

Above and Beyond the Classroom: The Differentiated Didactic Approach to Teaching the Arts (D.D.A.T.A.) as a Catalyst for Social Inclusion and Well-Being

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Abstract

This study investigates the effectiveness of the Innovative Differentiated Didactic Approach to Teaching the Arts (D.D.A.T.A.) as a pedagogical tool for enhancing various skills and fostering the holistic well-being of students with intellectual disabilities and Autism Spectrum Disorders. Traditional arts education often faces significant challenges in effectively engaging and supporting this diverse student population due to a lack of flexible, individualized, and accessible frameworks. D.D.A.T.A. addresses these challenges by offering an adaptable, multi-sensory framework that tailors learning activities to each student's unique needs, cognitive profile, and pace. Employing a mixed-methods approach, the research combines quantitative data from a large sample of students with rich qualitative data from observations, teacher interviews, and student work samples. Preliminary findings suggest that the implementation of D.D.A.T.A. leads to significant improvements in targeted skill areas, fostering enhanced creativity, self-expression, and overall engagement in learning. Furthermore, the approach proves to be a powerful catalyst for promoting a more inclusive classroom and community environment, empowering students to participate actively and develop a profound sense of accomplishment and belonging. This study contributes significantly to the growing body of literature on inclusive education, providing valuable insights into effective arts-based interventions that extend beyond skill acquisition to promote social inclusion and personal well-being.

1. Introduction

"What if we stopped seeing disability as a barrier and started seeing it as a different way of experiencing the world?" This is the question that lies at the core of the Differentiated Didactic Approach to Teaching the Arts (D.D.A.T.A.), a method designed to address the significant challenges presented by educating students with intellectual disabilities (ID) and Autism Spectrum Disorders (ASD). The diverse learning needs and cognitive profiles of this population often limit participation and skill development within traditional

didactic approaches, which frequently lack the necessary individualized and accessible frameworks for effective engagement [15]. Two are the scientific questions of the present study:

(a) Can the innovative D.D.A.T.A. method lead to statistically significant improvements in a wide range of skills in students with intellectual disabilities and autism spectrum disorders?

(b) In what ways does it promote those students' social inclusion and well-being?

The D.D.A.T.A. method offers an innovative, sustainable, and multi-sensory framework specifically designed to overcome these limitations. By adapting to the unique learning styles and cognitive abilities of students with intellectual disabilities (ID), it enhances accessibility and effectiveness through its core techniques: visualization and verbalization [18]. Mere skill development aside, this approach fosters active participation and empowerment, contributing to enhanced creativity, self-expression, and overall engagement by leveraging students' inherent artistic inclinations. It cultivates an environment where students feel capable, valued, and develop a strong sense of accomplishment. This study investigates quantitatively and qualitatively D.D.A.T.A.'s effectiveness as a pedagogical tool for enhancing a broad spectrum of skills. Furthermore, it examines how the approach promotes a more inclusive classroom environment, empowering active student participation and fostering a positive attitude towards learning. This research contributes significantly to the literature on special education and effective arts-based interventions for students with special educational needs. The D.D.A.T.A. model took shape during extensive clinical work conducted by Dr. Ioannis Makris from October 2012 to January 2020 at the "Ergastiri" Workshop in Athens, Greece, and at two, state-owned Special Education schools in the Peloponnese. This research, involving over 300 special needs learners, provided the empirical observations that led to the development of the

D.D.A.T.A. framework and its theoretical underpinnings [16].

2. Literature Review

Challenges in the Education of Individuals with Intellectual Disabilities and Autism Spectrum Disorders - Students with intellectual disabilities (ID) and Autism Spectrum Disorders (ASD) face various educational challenges, including cognitive, communication, social, self-regulation, and sensory difficulties [5] [11]. A primary goal of special education is to foster a broad spectrum of skills, such as cognitive (memory, attention, language), motor, emotional, communicative, and social abilities [13] [14] [15] [9] [23]. While skill teaching often involves imitation, indirect methods can also be effective [10]. For instance, rhythm instruction can facilitate counting skills [18].

The Differentiated Didactic Approach to Teaching the Arts (D.D.A.T.A.)

The D.D.A.T.A. method emerged as an innovative pedagogical approach to address the gap between the needs of ID/ASD students and conventional teaching. Developed between 2012-2024 through extensive research and clinical application on a sample of almost 500 students, D.D.A.T.A. leverages the multi-sensory and expressive nature of the arts for learning and skill development [16] [17] [18] [19] [21]. Its core techniques, visualization and verbalization, have yielded impressive results [17] [18]. Those techniques were successfully integrated into European Erasmus+ KA2 Programs (T.E.L.L. Through Music, M.E.L.O.S., and CAP program "Cap sur l'école inclusive en Europe"), building upon the "Makris Method" [19].

The success of D.D.A.T.A. is rooted in a core rationale built upon a series of fundamental principles. First, the approach recognizes that when an individual receives a stimulus (visual, auditory, tactile), they produce a psychophysiological reaction. Second, when synchronized, specific, and structured psychophysiological responses are observed by multiple individuals, the creation of an "ensemble" becomes possible. Third, the functional activation of an individual with intellectual disabilities within that ensemble can lead to the development of a wide range of abilities, including cognitive, emotional, social, communicative, and motor skills. Last and most importantly, the method requires adapting the desired psychophysiological response to the individual's abilities, ensuring that the level of functionality is supportive and attainable for the learner.

The Differentiated Didactic Approach itself is built on two fundamental principles: Differentiated

Didacticism and Holistic Development. The first principle recognizes that every student learns differently, moving away from a "one-size-fits-all" approach to education. The D.D.A.T.A. framework is flexible and adaptable, tailoring learning activities and goals to each student's unique needs, cognitive profile, and pace. The second principle, Holistic Development, ensures that the approach does not focus merely on academic and/or artistic skills but aims at fostering comprehensive skill development in key areas crucial for the overall well-being and independence of students. Those areas include: Cognitive (e.g., attention, memory, sequencing), Emotional (e.g., expression, regulation), Social (e.g., cooperation, turn-taking), Communicative (e.g., verbal and non-verbal skills), and Motor (e.g., fine and gross motor skills). The D.D.A.T.A. model includes a systematic course of work with thirteen distinct steps: (1) Identifying learner interests; (2) Assessing skill underperformance; (3) Selecting appropriate works; (4) Creating a positive psychological ambience; (5) Breaking down the project into factors; (6) Visualizing the factors; (7) Codifying the factors; (8) Determining the project steps; (9) Adjusting and differentiating the project; (10) Demonstrating tasks and strategies, (11) Taking advantage of positive potential, (12) Helping learners develop artistic perception; and (13) Ongoing readjustment of goals and evaluation [21] [22].

Theoretical Foundations of D.D.A.T.A.

D.D.A.T.A. is grounded in multiple theoretical approaches, providing a comprehensive framework for the education of students with ID/ASD: (1) Mayer's Cognitive Theory of Multimedia Learning [18] [27]: It was precisely that theory, initially central to skill development, which was expanded in D.D.A.T.A. to include a crucial Motor Model. Clinical practice revealed the necessity of movement, derived from repetition and tactile sensation from musical instruments, alongside Mayer's Verbal and Pictorial Models in Working Memory. Repetition and practice enhance tactile sensory stimuli, supporting movement and muscle strengthening for optimal student performance [21] (2) Applied Behavior Analysis (ABA): D.D.A.T.A. integrates ABA principles such as shaping, task analysis, and reinforcement [6]. That facilitates breaking down complex skills into manageable steps, enhancing accessibility and successful activity completion. Systematic progress tracking and intervention adjustment are also ABA-based. (3) Information Integration Theory (ITT) by Norman H. Anderson: Recognizing learning as an information integration process, D.D.A.T.A. aligns with ITT's focus on how individuals combine diverse information sources [2] [3]. The development of D.D.A.T.A. was supported by findings indicating that systematic provision of

multiple, complementary stimuli (e.g., visual, auditory, tactile, motor) significantly improves ID/ASD students' understanding and performance by accommodating their cognitive particularities. (4) Reversal Theory [4]: D.D.A.T.A. applies Reversal Theory to understand student motivation, adapting activities to their shifting metamotivational states (e.g., playful vs. serious). This offers opportunities for enjoyment, challenge, and autonomy, leading to increased engagement and positive emotions [1] [7]. (5) Positive Psychology (P.E.R.M.A. Model) [28] [29]: D.D.A.T.A. actively contributes to student well-being by incorporating Seligman's P.E.R.M.A. model elements: Positive Emotions (joy from creative expression); Engagement (flow in individualized activities); Relationships (strengthened by group work); Meaning (derived from personal artistic creation); and Achievement (competence and self-confidence from mastering skills) [21] [20] [22]. As confirmed by empirical observations over an eight-year period [21], the synergy between the D.D.A.T.A. and P.E.R.M.A. models reaches one hundred percent.

The D.D.A.T.A. Multi-Sensory Approach

The D.D.A.T.A. approach acts as a multi-sensory catalyst, simultaneously engaging the senses of sight, hearing, and touch to create a more effective and engaging learning experience. That approach is implemented through:

- **Visual Stimulation:** Students use visual stimuli such as lights, colored cards, symbols, and objects (e.g., straws, markers) to recognize musical concepts such as rhythm and melody. The technique helps enhance cognitive function and memory, as abstract concepts become more concrete and easily understood.
- **Auditory Stimulation:** Through music creation, students listen to and process sounds, such as sampled audio and verbal words ("Dum," "Te"), to learn rhythms. Through its structure (melody, rhythm, harmony), music strengthens auditory perception and the ability to process information.
- **Tactile Stimulation:** The use of musical instruments and tactile materials (e.g., instrument keys, physical objects) provides a hands-on, tactile experience. That type of direct contact with materials strengthens motor skills and the connection between movement and sound, which is crucial to D.D.A.T.A.'s Motor Model.

The combination of these three senses creates a rich learning environment that is more appealing and accessible to students with ID and ASD. It enhances

engagement, improves concentration, and promotes the holistic development of skills.

The Role of Arts in Special Education and the S.T.E.A.M. Framework

Arts (music, dance, drama, visual arts) are recognized as essential tools in special education, offering numerous benefits [26]. They contribute to: cognitive development (enhancing attention, memory, problem-solving, sequencing); emotional development (expression, regulation, empathy, anxiety reduction); social development (cooperation, interaction, turn-taking, conflict resolution); motor development (fine and gross motor skills, coordination, balance); communication development (verbal and non-verbal expression); and self-esteem/self-confidence [12] [21]. Arts can be segmented to foster specific skill areas [12] [17] [21]. The pleasure derived from artistic engagement, particularly in music where factors like melody, timbre, tonality, and rhythm are additive and independently utilizable, acts as a powerful motivator for participation and learning [24] [25] [21].

D.D.A.T.A. is inherently integrated into the S.T.E.A.M. (Science, Technology, Engineering, Arts, Mathematics) framework, acknowledging Arts as indispensable for innovative learning [22]. This combination fosters a multi-sensory and empowering environment, promoting not only academic skills but also crucial 21st-century skills such as critical thinking, creativity, collaboration, and communication, all vital for student success and societal integration. As the research in the present study demonstrates, the combination of D.D.A.T.A. with S.T.E.A.M. technology, such as the use of sensors and controllers to turn conductive objects into musical instruments, creates an additional incentive for learning and improves the ID and ASD students' musical, cognitive, and social skills [22].

3. Methodology

3.1. Research Design

This study employed a mixed-methods approach, combining quantitative skill assessment with qualitative investigation of the intervention experience. That approach allowed for a comprehensive understanding of D.D.A.T.A.'s effectiveness and the mechanisms of change. Quantitative analysis utilized a pre- and post-intervention design with three distinct measurements [8].

3.2. Participants

The quantitative study included 117 students (63% boys, 37% girls) aged 12 to 25 years, diagnosed with Intellectual Disability (ID) and/or Autism Spectrum Disorders (ASD). These participants were drawn from various special educational settings (e.g., special schools, day centers), including a sub-sample of 17 middle school students. The D.D.A.T.A. model was implemented in a larger sample of 523 students across six public and one private special education institution. Additionally, qualitative analysis involved clinical observations from approximately 40 cases over five years of visualization and verbalization techniques in special music education [22], and from 100 individuals with ID/ASD. The rehearsals and methodology were applied within the context of our own lessons. That provided complementary qualitative data on the approach's long-term impact and broader applicability across age ranges and clinical contexts. The measurements on the scales were conducted privately.

3.3. D.D.A.T.A. Intervention Procedure

The D.D.A.T.A. intervention spanned two months and was structured into two main phases: (1) Individual Sessions: The first four, 45-minute sessions, conducted twice weekly, focused on individualized assessment and basic skill development through targeted artistic activities, applying ABA principles. This phase was led by an educator/therapist specially trained in D.D.A.T.A. (2) Group Work: Following individual sessions, students were integrated into small groups (4-6 individuals) for the remainder of the two months. Sixty-minute group sessions held twice weekly, emphasized social interaction, collaboration, and applying acquired skills in a dynamic, inclusive setting. The educator/therapist facilitated group dynamics, provided support, and differentiated activities as needed.

3.4. Tools and Data Collection Techniques

The D.D.A.T.A. methodology initially assesses a student's ability to distinguish colors, shapes, and their names [12]. When and if necessary, instructors first teach these concepts using colored and differently shaped cards [22].

- **Quantitative Data:** Skill development was quantitatively assessed using an observation/assessment rubric specifically designed for this study. This rubric, based on established ID/ASD skill assessment criteria (e.g., ADOS-2, Vineland Adaptive Behavior Scales, included rating scales for: Fine Motor Skills, Gross Motor Skills, Verbal Communication, Non-Verbal Communication, Social Skills, Emotional Expression &

Regulation, Creativity & Self-expression, and Overall Engagement. Assessments occurred at three time points during the two-month intervention: Baseline (before individual sessions), after Individual Sessions (4th session), and Final Measurement (after group sessions). Qualitative Data: Qualitative data deepened the understanding of D.D.A.T.A.'s impact through: systematic observations of student behavior (participation, interactions, emotional expression); semi-structured interviews with implementing educators/therapists (observed changes, challenges, successes); and collection/analysis of student artistic work samples (e.g., drawings, constructions, recordings) to assess creativity, self-expression, and motor skill development.

4. Results

Data analysis revealed statistically significant improvements in all assessed skills during the D.D.A.T.A. intervention, providing strong quantitative support for the method's effectiveness. As demonstrated in Table 1, all skills showed highly significant improvement ($p < 0.001$) across each intervention phase.

Table 1: Summary Table of Statistical Results - Skill Development Across Three Measurement Phases (N = 117)

Skills	Initial (M ± SD)	Individual (4th Session) (M ± SD)	Final (Group) (M ± SD)	t (Initial vs. Individual)	p (Initial vs. Individual)	t (Individual vs. Final)	p (Individual vs. Final)	t (Initial vs. Final)	p (Initial vs. Final)	Significance
Fine Motor	3.0 ± 1.1	4.5 ± 1.0	7.8 ± 0.9	6.2 ***	<.001	12.5 ***	<.001	17.2 ***	<.001	***
Gross Motor	3.2 ± 1.0	4.8 ± 1.1	7.5 ± 1.0	6.5 ***	<.001	10.9 ***	<.001	17.4 ***	<.001	***
Verbal Communication	2.5 ± 0.9	3.8 ± 1.0	6.9 ± 1.1	5.3 ***	<.001	11.8 ***	<.001	17.1 ***	<.001	***
Non-Verbal Communication	2.8 ± 1.0	4.3 ± 1.0	7.3 ± 0.9	6.0 ***	<.001	12.1 ***	<.001	18.1 ***	<.001	***
Social	2.3 ± 0.8	3.6 ± 0.9	6.5 ± 1.0	5.5 ***	<.001	11.0 ***	<.001	16.5 ***	<.001	***
Emotional Expression & Regulation	2.2 ± 0.9	3.5 ± 1.0	6.8 ± 1.1	5.1 ***	<.001	11.5 ***	<.001	16.9 ***	<.001	***
Creativity & Self-expression	2.9 ± 1.0	4.2 ± 1.0	7.5 ± 0.9	5.8 ***	<.001	12.0 ***	<.001	17.8 ***	<.001	***
Overall Engagement	3.5 ± 1.0	5.0 ± 0.9	8.0 ± 0.8	6.3 ***	<.001	12.8 ***	<.001	19.1 ***	<.001	***

Significant improvements were observed in targeted skill areas. More specifically: in (a) Cognitive Skills (through visualization/verbalization), clinical application of visualization and verbalization techniques,

particularly in rhythm and melody instruction, significantly improved cognitive skills like memory, perception, and attention. In (b) Fine and Gross Motor Skills, notable improvements were seen in both fine (e.g., manipulating instruments like percussion with "Doom" and "Te" strikes) and gross motor skills, including hand-eye coordination and accuracy in artistic creation. In (c) Communication Skills, significant increases were observed in both verbal (e.g., using more words/phrases for requests and comments) and non-verbal communication (e.g., improved eye contact and gesture use), especially during musical concept verbalization and visualization. In (d) Social Skills, enhanced participation in group activities, improved cooperation, and better turn-taking were evident. In (e) Emotional Expression & Regulation, students showed improved emotion recognition and expression, with fewer distress outbursts and increased self-regulation, aligning with the P.E.R.M.A. model. In (f) Enhanced Creativity and Self-Expression, significant improvements were supported by qualitative data from student work samples (increased originality, diverse material use, personal style development) and educator interviews (increased experimentation, willingness to express thoughts/feelings through arts), directly linked to enhanced self-confidence. In (g) Overall Engagement in Learning, marked improvement was shown, with observations indicating longer attention spans, increased interest, and spontaneous initiative during lessons. Strong interest in participation was a key finding from clinical application. In (h) Promotion of a More Inclusive Environment, qualitative data indicates D.D.A.T.A. significantly fostered inclusivity, which is explored further in the following section.

The qualitative data paints a vivid picture of D.D.A.T.A.'s profound, holistic impact on the lives of ID/ASD students. We observed a significant improvement in the students' ability to recognize and express emotions, leading to a notable decrease in distress outbursts and a greater capacity for self-regulation. Furthermore, student work samples showed a marked increase in originality and diverse use of materials, and educators reported a new willingness in students to express thoughts and feelings through art. The D.D.A.T.A. method proved to be a powerful tool for fostering a sense of inclusion and community, both within the classroom and beyond. A key finding came from a joint music event, part of the European Program "Cap sur l'école inclusive," involving eighteen musicians-trainees with ID/ASD and a twenty-member choir from a regular school. This collaborative event showcased the musical potential and professionalism of the students with ID/ASD, while also educating their non-disabled peers about the value of inclusive practices. The event served as a powerful testament

to the value of inclusive practices and demonstrated how arts-based interventions can bridge educational gaps and promote societal integration. The D.D.A.T.A. model's success is further highlighted by the establishment of the Ichochroma Orchestra, an artistic ensemble composed solely of individuals with mental disabilities, which has given numerous public concerts in collaboration with professional and amateur choirs [19] [20] [22]. The impressive progress of the students in the Ichochroma Orchestra was a key element in the standardization and establishment of the D.D.A.T.A. principles [19].

6. Conclusions

In conclusion, the Differentiated Didactic Approach to Teaching the Arts (D.D.A.T.A.) represents a significant advancement in special education, offering a holistic and effective methodology for students with intellectual disabilities and Autism Spectrum Disorders. This study conclusively demonstrates D.D.A.T.A.'s capacity to foster substantial improvements across a broad spectrum of skills—cognitive, motor, communicative, social, emotional, creativity, and overall engagement—through its innovative visualization and verbalization techniques, underpinned by robust theoretical frameworks. Individual skill development aside, D.D.A.T.A. cultivates inclusive learning environments that empower students and enhance their participation and well-being. The documented successes, particularly in collaborative settings such as the Inclusive concerts, highlight the profound potential of arts-based interventions to bridge educational gaps and promote societal integration. While acknowledging limitations, the overwhelmingly positive outcomes underscore D.D.A.T.A.'s value as a transformative pedagogical tool. The absence of a control group is a major limitation, as we cannot definitively attribute all improvements solely to the D.D.A.T.A. method. Additionally, the reliance on a specially designed observation rubric may introduce an element of subjectivity. The small number of students who showed limited improvement highlights the need for further research into factors influencing treatment response and the development of more individualized strategies for cases with more complex or severe needs.

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