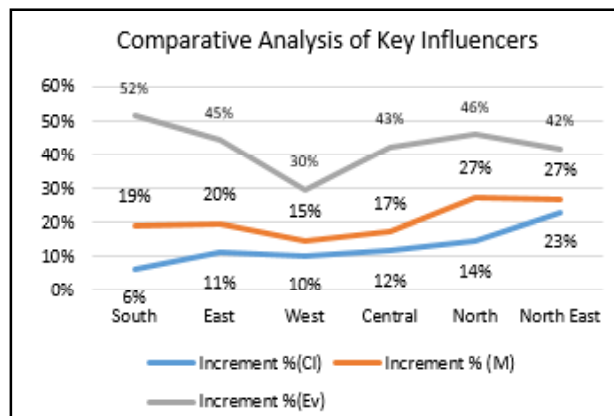

Figure 5: Zone-wise comparative analysis of key influencing factors.

In the realm of outreach activities and initiatives, the concept of primary influencers takes centre stage, delineating the factors crucial for their success. NDLI's outreach program hinges on three pivotal determinants: the number of clubs within a state, club membership figures, and the frequency of club-organized events. While initially assumed that the number of clubs held the primary sway, empirical data reveals a nuanced reality. It becomes clear that this metric, while significant, does not singularly dictate effectiveness. Consequently, a deeper analysis unfolds, probing into the impact magnitude of club membership and event frequency, thus refining our understanding of the primary influencers guiding NDLI's outreach endeavours.

Table 2: Zone-wise NDLI Club's details

Zone	Total Clubs (Cl)		Total Members (M)		Total Events (Ev)	
	Sept 2023	Mar 2024	Sept 2023	Mar 2024	Sept 2023	Mar 2024
South	1784	1899	625338	744523	9240	14016
East	520	577	103521	123784	1314	1900
West	1375	1517	351485	402556	4240	5504
Central	231	258	42971	50331	395	563
North	934	1069	144374	183916	1290	1887
North-East	160	197	30154	38216	253	359

6.3.2. Secondary influencers

In pursuit of factors indirectly influencing the NDLI Club's growth pattern, this study analysed the 2021 report by the Department of Higher Education, Ministry of Education (Government of India, 2021).

Table 3: 2-tailed Pearson Correlation

2-Tailed Pearson Correlations analysis for Northeast Zone					
	Total Members	Total Events	Total No. of Colleges	No. of Govt Colleges	No. of Private Colleges
Total NDLI Clubs	.988**	.991**	.987**	.990**	.875**
Total Members		.998**	.964**	.966**	.858**
Total Events			.973**	.972**	.882**
2-Tailed Pearson Correlations analysis for entire India					
	Total Members	Total Events	Total No. of Colleges	No. of Govt Colleges	No. of Private Colleges
Total NDLI Clubs	.961**	.889**	.705**	.558**	.700**
Total Members		.935**	.638**	.462**	.641**
Total Events			.548**	.356*	.558**
				**. Correlation is significant at the 0.01 level (2-tailed).	
				*. Correlation is significant at the 0.05 level (2-tailed).	

Variance analysis was conducted to explore variables with secondary impacts on club growth or distribution. The study considered total NDLI Clubs, club membership, and events, correlating them with the total number of government colleges, non-government colleges, and student enrolment in different states from Northeast zone and the entire India (all states + UTs) using 2-tailed Pearson Correlation (Kirch, 2008), assuming a consistent trend for the next three years.
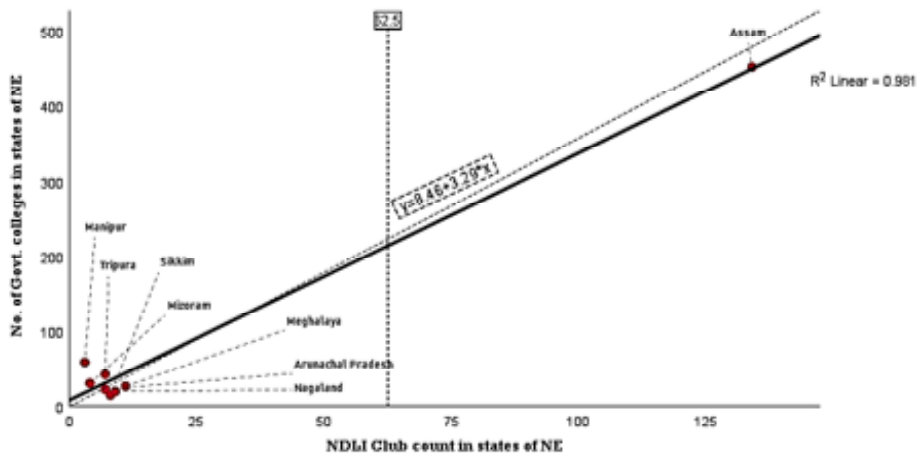

Figure 6: Regression graph of numbers of Govt. colleges and NDLI Clubs

Table 3 findings of the 2-tailed Pearson Correlation analysis reveal intriguing patterns in the relationship between NDLI Club variables and the number of colleges. Overall, a strong positive correlation was observed
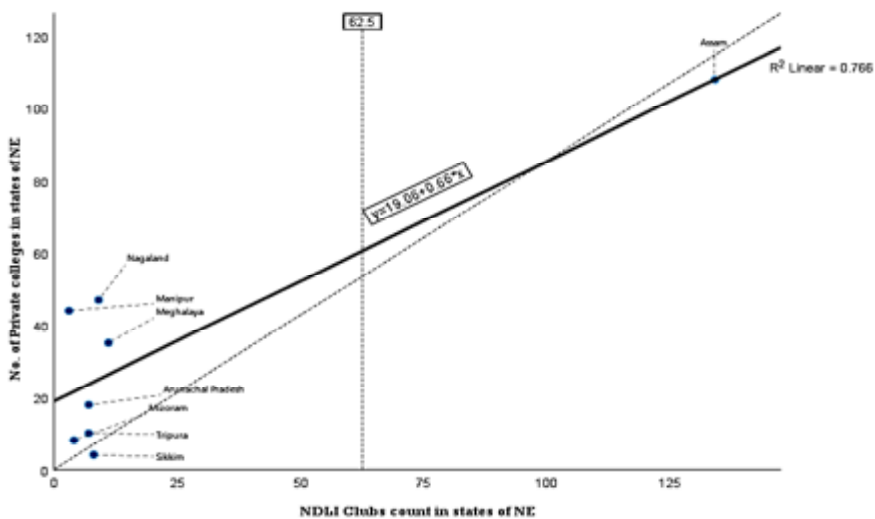

Figure 7: Regression graph of numbers of Private colleges and NDLI Clubs

between the number of clubs, members, and events with the total number of colleges at the .01 level of significance. However, upon disaggregating the total colleges into government and private categories, a noteworthy disparity emerged. For most zones, correlations were markedly stronger with the number of private colleges compared to government colleges, indicating a more robust presence of NDLI Clubs in private institutions. Conversely, the Northeast Zone exhibited an opposite trend, with correlations demonstrating a stronger association with government colleges. This suggests a distinct dynamic in the Northeast, where the NDLI Club's presence is notably stronger in government institutions compared to private ones. These findings shed light on the varying patterns of NDLI Club engagement across different zones, underscoring the importance of considering regional nuances in educational outreach efforts.

To gain deeper insights, let's examine the regression graphs depicted in Figures 6 and 7. A steeper slope in Figure 6 indicates a stronger correlation. Furthermore, Figure 7 illustrates a higher concentration of intersection points at elevated values on the Y-axis compared to the X-axis, suggesting a lower likelihood of a robust NDLI Club presence in states with a higher number of private colleges. While the underlying reasons behind this observation require further investigation, they are beyond the scope of this paper. Additionally, student enrolment demonstrates a strong positive correlation with the number of government colleges, paralleling a similar trend observed with the number of events and government colleges.

A stronger and active engagement of government educational institutes is a healthy sign for NDLI and the people of the state. This is because a higher correlation between student enrolment and the number of government colleges, as observed in the regression analysis, indicates that government colleges are playing a significant role in fostering NDLI Club activities. This suggests that government educational institutes are actively promoting NDLI initiatives, leading to increased access to educational resources and opportunities for the people of the state. This active involvement of government colleges is beneficial for the overall dissemination of knowledge and educational development within the state.

4.4. Future roadmap

Drawing from this study, a roadmap for the NDLI Club initiative emerges, aiming to enhance its reach and impact:

❖ **Expansion and Uniform Distribution:** Prioritize expanding NDLI Clubs, especially in Tripura, Mizoram, Manipur, and Nagaland, for broader access.

❖ **Tailored Initiatives:** Design special programs considering the unique needs of regions, particularly the Northeast Zone, through collaborative partnerships.

❖ **Empowerment through Workshops:** Organize workshops involving librarians, students, and authorities to build capacity and engagement.

❖ **Reward, Recognition, and Reinforcement (3Rs) Programs:** Implement Reward, Recognition, and Reinforcement initiatives for institutional library personnel to sustain participation and contributions.

❖ **Advocating Mandates through Government Bodies:** Advocate for mandates through government bodies like UGC and NAAC to boost visibility and adoption.

This roadmap aims to democratize education and reshape India's especially the Northeast India's educational landscape, ensuring open access to educational resources for all through targeted expansion and engagement efforts.

5. Conclusion

In conclusion, the National Digital Library of India (NDLI) emerges as a pivotal initiative in democratizing education, aiming to make it accessible to all citizens. With over 100 million content items, the NDLI has spearheaded India's efforts in open education. A notable achievement is the establishment of NDLI Clubs in 2021, aligning with NEP 2020 to bridge students' interests with educational resources. Remarkably, 5,505 institutions have embraced NDLI Clubs, engaging 15.4 lakhs of members nationwide. However, regional analyses reveal varied adoption rates, with Northeast India showcasing unique trends, emphasizing government colleges' significance. The Northeast's context highlights the importance of considering regional nuances in educational initiatives, showcasing the influence of government colleges in fostering NDLI Club engagement. Moving forward, the roadmap emphasizes expansion, tailored engagement, workshops, and advocacy, ensuring education's democratization across India's diverse landscape. The NDLI Club initiative symbolizes the transformative power of digital libraries in shaping accessible education, poised to play a pivotal role in India's educational future. This study offers critical insights into the evolution and expansion of NDLI Clubs, providing a blueprint for their continued growth and impact. As NDLI Clubs continue to evolve, they are poised to play an increasingly vital role in shaping the future of accessible education in India, bridging gaps and fostering lifelong learning opportunities for all citizens.

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