

Creative Dance as Pedagogy: A Study of Primary Students' Higher-Order Thinking Skills and Dance Learning Motivation

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ABSTRACT: This article reports part of a bigger scale 'Design and Development Research' (DDR) Study aimed at examining preliminary changes in primary school students' higher-order thinking and dance learning motivation following the implementation of Unit 1 of a theory-informed creative dance module. During Stage 2 of DDR, a quantitative one-group pre-test/post-test design was employed with 24 female primary school students from an extracurricular dance institution in China over three weeks (9 instructional hours). The intervention involved Unit 1 only as part of a larger DDR as aforementioned. Two instruments were used including a modified Fluid Intelligence Test (FIT), designed to assess higher-order thinking in movement-based contexts through critical and creative thinking, and an adapted Motivation Towards Dance Learning Survey (MTDLS). Both instruments underwent two rounds of expert validation prior to use. The findings showed positive change in both outcomes. The mean motivation score increased from 3.12 to 3.85, while the mean overall FIT score rose from 64.50 to 73.42. Improvements were also found in both critical and creative thinking sub-scores.

Keywords: Creative Dance Pedagogy, Higher-Order Thinking Skills, Critical Thinking, Creative Thinking, Dance Learning Motivation, Extracurricular Primary Education, Sustainable Development Education (SDE).

1. INTRODUCTION

1.1. Research Background

Arts-based learning has become more popular in modern education as a significant framework that can be used to foster cognitive and motivational growth of the young learners. Creative dance focuses on exploration, improvisation, and self-made moves over technical replication which makes it relevant to young learners in terms of pedagogical engagement with both cognition and personhood (Lin *et al.*, 2026). Extra-curricular primary education, these kinds of settings can offer some

chances to children to incorporate physical, emotional and cognitive activities via movement-based education (Koff and Mavilidi, 2021). Nevertheless, along with the increasing popularity of arts-based pedagogy, there is still a lack of empirical data on how organized creative dance programs can affect higher-order thinking abilities, especially critical and creative thinking, and motivation to

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learn dance in extracurricular settings (*i.e.*, not within the school system).

■ 1.2. Creative Dance and Embodied Learning

The pedagogical value of creative dance may be explained within the theoretical framework of embodied cognition, which suggests that thinking occurs between the body, the brain, and the environment. Cognition is formed in terms of sensorimotor experience and action-based exploration under the lens of embodied learning (Castro-Alonso *et al.*, 2024). As a part of creative dance, movement tasks that include pathways, rhythm, effort, and structure might have learners compare options, explain their decisions, and hone their answers through bodily participation (Mavilidi *et al.*, 2015). Therefore, creative dance represents a theoretical framework in which embodied exploration could potentially play a role in cognitive processes that are linked to higher-level thinking, particularly in the areas of critical analysis and the creation of innovative ideas.

■ 1.3. Higher-Order Thinking in Arts Education

The concept of higher-order thinking (HOT) is at the core of contemporary education, especially in situations where students are required to acquire problem-solving and creative skills in society. The present work puts HOT in the form of two interrelated concepts - critical thinking and creative thinking. Instead of perceiving them as abstract concepts, the study treats them as individual components of the modified FIT. Critical thinking involves examining information, weighing alternatives and making rational choices; creative thinking involves coming up with fresh, viable ideas or solutions (OECD, 2023). Based on educational research, both types of thinking may be encouraged in exploratory, reflective and iterative learning settings, particularly when students need to explain their reasoning (Abraham, 2018).

In the field of arts education, movement composition and improvisation are activities that naturally inspire children to experiment, consider the results and come up with ideas - all the steps associated with the HOT approach. Similarly, intervention studies also indicate the effectiveness of problem-based learning and participatory teaching approaches in enhancing student critical thinking and motivation to learn, implying that cognitively demanding, learner-centred instruction can help achieve both outcomes (Festiawan *et al.*, 2021). Movement composition, guided variation, and reflective discussion may involve critical and creative thinking in arts contexts, particularly when learners create options, evaluate alternatives, and discuss their movement decisions (Ruiz-del-Pino *et al.*, 2022).

■ 1.4. Learning Motivation in Dance Education

Apart from cognitive results, student motivation is one of the factors that can be used to evaluate the depth and duration of learning. Dance education affects the desire of students to practice intensively, their ability to persevere over the course of training, and their creativity in peer performances.

The Self-Determination Theory (SDT) is a well-known model of learning motivation that focuses on how autonomy, competence and relatedness promote intrinsic interest (Ryan and Deci, 2020). There are some learning environments that offer meaningful options, which give learners the impression of making progress and have access to supportive feedback, which may enhance positive motivation. It is consistent with recent studies that autonomy-supportive teaching has the potential of increasing student motivation, even in small-scale interventions (Kong and Liu, 2024). Another study indicates the same results where the perceptions of supportive course design, feedback and learning conditions are among the predictors of students satisfaction and willingness to continue learning in various educational environments (Abdullah *et al.*, 2022). Research in physical education and the arts also supports the idea that autonomy-supportive approaches are associated with increased engagement, enjoyment, and perseverance in learning activities (Manninen *et al.*, 2022).

The creative dance teaching already has such attributes that may help to stimulate motivation, including open-ended exploration, collaboration, and self-expression. Well-designed dance programs can thus be used to enhance the motivation of students to learn dance effectively. In this research, the concept is viewed as a dependent variable and explained using SDT as an explanatory model, not tested.

■ 1.5. Research Gaps

Although creative dance is often referred to in the literature on arts education, there are still significant gaps in the empirical literature.

To begin with, there is a contextual gap: much of the arts intervention studies are carried out in formal schools, however, most children, especially those on mainland China, learn dance outside school institutions. The learning conditions, pedagogy, and student expectations vary in such contexts and the educational results should be investigated in more detail.

The second is that there is a methodological gap: initial studies on creative dance tend to fail to have a well-

developed intervention design, measurement instruments and intervention delivery fidelity limiting the replicability and comparability of outcomes (Konstantinidou, 2023).

Third, there is a pedagogical gap in the theoretical basis of creative dance interventions. Numerous research papers describe class-room activities, but do not shed much light on teaching approaches that influence cognitive and motivational results.

To eliminate these gaps, studies need to involve theoretical rationale, structured teaching design, evidence of implementation, and empirical evaluation of higher-order thinking and motivation in less-researched educational settings.

A further practical gap concerns the transferability of creative and learner-centred pedagogy across educational settings. Although this study was situated in creative dance, the instructional principles underlying the module, such as guided exploration, gradual task progression, peer sharing, reflection, and supportive feedback, are not limited to dance education alone. These principles may also inform teaching innovation in other subject areas where learners are expected to generate ideas, compare alternatives, explain choices, and improve their work through feedback.

■ 1.6. Study Objectives and Research Questions

This paper aims at filling such gaps with the help of a pilot implementation of Unit 1 of a creative dance module that was created as part of a Design and Development Research (DDR) project. The module combines embodied learning, motivational instructional design and exploratory creative movement practice with the purpose of enhancing higher-order thinking among students, particularly critical and creative thinking, and motivating them to learn dance outside school. In addition to examining preliminary student outcomes, the study also considered how the structured and reflective features of the module may contribute to wider discussions of learner-centred teaching innovation.

The first research goal was to investigate early modifications in student higher order thinking, especially critical thinking and creativity, after the pilot of Unit 1.

The next one was to investigate the initial changes occurring in their dance learning motivation.

There were two research questions that directed the study:

RQ1: What were the initial observations on critical and creative thinking among primary school pupils following the pilot of Unit 1?

RQ2: After intervention what were the preliminary changes in dance learning motivation of these pupils?

This paper will be the first step to give empirical evidence on the pedagogical value of Unit 1 through a pilot intervention that is well-structured; it will also shed more light on how embodied arts pedagogy can promote higher-order thinking and motivation among young learners.

■ 2. MATERIALS AND METHODS

■ 2.1. Research Design

The study has utilized the quantitative pre-experimental one-group pre-test/post-test design to evaluate the initial changes in high-order thinking skills and dance learning motivation of primary students after the pilot intervention of Unit 1. The pilot was an element of a larger design and development research (DDR) project that incorporated three creative dance modules (McKenney and Reeves, 2018). Nonetheless, the paper will describe merely the implementation and results of Unit 1. It was piloted as to assess initial feasibility and preliminary learning outcomes in order to refine the module and implement it at full scale, in line with the function of pilot work in educational intervention research (Thabane *et al.*, 2010; Eldridge *et al.*, 2016).

The current research was aimed at examining one specific unit of a creative dance module that had been created using the DDR process. The intervention took three weeks (2 sessions per week) and each session lasted 1.5 hours, which is why the entire time of instruction was nine hours. To measure the change in overall higher-order thinking, critical thinking, creative thinking, and dance learning motivation before and after the pilot of Unit 1, pre-test and post-test data were gathered. Because this was a pilot study, the design was intended to generate preliminary evidence rather than to establish definitive causal effects. The absence of a comparison group and the short intervention period were therefore considered when interpreting the pre-test/post-test findings.

■ 2.2. Participants and Context

The research consisted of 24 girls in primary school aged between 7-10 years who attended an after-school dance class and had 2-4 years of dance experience. They were

all successful in Chinese Dancers Association Grade 5 examination which indicates that they have fundamental dance abilities and movement literacy that can be used in organized creative dance exercises. The female-only sample is indicative of the real enrolment pattern in the institution which should be taken into account when discussing the results generalizability.

China has extracurricular dance schools which play an important role in children dance education in the country and many times they offer more regular and specialized training as compared to the arts programs offered at schools. The findings of studies on teaching interventions in such contexts may be useful in elucidating the ways in which dance education is practiced in other informal learning contexts (Halverson *et al.*, 2023).

Engagement was entirely voluntary, and parents were given an opportunity to give their consent prior to data collection. There were all ethical standards used in educational research on minors.

2.3. Creative Dance Module

The intervention that was analysed in this paper is Unit 1 of a creative dance module which has been developed as part of a larger Design and Development Research (DDR) project. Unit 1 was intended to facilitate higher-order thinking skills among students especially critical thinking and creative thinking as well as motivation in learning dance using structured creative movement activities. Creative dance focuses on exploration, improvisation, and personal expression over technical reproduction of pre-established choreography (Koff and Mavilidi, 2021). This method enables the students to

explore the potential movements of the body as they think about the significance and form of their actions.

The design of the module drew upon three complementary theoretical perspectives:

- 1) Laban Movement Analysis (LMA)
- 2) ARCS Motivational Instructional Model
- 3) Multiple Intelligences (MI) Theory

These frameworks informed both the content and pedagogical structure of the module, as summarized in the Table 1.

(a) Instructional Design Principle

First, the module movement content was based on Laban Movement Analysis (LMA) defining human movement based on four main aspects that are body, space, effort and time (Laban, 1971). LMA offers a systematic model of analyzing and investigating movement qualities, allowing students to explore what changes in the dynamics of movement can express thoughts and feelings.

Second, the module also integrated the ARCS motivational instructional model, which highlights four main aspects of motivational design, including attention, relevance, confidence, and satisfaction (Keller, 2010). Attention was aroused in the module by challenge of movements and contrasted activity; relevance was created by connecting movements themes with daily life of students; confidence was achieved by increasing the levels of difficulty of tasks; and satisfaction was strengthened by reflections and sharing of performances.

Table 1: Core Design Features of Unit 1 and Their Alignment with Higher-Order Thinking Skills and Dance Learning Motivation

Curriculum / Units	Unit 1 Understanding of Physical Movement
Objectives	1.Explore body movement possibilities in a low-risk and structured way. 2.Develop awareness of basic dance elements through guided comparison and variation. 3.Compare and discuss movement expressions to foster creative and analytical thinking.
Content	Dance elements: Body, Space, Time, Effort, Relationship. Movement exploration progresses from guided tasks to simple variations rather than free improvisation.
Application of Thinking Skills & MI	Creative & Critical Thinking through comparison, variation, and choice-making. MI: BK, SI, MR, LM. Activities include movement puzzles, comparison of similar phrases, and guided discussion.
Application of Motivation Theory Anchored on ARCS	Attention: Movement challenges and puzzles spark curiosity. Relevance: Link movements to daily actions and emotions. Confidence: Tiered tasks with gradual difficulty increase. Satisfaction: Group sharing with teacher and peer affirmation.
Allocation	6 lessons, 1.5h/lesson; Total 9h

The third was the pedagogical strategy based on the theory of Multiple Intelligences (MI), which states that learning is more effective when instructional practices involve a combination of various cognitive modalities, such as bodily-kinaesthetic, interpersonal, and intrapersonal intelligence (Gardner, 2011). The creative dance activities thus promoted the exploration of movements by individuals and cooperation with others and reflection of personal learning experiences by the students.

These theoretical principles, both taken together, played a guiding role in designing the creative dance module, as well as in formulating instructional activities that were focused on the promotion of exploration, reflection, and creative expression.

■ (b) *Weekly Implementation Structure*

The first unit of the creative dance module was completed within three weeks that included six 90-minute lessons totalling nine hours of instruction. The themes for each week were based on one of the Laban Movement Analysis (LMA) modules: the awareness of the basic movements in Week 1, the concept of body mapping in Week 2, and the idea of an integrated movement composition in Week 3.

In all six lessons, activity sequences were based on a universal four-step model: introduction of movement, guided exploration, composition, and reflection and sharing which were developed to increase creativity engagement incrementally. Initial assignments involved imitation and directed variation as low-pressure explorations whereas subsequent lessons required pupils to form short pieces of work with spatial, time or effort components.

Throughout the unit, students were prompted to integrate the movement components and consider how their decisions affected the expressive quality. There were final sessions with emphasis on the integration of body, time and effort components and short group movement sequences. The lesson plan is thoroughly presented in Appendix 1.

■ (c) *Implementation Fidelity*

The extent to which a given instructional intervention is implemented as planned by researchers is referred to as implementation fidelity (O'Donnell, 2008; Carroll *et al.*, 2007). It is important in the context of educational intervention studies since differences in delivery may affect the interpretation of the outcomes of learning (Dusenbury *et al.*, 2003).

In order to ensure the same level of creativity in the dance module, the present study has used a number of fidelity measures. Prior to the pilot, the dance instructor attended a preparation meeting run by the researchers, where they discussed the educational objectives of the unit, the teaching methods and the structure of the tasks. The particular focus on the sequence of lessons: low-risk entrance tasks, directed exploration, composition and reflection was made.

In the course of the intervention, the teacher implemented the pre-prepared Unit 1 lesson plans, and the researcher monitored the class regularly to measure the level of adherence to the activities and delivery. The observations were carried out based on the structure of the lesson, implementation of tasks and student engagement which assisted in ensuring that the instructional design was delivered consistently and appropriately. All of the six planned lessons were finished. The observation records were also used to track how well the planned teaching matched the actual teaching as well as problems to refine prior to the ultimate implementation.

Although the module was designed for creative dance, several of its instructional features may be relevant to other learner-centred teaching contexts. These include beginning with low-risk entry tasks, providing guided exploration before open-ended creation, using peer sharing to expose learners to alternative solutions, and encouraging reflection on the reasons behind students' choices. Such features are pedagogically transferable because they support idea generation, comparison, confidence building, and revision, which are learning processes required in many subject areas.

■ 2.4. Instruments

Two tools that were utilized to evaluate the pilot results were a modified Fluid Intelligence Test (FIT), which measures higher-order thinking skills, such as critical thinking and creative thinking aspects, and a new Motivation Toward Dance Learning Survey (MTDLS), which assesses the motivation to learn dance.

■ (a) *Modified Fluid Intelligence Test (FIT)*

This research paper defines higher-order thinking (HOT) as two overlapping abilities, namely critical thinking and creative thinking. They were tested based on a modified version of the Fluid Intelligence Test (FIT) that was modified to fit with dance learning. Original FIT created by Ng (2012) is based on fluid reasoning associated with problem solving and mental flexibility. Higher-order cognition and the ability to reason and solve new problems without relying on past experiences are highly

connected and linked to the ability to perform more complicated cognitive tasks like reasoning, problem-solving and creativity. Nevertheless, conventional cognitive tests do not provide ecological validity in learning through movements because they cannot observe embodied and situational thinking (Bell *et al.*, 2023). To enhance construct validity, the FIT was modified to be applicable to dance activities and evaluated by experts.

The updated version of FIT included the use of reasoning, comparison, pattern recognition, and decision-making tasks to focus on critical and creative thinking. Contemporary studies confirm that there is conceptual overlap between fluid reasoning and HOT since they both require complicated processing and flexible thought (Schneider & McGrew, 2018). Analysing data and making rational decisions are elements of critical thinking and coming up with new ideas are components of creative thinking (OECD, 2024). Although fluid reasoning is not entirely representative of all the dimensions of HOT, particularly dispositional or domain specific ones, the modified version was confirmed to be applicable to movement contexts. Its purpose was to serve as a context sensitive measure of HOT and concentrate on critical and creative thinking without assuming to address all the components of HOT.

The updated version of FIT was put through an expert content validation in two stages to assess the measurement of HOT in dance contexts (Table 2).

Two experts in dance education and two experts in educational psychology scored the relevance of items on four points. The assessment of content validity was conducted through I-CVI and S-CVI, which have a permissible level of 0.78 (Polit and Beck, 2006).

The initial round disclosed problems: too abstract directions, low relevance to dance, development incompatibility with primary school children, and mismatched constructs. The validity indices were satisfactory but not perfect (I-CVI = 0.75-1.00; S-CVI = 0.89). The revisions made it more clear, contextually relevant, and age-appropriate; abstract items were

simplified, dance contexts included, and misaligned items eliminated.

At the second stage, the rest of the items were given scores of 4, which led to a value of I-CVI = 1.00 and S-CVI = 1.00, which is an indication of a high level of content validity, which summarised in Table 3.

The modified FIT was found appropriate in measuring higher-order thinking in the context of the study, but it was not as thorough in covering all the HOT aspects.

Since the validated tool had distinct critical and creative thinking domains, pilot analyses have reported the total HOT and domain-specific scores.

Table 3: Second-Round Expert Content Validation Results for the Modified FIT

Domain	I-CVI	S-CVI
Creative Thinking	1.00	
Critical Thinking	1.00	
Overall Scale		1.00

All retained items were rated 4 by all experts.

■ (b) *Motivation Towards Dance Learning Survey (MTDLS)*

The measurement of learning motivation was conducted through a modified version of the Motivation Toward Dance Learning Survey (MTDLS), which was based on the survey developed by Ng (2012) called the Motivation Toward Science Learning Survey. Specific domain motivation is a stronger predictor of engagement and persistence than general measures (Schunk and DiBenedetto, 2020) and can affect students efforts and performance (Wigfield and Eccles, 2000). Still, most academic motivation scales do not focus on arts-related characteristics including expressive pleasure and aesthetic self-assurance (Kiss *et al.*, 2025). Contextual adaptation is also suggested in order to enhance validity in specialized contexts (Ryan and Deci, 2020). The MTDLS has been adapted to apply to dancing learning and validated by experts.

Table 2: First-Round Expert Content Validation Results for the Modified FIT

Domain	I-CVI Range	S-CVI	Expert Feedback Summary
Creative Thinking	0.75–1.00		Abstract instructions; limited dance context
Critical Thinking	0.75–1.00		Developmental difficulty; construct misalignment
Overall Scale		0.89	Revision recommended

Rating scale: 1 = not relevant to 4 = highly relevant. Acceptable I-CVI ≥ 0.78.

Table 4: First-Round Expert Content Validation Results for the Revised MTDLS

Construct Domain	I-CVI Range	S-CVI	Expert Feedback Summary
Learning Behaviour	0.78–1.00		Redundant items; clarity issues
Learning Interest	0.78–1.00		Abstract wording
Future Orientation	0.78–1.00		Developmental appropriateness concerns
Self-Perception	0.78–1.00		Conceptual simplification required
Overall Scale		0.91	Revision recommended

To determine the relevance, clarity and developmental appropriateness of the MTDLS to primary students, the MTDLS was assessed in a two round expert validation. These four experts were used to score the items using four points each where I-CVI and S-CVI was calculated in the same manner.

The first round of feedback revealed that it has abstract vocabulary, complex phrasing and items which are developmentally inappropriate and future-oriented. The validity indexes were acceptable but could be improved (I-CVI = 0.78-1.00; S-CVI = 0.91). Simplification of language, reinforcement of dance context, and replacement of abstract identity or career concepts with age appropriate expressions, and modification of redundant items were made (Table 4).

All the remaining items in round two were rated as 4-relevant which would give I-CVI = 1.00 and S-CVI = 1.00, which means that there is an excellent content validity. This indicated that the modified MTDLS was appropriate to use in this research work (Table 5).

Table 5: Second-Round Expert Content Validation Results for the Revised MTDLS

Construct Domain	I-CVI	S-CVI
Learning Behaviour	1.00	
Learning Interest	1.00	
Future Orientation	1.00	
Self-Perception	1.00	
Overall Scale		1.00

All retained items were rated 4 by all experts.

The test of internal consistency was conducted through the Cronbach alpha, which was 0.93, indicating a high degree of reliability. Being a self-report measure, the MTDLS measured the dance learning motivation of the students based on their perception during the pilot and its results were interpreted accordingly.

2.5. Data Analysis

The data analysis in this study aimed at investigating the variations in students higher-order thinking and dance learning motivation after the intervention through a proper set of statistical methods that can be applied to pilot research. Educational intervention research with pre-post designs often utilizes within-subject comparisons to determine if measurable differences can be observed following the implementation of instruction when control groups are impractical. These analytical techniques make it possible to analyse learning results in small samples without compromising on the level of methodological rigor needed in exploratory studies. Paired-sample comparisons are statistically appropriate in assessing mean discrepancies between two dependent measures where the identical participants are studied both before and after intervention (Field, 2018). Nevertheless, smaller sample sizes can weaken statistical power and enhance the likelihood of a Type II error, *i.e.*, even nonsignificant results can indicate that there are no intervention effects (Lakens, 2022). Thus, descriptive statistics and t-tests of paired samples were used to compare pre-post differences in overall higher-order thinking, critical thinking, creative thinking, and dance learning motivation. Effect sizes were also computed to enhance the interpretation of the pilot results, but all statistical findings were interpreted as preliminary within-group changes rather than evidence of confirmed intervention effects

3. RESULTS

3.1. Higher-Order Thinking Outcomes: Overall HOT, Critical Thinking, and Creative Thinking

The results demonstrated that there was a positive change between the pre and post test in the overall higher-order thinking of the students, and additional tests on critical and creative thinking were carried out through the revised FIT to produce the total HOT scores and individual subscale scores. Before carrying out the analysis, normality and outliers were tested with no serious deviations recorded. The descriptive statistics

showed that the mean pre-test FIT score was 64.50 (SD = 10.22) and the mean post-test was 73.42 (SD = 7.81), with a difference of 8.92 points (Table 6).

The critical thinking scores went up to 34.35 (SD = 6.95) and to 38.17 (SD = 5.40). Paired-samples *t*-tests verified that this change was statistically significant, $t(23) = -2.35$, $p = .021$, and medium effect size (Cohen's $d = 0.588$). Also, creative thinking scores were increased significantly, 30.15 (SD = 8.43) to 35.25 (SD = 4.47), $t(23) = -3.36$, $p = .001$, with medium effect size (Cohen's $d = 0.693$). Post-intervention standard deviation decreased implying more uniformity in student performance. Total FIT scores were also significantly different: $t(23) = -3.76$, $p < .001$, large effect size (Cohen's $d = 0.939$) (Table 7).

In general, these results indicate a preliminary indication of improved higher-order thinking, and significant gains in both critical and creative thinking following the pilot of Unit 1.

■ 3.2. Learning Motivation Outcomes

The intervention also resulted in improvements in student motivation to learn dance. The revised version of Motivation Toward Dance Learning Survey (MTDLS) was used in order to measure the learning motivation before and after the instructional period. Motivation is regarded as a dynamic psychological construct that can be modified due to learning experiences, which makes the pre-post comparisons to be used in studies of instruction. Descriptive statistics revealed that the average motivation score rose by 3.12 (SD=1.22) prior to the intervention and 3.85 (SD=0.23) post-intervention. This improvement in mean scores can be interpreted as an improvement in the motivational response of students in the intervention

period. Paired-sample analysis also revealed that there was a statistically significant difference between pre-test and post-test motivation scores, $t(23) = -4.02$, $p < .001$ and a large effect size (Cohen's $d=0.726$) (Table 7).

The motivation outcomes show that there was a positive change in the short-term self-reported student motivation on the dance learning during the pilot interval.

■ 3.3. Summary of Findings

When combined, these findings suggest that after the Unit 1 pilot, the overall higher-order thinking is positively changed and so are its critical and creative thinking subdomains, and dance learning motivation. Due to the small number of participants, the short intervention period, and the lack of a comparison group, these findings should be interpreted as preliminary evidence of within-group change.

■ 4. DISCUSSION

■ 4.1. Overview of Findings

The pilot study examined if involvement in Unit 1 of a creative dance course would be related to initial progress in the higher-order thinking of primary students, particularly the critical and creative thinking as well as their motivation to learn dance. It was found that there were positive pre-to-post changes in overall scores of higher-order thinking and that domain-specific analyses confirmed improvement in critical thinking, creative thinking and dance learning motivation. These findings suggest that creatively designed dance settings may provide supportive conditions for children's cognitive involvement and motivational growth, although the pilot design does not permit strong causal claims.

Table 6: Pre–Post Comparison of Higher-Order Thinking Scores (FIT)

	N	Pre-Post (Mean± SD)		t	p	Cohen's d
		Pre-	Post-			
Critical Thinking Score	24	34.35±6.95	38.17±5.40	-2.35	0.021**	0.588
Creative Thinking Score	24	30.15±8.43	35.25±4.47	-3.36	0.001***	0.693
Overall Score	24	64.50±10.22	73.42±7.81	-3.76	0.000***	0.939

Table 7: Pre–Post Comparison of Dance Learning Motivation Scores (MTDLS)

	N	Pre-Post (Mean± SD)		t	p	Cohen's d
		Pre-	Post-			
MTDLS	24	3.12±1.22	3.85±0.23	-4.02	0.000***	0.726

Creative dance is a form of dance that emphasizes exploring movement, improvisation, and concept development instead of technical ability or predetermined choreography. The students are prompted to explore alternatives with movement, assess the expressive outcome, and improve their work under exploratory and reflective activities. Such procedures correspond to the educational standpoint that arts learning allows engaging cognition and emotion at the same time (Winner *et al.*, 2013). With this viewpoint, the research offers initial evidence that structured creative dance teaching may promote meaningful learning opportunities in dance education.

■ 4.2. Creative Dance and Higher-Order Thinking

An important finding of the study is the fact that the participation in the Unit 1 pilot of the module on creative dance was linked to the development of higher order thinking skills among the students, namely, two of the subdomains of higher order thinking that were evaluated, critical thinking, and creative thinking. Higher-order thinking in this research was operationalized as the ability to think critically and creatively measured using the modified FIT instrument. Since the modified FIT produced overall and domain specific scores, this pilot data can be considered at the general HOT level, and at the level of critical and creative thinking independently. These cognitive processes consist of identifying patterns, developing ideas, and assessing potential solutions, which are all vital parts of deep learning.

An explanation of this result could be explained based on the idea of embodied cognition theory, which posits that cognitive functions are intimately related to body movements and interaction with the world. Sensorimotor experiences are likely to assist reasoning and problem solving when learners investigate possibilities of movement using their bodies (Castro-Alonso *et al.*, 2024). In creative dance activities like exploring spatial pathways or manipulating rhythm or experimenting with effort qualities students have to analyse movement structures and decide what expressive intent they are going to use. Such experience might then trigger cognitive mechanisms related to critical and creative thinking.

Other works of art education have also indicated that creativity-focussed activities can help develop some elements of higher-order thinking as students are allowed to play around with ideas and reflect on their answers to improve them (Ruiz-del-Pino *et al.*, 2022). These findings go along with the position that in the current pilot situation structured creative dance can offer a pedagogically

significant setting to work with both critical and creative thinking. Nevertheless, due to the pilot design and context-specificity of the instrument, these findings must be considered as an interim indication of the wide development of HOT rather than as an ultimate confirmation of such a trend. The pedagogical logic underlying this process may also be relevant beyond dance. In other subject areas, learners may similarly benefit from opportunities to generate possible responses, compare alternatives, justify decisions, and revise their work through guided feedback.

■ 4.3. Creative Dance and Learning Motivation

On top of cognitive effects, the findings show that motivation to learn dance among the students increased after involvement in the creative dance program. The role of motivation as a key element in determining the involvement, persistence and enjoyment of students in learning tasks is well established. It has also been recently demonstrated that the educational experiences of students may influence their sense of belonging which in turn may be linked to a more positive engagement and participation in learning (Baek, 2025).

The implication of this finding is based on the Self-Determination Theory (SDT) which suggests that learning environments that promote autonomy, competence and relatedness are more likely to promote intrinsic motivation (Ryan and Deci, 2020). Creative dance classes usually enable learners to choose their movements, test various solutions, and work in pairs with other students. These opportunities might increase the feeling of autonomy and competence of students as well as facilitate social interaction in the learning setting. The interpretation is also compatible with the conclusion that perceived teacher support may have an enormous impact on the level of student engagement and learning power, which highlights the motivational role of supportive teaching classrooms (Zheng *et al.*, 2025).

Studies on physical activity and arts education have also indicated that autonomy-supportive learning settings can be related to higher levels of involvement and satisfaction among students (Manninen *et al.*, 2022). The creative dance module in the current study had organized exploration tasks and peers sharing opportunities, which could have been an additional factor to the noticed motivation to learn growth. Since motivation was measured using self-report measurements in a short pilot period and without a comparison group, the detected change ought to be considered as initial motivational reaction instead of a reliable indicator of the stable long-term motivational modification.

■ 4.4. Pedagogical Meaning of the Module

In addition to the learning outcomes observed, the results indicate the pedagogical value of the instructional design that was implemented within the creative dance module. It combined the ideas of Laban Movement Analysis, the ARCS motivational model, and Multiple Intelligences theory, which permitted movement exploration to be organized in a systematic but open way. This balance between structure and openness is important because young learners may need clear task boundaries before they can participate confidently in creative work.

To illustrate, the introduction of low risk entering tasks made it possible to introduce creative exploration with a guide to imitation and variation, which minimized the uncertainty that usually comes with open ended creative tasks. With the advancement of the lesson, the students were prompted to integrate movement components, including body, time and effort into short movement phrases. Reflection and sharing exercises gave students the opportunity to express their thoughts and see different ways other students went about their work.

These design features may be adapted to other subject areas that require creativity, reasoning, and learner participation. For example, in language learning, pupils may first imitate model expressions, then vary them, share alternative responses, and revise their writing or oral expression. In science or social studies, learners may explore a problem through guided tasks, compare possible explanations, justify their choices, and refine their solutions after peer discussion. In this sense, the module illustrates a more general learner-centred instructional sequence: low-risk entry, guided exploration, production of alternatives, peer sharing, reflection, and revision.

These instructional strategies are consistent with recommendations of dance education literature that indicates that creative learning environment is more productive as long as exploration has a clear pedagogical framework (Koff & Mavilidi, 2021). In the same way, the focus on well-organized and well-scaffolded task designing has been observed in the recent studies on creative learning environments and here, pedagogical innovation was reinforced by explicit design, not just by providing an opportunity to explore without any structure (Laksmiwati *et al.*, 2024). The results therefore indicate that, under the limitations of this pilot, well-designed creative dance modules may have pedagogical potential to support cognitive and motivational growth in dance learning settings. More broadly, the module exemplifies

how arts-based pedagogy can be organized as a form of teaching innovation: learners are not only asked to perform, but are guided to explore, compare, explain, collaborate, and revise. Such a structure may be relevant to wider educational reform efforts that seek to move classroom learning beyond memorisation and reproduction toward active participation, creative problem solving, and reflective learning.

■ 5. CONCLUSIONS

■ 5.1. Summary of the Study

The article has reported on the pilot of Unit 1 of a creative dance module and revealed significant pre-post changes in higher-order thinking skills (critical thinking and creative thinking) and in dance learning motivation. The pilot intervention that lasted three weeks was performed within the framework of an extracurricular dance institution, where the research established initial improvements in higher-order thinking skills and dance learning motivation after the module engagement.

The results offer some initial empirical evidence to support the educational potential of organized creative dance learning spaces, albeit in a limited setting of a small pilot study without comparison. The combination of embodied movement exploration and reflective learning activities allowed the module to offer opportunities to students to participate in the learning process both cognitively and emotionally.

■ 5.2. Educational Implications

The results of this research have several implications for dance education practice and arts-based pedagogy. First, creative dance modules may serve as structured learning environments that support higher-order thinking, especially critical and creative thinking, as well as motivation in young learners. In addition to technical training, dance teaching may include movement exploration, guided variation, peer sharing, and reflective discussion, which provide pupils with opportunities to make choices and explain their ideas. (Koff and Mavilidi, 2021).

Second, the instructional design of the module shows how theoretical frameworks including Laban Movement Analysis and motivational instructional models can be translated into practical teaching strategies. These frameworks helped the module balance creativity and specific learning goals, helped the module balance creativity with specific learning goals, (Ryan and Deci, 2020).

Third, the pedagogical value of the module may extend beyond dance education. Conclusively, the findings imply that dance clubs outside school are also useful learning environments where experimental methods of teaching dance can be explored. The sequence of low-risk entry, guided exploration, production of alternatives, peer sharing, reflection, and revision could inform learner-centred teaching in other subjects that require students to generate ideas, compare possible answers, justify decisions, and improve their work. From this perspective, the study contributes to broader discussions of teaching innovation and educational reform by showing how structured creative tasks may promote active, reflective, and participatory learning.

5.3. Limitations and Future Research

Several limitations should be considered when interpreting the findings. First, the study involved a small sample of 24 female pupils from one extracurricular dance institution, which limits the generalisability of the results to broader primary education contexts, male pupils, mixed-gender groups, or learners with different levels of dance experience. Second, the intervention lasted only three weeks and focused on Unit 1 of the module; therefore, the findings reflect short-term preliminary changes rather than stable or long-term learning outcomes. Third, the study used a one-group pre-test/post-test design without a comparison group, so the observed changes cannot be attributed exclusively to the intervention. Other factors, such as repeated testing, maturation, teacher influence, or participants' prior dance experience, may also have contributed to the results. Fourth, the modified FIT and MTDLS were context-adapted instruments. Although they underwent expert validation and the MTDLS showed high internal consistency, the modified FIT cannot represent all dimensions of higher-order thinking, and the MTDLS remains a self-report measure of motivation. Finally, feasibility evidence was limited mainly to lesson

completion and observation-based fidelity monitoring; future pilot work should report more systematic feasibility indicators, including attendance, adherence, student response, and implementation challenges.

Future studies should extend this pilot work by involving larger and more diverse samples, including pupils from different institutions, regions, genders, and levels of prior dance experience. Longer intervention periods and delayed post-tests would help determine whether the observed changes in higher-order thinking and motivation can be sustained over time. Comparative or quasi-experimental designs with control or comparison groups would also strengthen the validity of future findings. In addition, future research may examine the full creative dance module rather than Unit 1 only, and may investigate how similar structured, learner-centred instructional strategies can be adapted to other arts, language, science, or interdisciplinary learning contexts.

6. CO-AUTHOR CONTRIBUTION

As there was no conflict of interest, the author developed the concept and focus of this study, conducted a literature review, created the competency-based curriculum framework, wrote this manuscript, and made final edits to the paper before it was submitted.

7. CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known conflicts of interest related to this manuscript.

8. DECLARATION OF AI-GENERATED CONTENT

The authors used AI tools for language proofreading (grammar, spelling, and style). No AI was used in research design, data analysis, or the generation of scientific contributions. The authors is fully responsible for the manuscript.

APPENDICES

Appendix 1: Example of detailed lesson structure (Lesson 1 plan)

Item	Content
Week	Week 1
Class	Lesson 1
Duration	90 minutes
Course Theme	Introduction to Body & Space: Low-risk Movement Exploration

Teaching Objectives	1. Enable students to understand basic concepts of body parts and spatial pathways through guided movement exploration, reducing anxiety toward dance creation. 2. Develop initial creative and analytical thinking through structured movement tasks. 3. Activate bodily-kinaesthetic and spatial intelligences to build basic confidence in body expression.
Teaching Content & Procedures	(1) Lesson introduction (10 mins): The teacher prompts students with questions (e.g., "Can the body draw lines?") to introduce body-space relationships in a safe learning atmosphere. (2) Guided exploration (25 mins): The teacher demonstrates straight and curved pathways using arms and legs; students imitate first and then make small variations to avoid one-step free creation. (3) Movement phrase practice (30 mins): Students combine "one body part + one spatial pathway" to create a short phrase; advanced students may add level changes. (4) Sharing and feedback (15 mins): Students share phrases in groups with supportive peer and teacher feedback. (5) Reflection (10 mins): Students reflect orally on ease and challenges encountered.
Teaching Methods	Demonstration, Guided Exploration, Tiered Tasks, Group Sharing
Materials & Tools	Open dance space, music player, rhythmic music
Student Work Requirements	1. Each student completes a movement phrase including "one body part + one spatial pathway." 2. Advanced students may voluntarily add level or direction changes. 3. Students should be able to briefly explain their movement choices.

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