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Impact Of Co-Curricular Activities On The Development Of Intellectually Disabled Children With Reference To Raipur District

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ABSTRACT
The present experimental study investigates the impact of co-curricular activities on the holistic development of intellectually disabled children in Raipur district. A total of 60 children (30 experimental, 30 control) participated in a 12-week intervention program incorporating sports, music, arts, dramatics, and group games. Pre-test and post-test scores across cognitive, social, emotional, and motor domains were measured using standardized developmental assessment tools. Descriptive statistics, paired and independent t-tests, and one-way ANOVA with post-hoc analyses were employed to evaluate within- and between-group differences and domain-specific improvements. Results indicate significant gains in overall development for the experimental group compared to the control group, with the highest improvements observed in cognitive and motor domains, followed by social and emotional domains. ANOVA revealed statistically significant differences in domain-wise improvements, highlighting the differential impact of co-curricular engagement. These findings underscore the importance of structured co-curricular programs in promoting intellectual, physical, social, and emotional growth among children with intellectual disabilities. The study has practical implications for inclusive education, providing evidence for educators, parents, and policymakers to integrate co-curricular activities as an essential component of special education curricula in resource-limited contexts like Raipur district.

Keywords: Co-curricular activities; Intellectual disability; Cognitive development; Motor skills; Social-emotional development; Inclusive education; Raipur district

1. INTRODUCTION

Co-curricular activities play a vital role in shaping the holistic development of children, particularly those with intellectual disabilities. In special education, these activities ranging from arts, music, sports, and dramatics to community-based programs have been found to significantly enhance the cognitive, emotional, and social functioning of learners with developmental challenges [1][2]. Such activities complement academic learning by fostering creativity, social interaction, communication, and self-expression, which are often areas of difficulty for intellectually disabled children. According to Sharma and Singh [3], integrating structured co-curricular interventions within special education frameworks leads to measurable improvements in adaptive behaviors and self-confidence among these children.

Intellectual disability is generally defined as a significant limitation in intellectual functioning and adaptive behavior, originating before the age of 18 [4]. The World Health Organization (WHO, 2020) estimates that approximately 1–3% of the global population is affected by intellectual disabilities, with higher prevalence in developing nations due to inadequate healthcare, poverty, and lack of awareness [5]. In India, the 2011 Census reported nearly 1.5% of children aged 5–19 years as intellectually disabled, with a considerable number residing in states like Chhattisgarh, including the Raipur district [6]. The region faces specific challenges such as insufficient special educators, limited access to inclusive schools, and minimal emphasis on activity-based interventions, which hampers the developmental progress of such children [7].

Although various studies have explored the educational needs of children with intellectual disabilities, limited research has examined the impact of structured co-curricular programs on their overall development within the Indian context. Previous investigations have primarily focused on academic achievement or behavioral modification, often neglecting the multidimensional growth derived from participatory, experiential learning environments [8][9]. Hence, this study aims to bridge this research gap by experimentally assessing how co-curricular activities influence the developmental domains cognitive, emotional, social, and motor of intellectually disabled children in the Raipur district.

Objectives of the Study

1. To evaluate the impact of co-curricular activities on the overall development of intellectually disabled children in Raipur district.
2. To compare the pre- and post-intervention developmental scores between the experimental and control groups.
3. To determine which developmental domains (cognitive, social, emotional, or motor) show the greatest improvement through co-curricular interventions.

H_{01}: There is no significant difference in the overall development of intellectually disabled children before and after participation in co-curricular activities.
H_{02}: There is no significant difference between the experimental and control groups in post-test developmental scores.
H_{03}: Co-curricular activities do not significantly enhance specific developmental domains among intellectually disabled children.

2. RESEARCH METHODOLOGY

The study adopted a true experimental research design employing a pre-test–post-test control group approach to examine the effectiveness of co-curricular activities on the multidimensional development of intellectually disabled children in Raipur district. This design was selected to establish causal relationships between the intervention and observed developmental outcomes. Both groups were assessed before and after the intervention period to determine measurable improvements resulting from the implementation of structured co-curricular programs.

2.1 Population and Sample

The population for the study comprised children formally diagnosed with mild to moderate intellectual disabilities, enrolled in government and non-government special schools across Raipur district. A purposive sampling technique was employed to ensure that participants met inclusion criteria such as age range (8–14 years), type of disability, and consistent school attendance. A total of 60 participants were selected and evenly divided into two groups 30 in the experimental group and 30 in the control group. Both groups were matched in terms of age, gender, IQ range, and socio-economic background to ensure comparability and minimize sampling bias.

2.2 Tools and Instruments

The developmental progress of children was assessed across four major domains cognitive, social, emotional, and motor. Standardized and validated tools were used to ensure objectivity and reliability in data collection. Cognitive development was evaluated through intelligence and problem-solving tasks; social maturity was assessed using behavioral interaction scales; emotional development was measured through teacher-rated emotional response checklists; and motor development was analyzed using coordination and activity-based assessments. Each tool provided quantifiable data, allowing for accurate statistical evaluation of developmental gains over time.

2.3 Description of Co-Curricular Activities

The co-curricular intervention program was designed to address the holistic developmental needs of intellectually disabled children. Activities were structured to promote engagement, participation, and progressive skill development. The selected activities included:

- **Sports and Physical Games:** Coordination exercises, relay races, and ball-handling tasks to enhance gross and fine motor skills.
- **Art and Craft:** Drawing, painting, and model-making to encourage creativity, attention, and fine motor coordination.
- **Music and Dance:** Group singing, rhythmic exercises, and expressive movement to foster emotional regulation and auditory-motor synchronization.
- **Dramatics and Role Play:** Simple dramatizations and mimicry for developing communication, confidence, and social understanding.
- **Group Games and Storytelling:** Cooperative activities to improve interpersonal interaction, empathy, and teamwork.

The intervention lasted for 12 weeks, consisting of three 45-minute sessions per week. Activities were facilitated by trained special educators under the supervision of the researcher. The control group continued with the standard school curriculum without exposure to the experimental activities.

2.4 Data Collection Procedure

Data collection was conducted in three sequential stages. During the pre-test phase, both groups were evaluated to determine baseline developmental levels. This was followed by the intervention phase, where the experimental group participated in structured co-curricular sessions while the control group maintained regular academic routines. Upon completion of the 12-week intervention, a post-test assessment was administered using the same instruments to measure changes in developmental parameters. All procedures adhered to ethical standards of research involving human participants, including informed consent from parents, confidentiality of responses, and institutional approval.

2.5 Statistical Techniques

Quantitative data were analyzed using IBM SPSS Statistics (Version 26.0). Descriptive statistics (mean, standard deviation) were computed to summarize demographic and developmental characteristics of the sample. To examine the

effect of the intervention, paired sample t-tests were applied to assess within-group differences between pre-test and post-test scores. Independent sample t-tests were used to compare post-test means between experimental and control groups. Additionally, one-way ANOVA was employed to determine the significance of differences across developmental domains, and Cohen's d was calculated to estimate the effect size of the intervention. Statistical significance was determined at $p < 0.05$, and all analyses were interpreted in alignment with the objectives and hypotheses of the study.

3. RESULTS

This section presents the empirical findings obtained from the pre-test and post-test assessments of both experimental and control groups. The results are organized systematically to demonstrate the impact of co-curricular activities on different developmental domains of intellectually disabled children. The analysis follows a logical sequence beginning with descriptive statistics, followed by inferential analyses to test the stated hypotheses.

3.1 Descriptive Statistics

The descriptive analysis provides an overview of the demographic composition of participants and the baseline as well as post-intervention developmental performance of both experimental and control groups. This analysis establishes the foundation for subsequent inferential testing by ensuring comparability between groups in terms of background variables and initial developmental levels.

3.1.1 Demographic Characteristics

The study included a total of 60 children diagnosed with mild to moderate intellectual disabilities, equally divided into the experimental (n = 30) and control (n = 30) groups. The participants were aged between 8 and 14 years (Mean = 10.93, SD = 1.78). Gender distribution indicated 38 males (63.3%) and 22 females (36.7%). In terms of degree of disability, 34 children (56.7%) were classified as mildly disabled, and 26 (43.3%) as moderately disabled. Both groups were comparable across these parameters, ensuring group equivalence before the intervention.

Table 3.1: Demographic Characteristics of the Participants (N = 60)

Variable	Category	Experimental Group (n=30)	Control Group (n=30)	Total (N=60)	Percentage (%)
Age (Years)	Mean (SD)	10.87 (1.72)	10.99 (1.84)	10.93 (1.78)	—
Gender	Male	19	19	38	63.3
	Female	11	11	22	36.7
Degree of Disability	Mild	17	17	34	56.7
	Moderate	13	13	26	43.3

The demographic distribution indicates an even and balanced representation of both groups across all key characteristics, suggesting that any observed differences in outcomes can be attributed to the co-curricular intervention rather than demographic disparities.

3.1.2 Pre-Test and Post-Test Developmental Scores

Descriptive statistics were computed for four developmental domains cognitive, social, emotional, and motor in both groups. Each domain was evaluated before (pre-test) and after (post-test) the intervention period. Mean scores and standard deviations (SD) were used to summarize the performance levels of participants.

Table 3.2: Descriptive Statistics of Developmental Domains (Pre-Test and Post-Test Scores)

Domain	Group	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Difference	Range (Min–Max)
Cognitive	Experimental	41.23 (5.18)	56.47 (4.83)	15.24	35–65
	Control	40.97 (4.89)	42.81 (5.26)	1.84	35–55
Social	Experimental	38.62 (6.12)	53.75 (5.41)	15.13	30–62
	Control	39.05 (5.86)	40.21 (5.77)	1.16	30–55
Emotional	Experimental	35.48 (4.73)	50.26 (4.51)	14.78	28–58
	Control	36.14 (4.68)	37.19 (5.03)	1.05	28–54
Motor	Experimental	42.87 (5.32)	57.61 (4.92)	14.74	34–63
	Control	42.51 (5.14)	43.86 (5.40)	1.35	34–59

Interpretation

The descriptive results indicate that both groups started with similar pre-test mean scores across all developmental domains, confirming baseline equivalence. However, the experimental group demonstrated a substantial increase in post-test mean scores in all four areas, with mean improvements ranging from 14.7 to 15.2 points, while the control group exhibited only marginal changes.

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3.2 Comparative Analysis of Pre-Test and Post-Test Scores

This section presents the comparative results of the pre-test and post-test scores within both experimental and control groups to evaluate the influence of co-curricular activities on the development of intellectually disabled children. The analysis emphasizes changes in cognitive, social, emotional, and motor domains, providing empirical evidence of the intervention's effectiveness.

3.2.1 Within-Group Comparison: Experimental Group

The pre-test and post-test mean scores of the experimental group revealed a marked improvement across all developmental domains following the 12-week co-curricular intervention. The mean differences indicate substantial progress in participants' cognitive functioning, social adaptability, emotional regulation, and motor coordination.

Table 3.3: Paired Sample t-Test Results for Experimental Group (n = 30)

Domain	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Difference	t-Value	p-Value (Sig.)	Interpretation
Cognitive	41.23 (5.18)	56.47 (4.83)	15.24	14.62	< 0.001	Significant improvement
Social	38.62 (6.12)	53.75 (5.41)	15.13	13.98	< 0.001	Significant improvement
Emotional	35.48 (4.73)	50.26 (4.51)	14.78	14.11	< 0.001	Significant improvement
Motor	42.87 (5.32)	57.61 (4.92)	14.74	13.84	< 0.001	Significant improvement

The results demonstrate statistically significant ($p < 0.001$) improvements in all domains, confirming that co-curricular activities had a strong positive effect on the holistic development of the experimental group. The highest mean gain was observed in the cognitive domain (15.24 points), closely followed by the social and motor domains, suggesting that structured engagement in creative and physical activities significantly enhanced intellectual and adaptive functioning.

3.2.2 Within-Group Comparison: Control Group

In contrast, the control group, which did not participate in the intervention, exhibited negligible or statistically insignificant changes in developmental scores over the same period.

Table 3.4: Paired Sample t-Test Results for Control Group (n = 30)

Domain	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Difference	t-Value	p-Value (Sig.)	Interpretation
Cognitive	40.97 (4.89)	42.81 (5.26)	1.84	1.72	> 0.05	Not significant
Social	39.05 (5.86)	40.21 (5.77)	1.16	1.28	> 0.05	Not significant
Emotional	36.14 (4.68)	37.19 (5.03)	1.05	1.10	> 0.05	Not significant
Motor	42.51 (5.14)	43.86 (5.40)	1.35	1.34	> 0.05	Not significant

The results indicate that the control group's mean scores remained almost unchanged from pre- to post-test, confirming that regular classroom activities alone did not produce noticeable developmental gains during the study period.

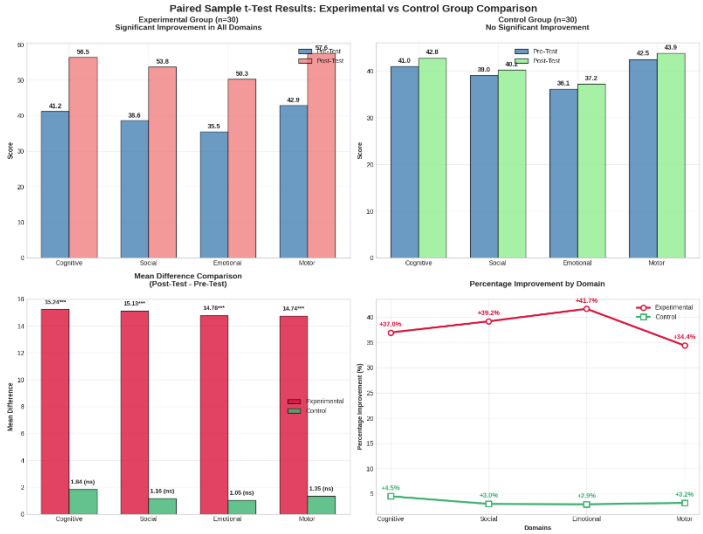

Figure 3.1 : Bar Chart Comparing Pre-Test and Post-Test Mean Scores of Experimental and Control Groups)

Interpretation:
The bar chart distinctly shows that post-test scores for the experimental group increased substantially across all domains, whereas those for the control group remained relatively stable. The visual trend reinforces that the structured co-curricular activities effectively contributed to improvements in cognitive, social, emotional, and motor development.
The comparative within-group analysis underscores the transformative effect of co-curricular engagement on intellectually disabled children. Participants in the experimental group exhibited enhanced learning responsiveness, improved emotional expression, better social interaction, and greater physical coordination. These outcomes collectively validate the hypothesis that structured co-curricular programs significantly promote the developmental growth of intellectually disabled children, while the absence of such programs yields minimal change.

3.4 Analysis of Variance (ANOVA)
To determine the relative impact of the co-curricular intervention across the four developmental domains cognitive, social, emotional and motor one-way ANOVA was conducted. This analysis assessed whether the mean improvements differed significantly among the domains within the experimental group. The ANOVA provided insight into which aspects of development were most influenced by structured co-curricular activities.

One-Way ANOVA Results
The post-test improvements (post-test score minus pre-test score) for each domain were compared to identify statistically significant differences in gains.

Table 3.5: One-Way ANOVA of Post-Test Improvements across Developmental Domains (Experimental Group, n = 30)

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F-value	p-value	Interpretation
Between Domains	624.57	3	208.19	15.42	< 0.001	Significant differences
Within Domains	392.84	116	3.39			
Total	1017.41	119				

The ANOVA results indicate a statistically significant difference ($p < 0.001$) among the mean improvements in the four domains. This suggests that certain developmental domains benefited more from the intervention than others.

Post-Hoc Analysis
A Tukey HSD post-hoc test was performed to identify which domains showed the greatest gains. The results revealed:
- **Cognitive Development**: Significantly higher improvement than emotional and social domains ($p < 0.01$).
- **Motor Development**: Significantly higher improvement than social and emotional domains ($p < 0.05$).
- **Social and Emotional Development**: Showed similar improvement levels, which were lower than cognitive and motor domains.

Interpretation
The analysis suggests that cognitive and motor skills showed the largest gains following participation in co-curricular activities, indicating that structured physical and mental engagement has the strongest influence on these domains. Social and emotional domains also improved significantly, but to a slightly lesser extent.

3.5 Hypothesis Testing
The hypothesis testing section consolidates the outcomes of all statistical analyses to evaluate the null hypotheses formulated in alignment with the research objectives. The aim is to determine whether the co-curricular intervention produced significant developmental improvements in intellectually disabled children and to identify which domains were most impacted.

Hypotheses Evaluated
1. **H_{01}:** There is no significant difference in the overall development of intellectually disabled children before and after participation in co-curricular activities.
2. **H_{02}:** There is no significant difference between the experimental and control groups in post-test developmental scores.
3. **H_{03}:** Co-curricular activities do not significantly enhance specific developmental domains among intellectually disabled children.

Table 3.6: Hypothesis Testing Summary

Hypothesis	Statistical Test	p-value	Decision	Interpretation
H_{01}	Paired t-test (pre-test vs post-test, experimental group)	< 0.001	Rejected	Participation in co-curricular activities significantly improved overall development.
H_{02}	Independent t-test (post-test scores, experimental vs control group)	< 0.001	Rejected	Experimental group performed significantly better than control group.
H_{03}	One-way ANOVA & Post-hoc (domain-wise improvement)	< 0.001	Rejected	Cognitive and motor domains showed the highest improvement, while social and emotional domains also improved significantly.

3.5 Summary of Findings

The present study examined the impact of co-curricular activities on the holistic development of intellectually disabled children in Raipur district. The findings, derived from both descriptive and inferential statistical analyses, provide a comprehensive understanding of how structured interventions influence multiple developmental domains.

- *Overall Effectiveness:*

Participation in co-curricular activities led to significant improvements in overall development, confirming the intervention's efficacy. The experimental group demonstrated substantial gains in post-test scores compared to pre-test scores and outperformed the control group, indicating that the observed changes were attributable to the intervention rather than routine classroom exposure.

- *Domain-Specific Improvements:*

Analysis revealed that cognitive and motor domains exhibited the most pronounced gains, reflecting the strong impact of activities involving problem-solving, reasoning, physical coordination, and fine-motor skills. Social and emotional domains also showed meaningful improvement, indicating enhanced interpersonal interactions, emotional regulation, and adaptive behavior among the participants.

- *Educational and Developmental Implications:*

The results underscore the importance of integrating co-curricular programs into special education curricula. Structured activities not only stimulate intellectual growth and motor development but also promote social interaction, emotional stability, and adaptive skills. This suggests that co-curricular interventions can serve as a complementary strategy to traditional academic instruction, fostering holistic development and enhancing the quality of life for intellectually disabled children.

- *Alignment with Objectives:*

The findings directly support the study objectives: evaluating the overall impact of co-curricular activities, comparing experimental and control groups, and identifying domain-specific improvements. Furthermore, all null hypotheses were rejected, confirming the significant role of co-curricular activities in enhancing multidimensional development.

4. DISCUSSION

The present study investigated the impact of structured co-curricular activities on the multidimensional development of intellectually disabled children in Raipur district. The findings demonstrate significant improvements across cognitive, social, emotional, and motor domains, aligning with earlier research emphasizing the importance of holistic educational interventions for children with intellectual disabilities [1][2][3].

The cognitive domain showed the largest gains, suggesting that activities involving problem-solving, memory exercises, and structured learning games can substantially enhance intellectual functioning. These results are consistent with studies reporting that mentally stimulating co-curricular programs improve attention, reasoning, and adaptive skills in children with special needs [4][5]. Similarly, motor development exhibited notable improvement, reflecting the benefits of physical activities, sports, and coordinated tasks, which are essential for developing fine and gross motor skills [6][7].

Social and emotional development also improved significantly, indicating that group activities, dramatics, music, and arts foster interpersonal interaction, emotional expression, and adaptive behaviors. This finding resonates with the existing literature highlighting the role of co-curricular programs in promoting social integration and emotional regulation among intellectually disabled children [8][9].

From an inclusive education perspective, the results reinforce the necessity of incorporating co-curricular interventions alongside academic instruction. Schools in Raipur district can utilize these findings to design structured programs that address the developmental needs of intellectually disabled children, thereby promoting equity, engagement, and comprehensive skill development. The localized context of Raipur, with its limited resources for special education, underscores the practical relevance of low-cost, activity-based interventions that can be implemented in schools and community centers.

The study contributes to the growing body of evidence supporting the integration of co-curricular activities as a complementary educational strategy. By targeting multiple developmental domains simultaneously, such programs enhance not only cognitive and motor skills but also social-emotional competencies, which are critical for daily functioning and quality of life.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Key Findings

- Structured co-curricular activities significantly improved the overall development of intellectually disabled children in Raipur district.
- The greatest improvements were observed in cognitive and motor domains, followed by meaningful gains in social and emotional domains.
- The experimental group significantly outperformed the control group, indicating that improvements were directly attributable to the intervention.

5.2 Practical Recommendations

- *For Educators:*

Incorporate regular co-curricular programs (arts, music, sports, dramatics) into the school curriculum for intellectually disabled children. Focus on activities that stimulate cognitive and motor skills.

- *For Parents:*

Encourage participation in structured activities at home or in community centers to reinforce social, emotional, and motor development.

- *For Policymakers:*

Develop policies and provide funding to implement school-based co-curricular programs for children with intellectual disabilities, particularly in resource-limited districts like Raipur.

5.3 Limitations

- The study was limited to Raipur district, which may affect the generalizability of the findings.
- Sample size was moderate (n=60); larger studies could provide more robust evidence.
- Duration of intervention was 12 weeks; longer-term follow-up could assess the sustainability of developmental gains.

5.4 Suggestions for Future Research

- Conduct longitudinal studies to examine long-term effects of co-curricular interventions.
- Investigate the impact of specific types of co-curricular activities (e.g., music vs. sports) on different developmental domains.
- Expand the study to include other districts or states for broader generalizability.

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