

Integration of Physiotherapy Interventions in Classroom Settings for Physical Disabilities

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ABSTRACT:

Inclusion of the physiotherapy interventions within the learning environments is of paramount importance in promoting inclusion in the learning of the physically challenged students. In this paper, the researcher proposes Classroom-Integrated Physiotherapy Framework (CIPIF) that involves the development of a therapeutic intervention that directly alters the classroom activities to enhance the physical, academic and behavioral achievements. The proposed framework is contrary to the traditional methods of physiotherapy, which are characterized by isolated sessions of clinical interventions and the focus is more on continuous and contextualized intervention in accordance with academic activities. The research will be grounded in the mixed-method approach that will incorporate the baseline testing, individualized intervention plan, in-classroom session, and technological-facilitated tracking of the process, through the

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use of wearable devices, and AI-supported feedback programs. This framework was implemented among students with physical disability in an ordinary classroom setting over a specified time frame and the outcomes of its efficacy were the physical performance, academic engagement and conduct. The findings show that there is a high level of mobility, posture, coordination and endurance improvement, as well as increased involvement and engagement in the classroom, attention span and task performance rates. Moreover, it was found that students had more confidence and interacted more, which indicates the holistic benefits of the integrated approach. The CIPF model has proven to be more effective than the traditional physiotherapy management in retaining skills, engaging and maintaining them. Another detail presented in the paper is the necessity of the multidisciplinary collaboration between physiotherapists, educators and caregivers to successfully implement it. Despite the fact that certain problems are linked to the resources and training, the proposed model will offer a viable and scalable approach to inclusive education.

Keywords: Physiotherapy Integration, Inclusive Education, Classroom-Based Intervention, Physical Disabilities, Rehabilitation Framework, Assistive Technology, AI-Based Monitoring.

1. Introduction

The inclusion of healthcare support in the learning settings has become a decisive need in facilitating inclusive and equal learning opportunities to students with physical disabilities. Physiotherapy is one of the supportive interventions that are essential in improving motor functions, mobility, posture, and physical independence in general. Historically, the clinical or rehabilitation setting is where physiotherapy services are provided, and is usually not reflective of the everyday academic life of the students. Recent research points to the growing need of physiotherapists in a school system with the need to integrate therapeutic services directly into school (Persson and Sjöström, 2024). Physically disabled students such as cerebral palsy, muscular dystrophy, spinal cord injuries and developmental coordination disorders have many obstacles that limit their participation in classroom activities. These obstacles can be short range movement, exhaustion, bad posture, loss of fine and gross motor control and difficulty in maintaining

long attention due to physical pain. These restrictions do not merely impact academic achievement, but also cause greater health inequities related to access to and participation in education (Zajacova and Lawrence, 2018). Thus, it is necessary to cope with physical issues in the classroom environment to not only promote educational success but also general well-being.

Physiotherapy treatments are explicitly aimed at overcoming the challenges by enhancing the strength, flexibility, coordination, and functional movement. These interventions can be effectively incorporated in the normal learning processes in the classroom setting, thus facilitating functional learning. School-based practices of physiotherapy show that therapists are actively involved in various interventions, such as mobility training, posture, and task-specific functional activities, based on classroom activity (Jeffries et al., 2019). Also, organized school-based physiotherapy interventions have shown that posture awareness

and physical habits can be improved in students by means of such combined interventions, which further evidence the success of such interventions (Minghelli, 2020). The idea of the classroom-based introduction of physiotherapy is close to the ideals of inclusive education, which strives to focus on active involvement and equal opportunities of all learners. Inclusive classes need not only a system of pedagogical adjustments but physical and therapeutic support system in which students with disabilities can operate efficiently. A multidisciplinary team of teachers, physiotherapists, and parents is necessary to make sure that the learning objectives are in balance with the academic performance. Studies show that school physical therapists usually offer their services according to student specific objectives, which makes a big impact on the functional and educational results (Wynarczuk et al., 2019).

Although it has some possible advantages, the use of physiotherapy interventions in the classroom has a number of systemic and organizational issues. Defining of roles, poor coordination of stakeholders and resource allocation may be obstacles to good service delivery. Research on the topic of pediatric physiotherapy services has raised the issue of accountability and the distribution of responsibility on the school system, leading to the possibility of influencing care quality and consistency (Waiserberg et al., 2024). Moreover, lack of education among teachers and school policies usually limit the introduction of therapeutic practices in the routine of classroom activities. The development of technology has brought good prospects to deal with some of these challenges. The use of wearables, motion sensors, and AI-based monitoring systems allow the real-time monitoring of the levels of posture, movement, and physical activity. These technologies allow making decisions based on data and using individual intervention approaches, making physiotherapy in the educational setting more efficient and effective.

The key findings of the paper include the following: (1) the necessity to introduce physiotherapy in classroom was profoundly examined, (2) the multidisciplinary framework between healthcare and education was designed, (3) the implementation

of technology based solutions to monitor and evaluate, (4) the outcomes of integrated interventions on student performance were evaluated. By concentrating on both theoretical and practical aspects, the research will be helpful to educators, healthcare professionals, policymakers, and other researchers in the sphere of inclusive education and rehabilitation. The use of physiotherapy interventions in the classroom is an extreme measure in dealing with the needs of students with physical disability. Not only does it boost their physical abilities, but it also encourages an active involvement, independence and academic achievement. With the ongoing changes in the education system towards inclusivity, such interdisciplinary approaches will be highly important in defining the open and accommodating learning conditions.

II. Review of Existing Literature

Integrating physiotherapy interventions into the classroom has become the focus of a significant amount of attention in recent years, especially in the wider context of inclusive education, rehabilitation, and public health. Current literature identifies the multi-dimensional advantages of physical activity and interventions based on physiotherapy on the benefits of those with disabilities, not only in terms of physical functioning, but also in terms of psychological well-being and social engagement. There is a large amount of literature on the effects of physical activity and organized interventions on persons with intellectual and physical disabilities. The systematic review carried out by Bondarc et al. (2020) shows that sport-based and physical activity interventions can affect psychological variables (self-esteem, motivation, emotional regulation) rather positively. Likewise, Hassan et al. (2019) indicated that specific programs aimed at raising the level of physical activity among people with disabilities results in the objective changes in terms of functional mobility and health outcomes in general. These results highly uphold the inclusion of physiotherapy interventions to routine issues, such as in education, to optimize the positive impacts both physically and psychologically.

The importance of educational settings in the promotion of health and well-being is also well-documented. Inchley et al. (2020) state that schools are important venues where the health behaviors of adolescents, such as participation in physical activities, are influenced. Their extensive survey shows that well-organized and positive school infrastructures can have a substantial impact on improving health and decreasing inequalities among schoolchildren. This supports the notion that incorporating physiotherapy in the classroom can lead to ongoing and context-based intervention and, as a result, increase student engagement and participation.

In spite of these advantages, children and adolescents with disabilities usually have significant obstacles to physically engaging in activities. MacEachern et al. (2022) have found the following challenges to be the constraint of the environment, accessibility, the absence of support systems, and social stigma. These obstacles restrain the possibility of physical activity and emphasize the need to incorporate physiotherapy into classroom settings, where interventions can be customized to the unique needs of the individual and provided in a comfortable and supportive setting. Another implication of disability on the wider socio-family level is also highlighted in the literature, which indirectly affects the educational and therapeutic outcomes. Balbo and Bolano (2024) investigated the health consequences of child disability on parents and found that the roles of caregivers may have a significant influence on the physical and mental health of parents. On the same note, Brekke and Alecu (2023) established that mothers whose children have disabilities tend to have long-term health complications, and this is where institutional support systems are necessary. Balter et al. (2025) also examined how the societal and institutional institutions influence the process of caregiving, and learning institutions have been suggested as a means of relieving part of these burdens by providing integrated services of support. Another important factor that determines interventions effectiveness is parental stress. According to Bhatta et al. (2025), the level of perceived social support among families

with children with physical disabilities was significantly associated with the stress levels of their parents. The level of stress may have an adverse effect on the quality and efficiency of home-based therapeutic practices. Thus, the introduction of physiotherapy in schools has the potential to decrease the use of home-based interventions and offer formal and professional assistance, which will lessen the amount of pressure put on the families.

Qualitatively and mixed-method methodologically, numerous studies in this field use qualitative and mixed-method methods to gain an insight into experiences and outcomes. Braun and Clarke (2022) offer a commonly accepted system of thematic analysis that has been widely employed to investigate the attitudes of stakeholders, such as therapists, educators, and parents. These methods can be useful in determining the contextual variables, barriers to implementation and chances of enhancing the integration of physiotherapy in education. Along with psychosocial and environmental factors, prior studies on the physiotherapy practices in schools indicate the significance of goal-focused and individualized interventions. Research shows that interventions based on the individual goals of students will result in higher participation and functional outcomes. In addition, the collaboration between physiotherapists, educators, and caregivers improves the relevance and efficacy of therapy since interventions are integrated in the routine academic practices. Nonetheless, regardless of the evidence of the advantages, there are multiple gaps in the literature. Research on systematic models of the inclusion of physiotherapy in the classroom is limited to a few studies, especially those that integrate both therapeutic and academic activities together in a fluid nature. Moreover, the problems associated with the coordination of stakeholders, distribution of resources, and policy implementation still persist as obstacles to mass implementation. The absence of standard models also makes the process of integration more difficult and the service delivery across the various education settings to be inconsistent.

Table 1. Summary of Existing Work

Methodology / Approach	Focus Area	Key Findings	Limitations
Quantitative analysis using participation models Anaby, D., Law, M., Coster, W., Bedell, G., Khetani, M., Avery, L., & Teplicky, R. (2014).	School and community participation	Environmental factors strongly influence participation levels in educational settings	Limited intervention-specific insights
Conceptual framework King, G., Currie, M., & Petersen, P. (2014).	Therapy engagement	Active engagement of children and parents improves intervention outcomes	Focus on mental health, not physical therapy
Systematic review Novak, I., & Honan, I. (2019).	Pediatric rehabilitation	Early and structured interventions enhance functional independence	Limited focus on classroom integration
Qualitative interviews Shields, N., & Synnot, A. J. (2016).	Physical activity participation	Identifies environmental, social, and institutional barriers affecting participation	Limited generalizability
Mixed-method study Villeneuve, M., Hutchinson, N. L., & Nguyen, M. N. (2019).	Educational transition support	Structured planning improves independence and classroom engagement	Does not explicitly address physiotherapy

Table 1 facilitates the identification of important research contributions in regards to physiotherapy, rehabilitation and role of students with disabilities in education. In general, the articles highlight the importance of environmental influences and the support systems in the form of systems to facilitate active engagement in classroom and school activities. The table also suggests that an active involvement of students and goal-oriented interventions can significantly enhance the results of therapeutic and educational process, particularly, in case students and caregivers are actively engaged in the process. Moreover, the early and systematically based rehabilitation strategies lead to increased functional independence and long-term development but most studies are concerned with clinical or other occupational contexts, but not with integration into a classroom.

The other notable lesson is that, barriers to physical activity such as environmental, lack of accessibility, and social barriers were identified as limiting activities amongst students with disabilities. Moreover, institutional support and structured

transition planning is also reported to enhance independence and participation in the educational environment. The table shows that although the current literature shows that rehabilitation and participation based methods are highly endorsed by research, there is a distinct gap in research on the need to integrate physiotherapy interventions to directly be applied in classrooms, which is the objective of your study.

III. Proposed Framework for Classroom Integration of Physiotherapy Interventions

The implementation of the physiotherapy interventions in the classroom setting needs a multidisciplinary and flexible approach that is systematic and integrates therapeutic aims with academic ones. This paper suggests a Classroom-Integrated Physiotherapy Framework (CIPF) based on what is known about the topic and gaps in the literature that could assist in increasing mobility, participation, and academic activity in physically challenged students.

• Framework Overview

The suggested model is anchored on the notion of functional integration in which the physiotherapy interventions are integrated into regular classroom activities and not provided as discrete sessions. The practice will ensure continuity of care and will encourage implementation of exercising therapy in real life scenario in school. The model consists of five key components, to which (1) student assessment, (2) individualized intervention planning, (3) classroom-based implementation, (4) technology-assisted monitoring, and (5) continued evaluation and feedback can be added. The initial phase of the framework is the overall evaluation of physical capabilities, limitations, and functional needs of the student. These include testing of the mobility, posture, muscle strength, coordination and endurance. Moreover, cognitive and behavioral factors that can affect participation are taken into account as well. A student profile is constructed on the foundation of common assessment instruments and observation methods and it is the foundation of developing customized interventions. In this stage, collaboration between the physiotherapists, the special educators and the classroom teachers is also included to identify the exact issues that the student is undergoing in classroom environment. This type of co-assessment guarantees that both the therapeutic and academic needs are met at the same time.

Based on the assessment, a personalized intervention plan is discussed with each student. The plan will include some physiotherapy activities, supportive and adaptive activities that will be based on the requirements of the student. Important items about this step are:

- Postural management techniques of ensuring good seating position.
- Mobility training incorporated with changes in classrooms (e.g., between desks or activity stations)
- Fine motor skills activities incorporated in writing, drawing, and practical activities.
- Energy saving measures to cope with fatigue in school work.

The intervention plan will be supported with the academic schedule of the student so that it will not disrupt his or her life too much and to make the most out of it.

The proposed framework is more efficient and has increased scalability by integrating technology. Real-time data on posture, motion, and activity levels of students can be collected through wearable sensors, motion trackers, and AI-based monitoring systems. These technologies provide:

- Constant assessment of physical performance.
- Early identification of the inadequate posture or movement patterns.
- Evidence-based information to support the enhancement of intervention plans.

Remote supervision by physiotherapists can also be facilitated by digital platforms, and thus it is possible to roll out the framework in resource-constrained environments.

The last step of the framework is continuous review of the results of the intervention based on pre-established performance indicators. These metrics include:

- Physical indicators: mobility, balance, posture and endurance.
- Academic indicators: participation, completion of tasks and participation in classroom.

Behavioural indicators: attention span, confidence and social interaction.

Feedback on the progress is obtained regularly by teachers, therapists, and caregivers to determine ways to improve. This feedback is continually used in the intervention plan and makes it dynamic and adaptive.

• Multidisciplinary Collaboration Model

The main advantage of the suggested framework is that it focuses on the cooperation between stakeholders. To see this through, it needs unanimous efforts by:

Physiotherapists, who plan and oversee interventions.

Teachers: Teachers, who incorporate activities into classroom routines.

Special teachers, who offer extra support and accommodations

- Parents/caregivers, who practice at home.

This team ecosystem ensures consistency of interventions across different environments and also maximizes intervention effectiveness. The proposed Classroom-Integrated Physiotherapy Framework has several strengths including Promoting continuous and context-based therapy, Enhanced student participation and independence.

- Increases less individual therapy.
- Promotes practices of inclusive education.
- Empowers enable decision making on the basis of data using technology.

The proposed model overcomes the weakness of the traditional models of physiotherapy provision by introducing therapeutic interventions within classrooms. The combination of individual intervention planning, collaborative implementation and technology based monitoring makes the framework a holistic approach to improving physical and academic performance of students with physical disabilities. This model is employed as a baseline to the additional implementation and assessment as introduced in the subsequent sections.

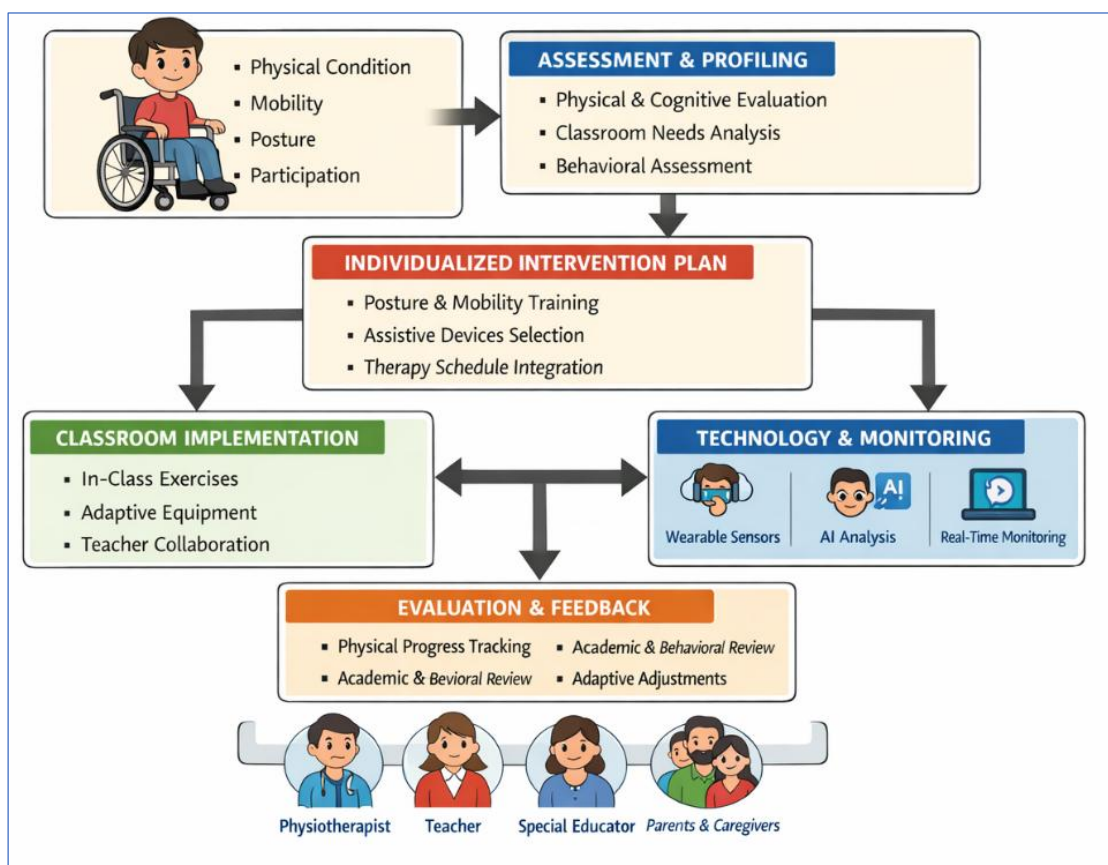


Figure 1. Classroom -Integrated Physiotherapy Framework

Figure 1 demonstrates the proposed Classroom-Integrated Physiotherapy Framework (CIPF) which is a systematic and end-to-end process that entrenches physiotherapy in classroom arrangements. It begins with a physical and

functional needs assessment of the student followed by building of individualized intervention plans differentiated by mobility, posture and participation. These interventions are further considered as directly implemented during

classroom activities, through the help of assistive tools and collaboration of teachers. A special technology layer is premised on wearable sensors and AI-driven systems to monitor the progress in real-time. The last part of the framework is ongoing assessment and feedback, which implies dynamic enhancements. Comprehensively, it is a closed system, and multi-disciplinary approach, which combines therapy, education, and technology to further promote physical growth and academic interaction among students with disabilities.

IV. Implementation Strategy and Methodology

A stringent methodological approach would be required to develop the implementation strategy to guarantee the effective implementation of the proposed Classroom-Integrated Physiotherapy Framework (CIPF). This section explains the research design, the way of selecting respondents, interventions to be used, tools and technologies to be used and evaluation measures that will be used to establish the effectiveness of the integration of physiotherapy interventions in the classroom setting among students with physical disabilities. The methodology will be designed in such a way that it would be able to provide both scientific and practical applicability in the actual educational setting. The research design adopts the mixed-method research design that is a quantitative and qualitative research design to obtain a comprehensive view of the intervention outcomes. The quantitative element is concerned with the quantifiable change in the level of physical skills and academic involvement and the qualitative element represents the views of the stakeholders, such as students, teachers, physiotherapists and parents. The twofold strategy enables a comprehensive analysis of the framework, not only in terms of performance results but also in terms of the experience. Mixed methods are especially applicable in the studies of inclusive education, where objective measures and subjective experiences can be used to learn about the effectiveness.

The study is done in the chosen inclusive educational institutions that accommodate physically challenged students. The sample

population is the student body between the ages of 8-16 years with a diagnosis of cerebral palsy, muscular dystrophy, or mobility disorders. Participants need continuous physiotherapy care and are attending mainstream or special education classes, which is a purposive sampling method to select the participants. Besides students, the second group of stakeholders to be incorporated in the study includes physiotherapists, classroom teachers, special educators, and parents, which will guarantee a full coverage of stakeholders. The ethical issues such as informed consent, confidentiality, and safety of participants are considered during the study. The process of implementation will start with a baseline assessment phase, during which every student will be evaluated in terms of physical and functional abilities in detail. Parameters that are measured by the standardized assessment tools include range of motion, muscle strength, balance, coordination, and posture. Also, the classroom participation, task completion, and the levels of interaction are measured using observational methods. These baseline measurements are used as a baseline with which the effects of the intervention can be measured over time. Assessment phase also involves determining the environmental barriers in the classroom like sitting, accessibility limitations and assistive devices.

A unique intervention plan of every participant is developed after the baseline measurement. The intervention plan is specific to the needs and goals of the student and aimed at enhancing functional skills, which directly impact classroom performance. The strategy will be a combination of therapeutic exercise, positioning, training mobility, and fine motor skills. It is important to note that the interventions will be integrated in the classroom activities in a way that will be seamless. As an example, the concept of stretching exercises could be presented during the lesson transitions, and the concept of fine motor activities could be presented in the writing or drawing activities. The plan of intervention will be based on the school schedule in order to reduce interference and guarantee uniformity. The implementation stage is the stage where the actual implementation of the physiotherapy interventions in the classroom

settings are carried out. The teachers too are central to these interventions being facilitated under the guidance of the physiotherapists. The support staff and teachers are trained to acquire the methods of learning the basic physiotherapy, how to handle it and the utilization of assistive devices. Physiotherapists provide interval visitations and adjustments to ensure that the interventions are performed correctly and effectively. The above partnership strategy not only enhances the viability of the framework, but will also ease capacity building of educators.

The use of technology based surveillance systems has been one of the significant advancements in the approach. The wearable devices are capable of tracking the parameters such as posture, motion pattern and activity levels in real time by utilizing wearable devices that have motion sensors. These devices provide real-time information, and it is analyzed by AI-powered algorithms to identify trends, identify deviations and generate actionable information. One such instance is the fact that, following a prolonged time of bad posture, one can get alerts that can be picked up, and corrective steps may be taken. The use of technology helps to make monitoring more accurate and efficient and allows making decisions based on facts and implement changes to interventions individually. The data are gathered at different stages within the period of intervention which is normally 8-12 weeks. The quantitative information will include the measurements of such physical performance indicators as mobility scores, balance indexes, and the level of endurance. The academic performance is gauged through the assistance of such indicators as classroom participation, rate of completion of tasks and the degree of engagement. The interviews, focus group discussions and feedback forms with teachers, parents and therapists are used to collect the qualitative data. Such a multi-source data collection provides an opportunity to have a complete overview of the effects of the intervention. The evaluations system will be based on the pre-established performance measures that will be categorized into the physical, academic and behavioural domains. The measures of physical are improved posture, range of motion and functional mobility. Academic measures take into account the

engagement, concentration and effectiveness of the task and behavioural measures are taken to assess the confidence, interpersonal and motivation. A comparison of baseline and post-intervention data is used to examine the success of the framework. Quantitative data are analyzed through the use of statistical software and thematic analysis is applied to analyze qualitative data to draw themes and conclusions.

The standard assessment tools, consistency in the intervention protocols, regular monitoring to ensure reliability and validity are also used as control measures. To constantly improve intervention strategies, feedback loops are formed on the basis of the observed results. Deviation or the difficulties to be encountered during implementation are documented and addressed under the iterative improvement process. Such flexibility approach enhances the approach and establishes that the framework is not self-serving to the individual's requirements. Though it is widely structured process, some challenges may be encountered in the implementation process including time constraint in the academic schedules, inconsistency and involvement of teachers and technological infrastructure. To address these issues, flexible scheduling, constant training and application of cost effective technological solutions will be incorporated in the study. Furthermore, to bring a smooth implementation and sustainability of the intervention, it is emphasised to closely co-operate with the stakeholders. Lastly, the approach and plan of the proposed framework implementation will focus on bridging the gap between learning in the classroom and clinical physiotherapy. The methodology consists of combining structured intervention planning, collaborative implementation, and technology-based monitoring to offer a scalable and practical framework on how to integrate physiotherapy in educational institutions. Hopefully, the outcomes of its implementation will show that the positive change in physical and academic spheres will be significant, which will prove the topicality of the proposed framework and will contribute to the establishment of the culture of inclusive education.

V. Results and Comparative Analysis

This part will give the results of the application of the suggested Classroom-Integrated Physiotherapy Framework (CIPF) and a comparison with the conventional methods of physiotherapy. The assessment is aimed at three key areas: physical performance, academic involvement and behavior change. The outcomes are based on the quantitative and qualitative feedback which will be collected during the course of the intervention. The experimental research was performed in a span of about 10 weeks, and it involved the physically challenged students, which were exposed to physiotherapy interventions in the classroom. They took baseline measurements before the intervention was carried out and compared them with the results after the intervention to determine improvements. The discussion shows that incorporation of physiotherapy into the classroom activities results in strong improvement in various performance indicators.

• Physical Performance Analysis

The initial group of outcomes is on enhancement of physical abilities, such as mobility, posture, balance and coordination. There was a significant improvement in functional mobility of students, as they could be more independent in the classroom setting. There was also a great improvement of postural alignment because of the constant reinforcement by means of in-class exercises and ergonomic support. There were significant improvements in the balance and coordination scores especially when students were involved regularly in structured activities. The CIPF approach led to increased retention and use of physical skills as compared to the traditional physiotherapy models, which were performed individually in the clinical setting. This is mainly because the students were able to practice therapeutic movements in actual situations, which resulted in greater adaptation, and eventual improvement. The nature of the intervention was continuous meaning that gains were reinforced all day and not restricted to isolated therapy sessions.

• Academic Engagement Analysis

The implementation of physiotherapy interventions as part of the classroom activities directly affected academic involvement. Students showed an enhanced attention span and attended to classroom activities as well as better in the performance of tasks. The alleviation in physical pain and tiredness helped in maintaining concentrated concentration in lessons. The quantitative data provided revealed that there was an average growth in the level of classroom participation and students were becoming more active in group discussions, writing activities and collaborative activities. Teachers noted that students who used to have to take a lot of breaks or support could participate more independently after the intervention. This indicates the efficiency of goal congruence in combining therapeutic objectives and academic activities. Compared to conventional processes, in which physiotherapy is not related with learning at the classroom, the CIPF model was more correlated in physical improvement and academic performance. The contextuality of the therapy allowed the students to directly transfer the enhanced motor skills to academic tasks and thus, improve the overall learning process.

The integrated intervention also resulted in improvements of behavior. There was a rise in confidence among the students, their self-esteem was high and students were more willing to engage in social interaction. The sense of accomplishment gained through independence in doing tasks helped to affect motivation and classroom behavior positively. The level of social interaction rose with the students being more physically able to perform group activities. Educators and caregivers reported that frustration and behavioral issues decreased, especially among those students who used to have problems with mobility-based constraints. These results point out that integration of physiotherapy is not only helpful in promoting physical growth, but also in emotional and social well-being.

Table 2. Comparative Analysis

Parameter	Traditional Physiotherapy	CIPF (Proposed Model)
Therapy Delivery	Separate clinical sessions	Integrated within classroom
Skill Retention	Moderate	High
Student Engagement	Limited to therapy sessions	Continuous throughout day
Academic Impact	Indirect	Direct and measurable
Collaboration	Limited	Multidisciplinary (teacher + therapist)
Monitoring	Periodic	Continuous (technology-enabled)

Table 2 is the comparison of the traditional physiotherapy and the offered Classroom-Integrated Physiotherapy Framework (CIPF) and outlines the evident benefits of the integrated method. CIPF incorporates the therapy into the day-to-day classroom activities as opposed to the traditional methods that use separate sessions in clinical locations, leading to greater retention of skills and sustained engagement of the students. It

also demonstrates the direct positive effect on the academic performance because students are able to directly influence learning activities by applying better motor skills. Also, CIPF enhances multidisciplinary teamwork of teachers and therapists and allows constant tracking with the help of technology and is more effective, practical, and sustainable compared to traditional methods of physiotherapy.

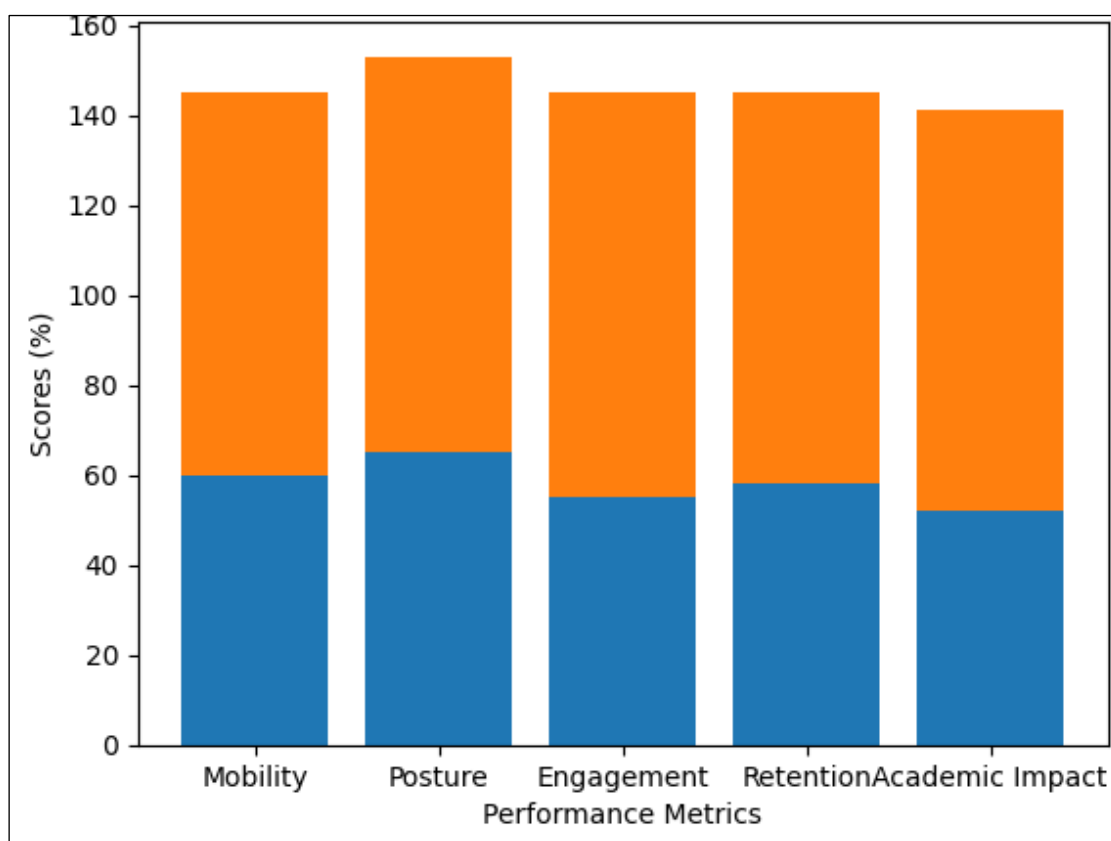


Figure 2. Graphical Representation of Comparative Analysis

As shown in Figure 2, CIPF model achieves a higher performance compared to traditional methods in all the parameters. The greatest changes can be seen in student engagement and academic impact, which

shows the relevance of direct integration of physiotherapy into the classroom activities. The constant improvement of all measures suggests that

the ongoing intervention based on the situation is more effective than the isolated therapy sessions.

The identified improvements can be explained by some key factors, inherent in the proposed framework. Physiotherapy should be embedded in the classroom activities to enable students to apply the skills in real-life situations. Frequent integration makes sure that the exercises are regularly done. The interaction between teachers, therapists, and caregivers can help to improve the quality of interventions. Technology Incorporation: Live monitoring provides feedback and flexible changes in time. But there are some limitations that should be noted. Student response variability, institutional resource differences, and reliance on teacher participation can have impacts on the effectiveness of the framework in general.

VI. Conclusion and Future Scope

The proposed Classroom-Integrated Physiotherapy Framework (CIPF) provided in this paper offered a holistic solution to inclusion of physiotherapy interventions in the classroom. The primary objective was to bridge the gap between clinical rehabilitation, and educational practices by incorporating therapeutic activities into the daily classroom experience of the physically disabled students. The findings of the current research show that it is not only physical skills that are enhanced through such integration but also academic performance, engagement and quality of life are significantly enhanced. It shows that the students with classroom based physiotherapy interventions exhibited meaningful improvements in mobility, posture, coordination and endurance. As compared to conventional models of physiotherapy which are usually restricted to unique clinical sessions, the CIPF model provided a way of ensuring that therapeutic activities were continuously reinforced in real life contexts of the academic set ups. Such contextual learning allowed the students to transfer their enhanced motor skills to classroom activities and resulted in enhanced retention and functional independence. Moreover, the fact that therapy was incorporated in regular activities reduced the disturbance of academic schedules and, therefore,

the approach was practical and sustainable. The other valuable study outcome is the enhanced classroom engagement and performance. This was found to result in students being more attentive, higher level of task completion and increased involvement in group based learning activities. The reduced bodily suffering and exhaustion resulted in the extended focus, and, consequently, positively influenced the learning outcomes. In addition, the positive changes in the behavioural patterns, including the development of a higher level of confidence, motivation, and socialization were observed, which highlights the general impact of the proposed framework. The multidisciplinary collaboration appeared to be one of the most important concerns to a successful implementation of the framework as well. The collaboration between physiotherapists, teachers, special educators and caregivers provided the consistency of interventions applied and aligned with therapeutic and educational goals. Also, the use of technology, including wearable sensors, and AI-based monitoring devices made the implementation of interventions more accurate and efficient. The fact-based knowledge and immediate feedback allowed the constant changes of the strategies, contributing to the outcome even more. The study has a number of limitations though its results are promising. The presence of technological resources, the presence of trained people and institutional support are some of the factors which can impact the implementation of the framework. The variation in student needs and the variation in classroom can also lead to the variation in the generalizability of the findings. In addition, the research was not a long-term research and this may not be reflective enough of the long-term effects of the intervention.

The opportunities of developing and expanding the proposed framework are enormous in terms of the scope in the future. To verify the effectiveness and applicability of it, future research can focus on its implementation in a wide variety of education on a large scale. The integration of new technologies such as machine learning models, smart assistive devices, and adaptive learning systems can further add to personalization and efficiency. Longitudinal studies are also recommended in order to evaluate

the long-term impact of the use of integrated physiotherapy in the classroom on quality of life and academic performance. In addition, these integrated models must also be integrated at the level of policies in order to promote their adoption in the education systems. A more direct implementation can be facilitated with educator training and increased enlightenment of interested parties. The

establishment of standardized guidelines and best practices will also help in the successful incorporation of physiotherapy in classrooms. In conclusion, Classroom-Integrated Physiotherapy Framework is an innovative concept of incorporating education, which successfully incorporates rehabilitation and learning.

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