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RESEARCH ARTICLE

The Effect of O2O Teaching Modules Based on Social-Emotional Learning (SEL) on Dance Students' Imagination

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ABSTRACT

Dance education values the imaginative over and above technique; however, traditional studio teaching does not generally include systematic creativity modules. Within this context, integrating Online-to-Offline (O2O) pedagogy with Social-Emotional Learning (SEL) can aid in the development of creative abilities among dancers. A quasi-experimental pre-test–post-test approach was used for the following study. An intervention was designed for a definite period. Additionally, two groups were used: control (90 students) and experimental (90 students). The results of the pre-test and post-test were analysed through statistical analysis. The results showed that there was a positive impact of such integrated classes. Specifically, high-interaction situations were observed to have been impacted by role-playing and imagination. Contrarily, similar improvements were not observed in the control group supporting the findings. The findings asserted the potential application of the integrated SEL and O2O model in dance classes for the enhancement of metacognition. In terms of metacognition, it can be recommended to develop similar classes for dance students with metacognitive reflection and the offline embodied cooperation.

Contribution/Originality: This study contributes to the existing literature by integrating social-emotional learning frameworks with visual methods to examine children's emotional expression and imagination, offering new insights into pedagogical practices that bridge digital and physical learning environments effectively.

1. Introduction

Imagination is a core element in dance education, functioning as the connection between technique and artistic expression. Imagination helps dancers to represent stories, respond to choreographies, and convey emotions that resonate with audiences (Bläsing & Zimmermann, 2021). Technical skill enables dancers to perform movements with accuracy. Without imagination, dance could be reduced to a mechanical task without creativity and sincerity. Research also indicated that imagination in the performing arts not only stimulates creativity but also critical thinking, adaptability in problem-solving, and innovation in art practice (Bläsing & Zimmermann, 2021). Therefore, an educator needs to develop the skill of imagination in combination with physical training.

Creativity, imagination, and attention development is developed by Social-Emotional Learning (SEL). In turn, it focuses on self-awareness, social awareness, responsible decision-making, self-management, and relationship-building (Gotlieb et al., 2016). Social competency, or responsible decision-making skills or even concepts related to self-management are relevant for those who are dancing. This is especially relevant for those who are usually working within teams (Ala-Mutka, 2022; Braun, Kotera, 2022). Moreover, it has been reported that SEL promotes openness, risk-taking, and reflective participation which are elements to support the creative thinking processes and imaginative abilities (Weissberg, n.d.). After that, a dancer who develops consciousness and caring for themselves through SEL training could potentially find it easier to get involved with different roles or emotions required for performance. Hence, incorporating SEL principles in dance education may also provide an organized and structured scaffolding of tools for the creative and imaginative learning process that conventional teaching might not offer.

Simultaneously, changes in pedagogy is leading the implementation of technology-enhanced learning modules, such as Online-to-Offline (O2O) learning. O2O learning combines online instruction with offline practice in a bid to leverage the advantages of both learning spaces (Wang & Fan, 2023). For dance education, O2O learning can revolutionise because theoretical underpinning, choreography analysis, or reflective tasks can be conducted online, while bodily practice and expressive exploration take place offline at dance studios. Notably, O2O modules naturally foster reflective practice, autonomy of the learner, and collaborative participation, which are all consistent with the objectives of SEL-based imaginative learning (Lee & Lim, 2023). Therefore, the O2O can be an instructional module, built on SEL principles, as a possible way to meaningfully improve imagination among dance students. These are consistent with the objectives of SEL-based imaginative learning. Identifying the necessity of imagination to dance, the ability of SEL to nurture creativity, and the groundbreaking nature of O2O education highlight the scope to study empirically how these methods can be integrated. Connecting the O2O pedagogical module to SEL in dance education is based on the argument that technology integration by itself cannot meet all of the students' affective and creative requirements. Within this context, O2O modules allow for adaptable access to theoretical material (Lee & Lim, 2023). However, without intentional development of self-awareness, emotional management, and collaboration skills, digital aspects can end up as lifeless deliverables instead of inspiring creative exploration. While restrictive factors like stage fright, peer observation, and absence of organised creative guidance further constrain imagination development (Payne & Costas, 2021). Therefore, integrating SEL in O2O pedagogy guarantees that online modules generate trust, reflective discussion, and risk-taking attitudes (Saluja, 2025). Thus, it would lead to

richer, more creative offline choreography and performance. This synergy is claimed to reduce affective barriers, foster creative confidence, and ultimately broaden students' imaginative abilities beyond traditional technique-focused pedagogy. Thus, the study aimed to effect of the O2O teaching module based on SEL on Dance students' imagination.

RQ: What is the effect of the O2O teaching module based on SEL on Dance students' imagination?

2. Literature Review

2.1. Imagination in Dance Education

Dance education entails the integration of cognitive sophistication and creative expression. Modern neuroscience shows that dance engages "neurobehavioral processes in seven different areas, including sensory, motor, cognitive, social, emotional, rhythmic, and creative" spaces, and imagination as the integrating mechanism that brings these several systems together (Basso et al., 2021). Theoretical models of imagination in performing arts locate the construct as ontologically embodied over strictly cognitive. Cappello et al. (2024) discussed that imagination is theorized as a "kinesthetic response to a stimulus" that arises through "cultivating sensitivity to qualitative aspects of movement" and fosters "a creative interaction between kinesthesia and perception". Within the context of dance, kinesthetic imagery (sensations of body movement), auditory imagery (music accompaniment), and interoceptive imagery (internal emotional responses) form three different connected systems (Christensen & Borhani, 2020). This understanding goes beyond classical Cartesian mind-body distinctions, placing imagination as emerging "inside movement" through "complex psychophysical tensions" that spread beyond typical bodily routines.

However, critics state that extant imagination-based pedagogies of dance education still fall short of being systematic enough (Christensen & Borhani, 2020). For example, dancers are frequently assigned to warm-up sessions instead of being dispersed throughout learning cycles. Literature suggests that although creative dance interventions can boost cognitive flexibility, attention span, and problem-solving ability among children, the transference of these outcomes among adolescent and adult learners still needs to be investigated more rigorously (Bicenturk, 2024). Additionally, empirical research indicates that the development of imagination in dance can be extremely personal, with "meaning construction" being "a highly perceptually individualised process" that differs considerably between students depending on their experiential contexts (Konstantinidou, n.d.). This highlighted important questions regarding the viability of standardized imagination-improvement methods to respond to various learning demands in dance education environments.

The relationship between cognitive needs and creative potential in dance apparently is reciprocal (Bläsing et al., 2012). On the other hand, imagination contributes to the integration of complex motor, affective, and aesthetic content (Basso et al., 2021). Thus, by recognizing the dual complexities of intellect and imagination, one can foster artistically cognizant and creative musicians. Hence, there is a need for continuing cognition to perform in dance, also enhancing imaginative skills via increased neural synchrony and cross-domain connections. This suggested that effective dance education

should deliberately combine the development of technique with the nurturing of the imagination.

2.2. Social-Emotional Learning (SEL) Framework

There is strong evidence connecting SEL to imagination and creativity through numerous pathways. The conceptualisation of SEL is generally summarised in five mutually interrelated skills: self-awareness, self-management, social awareness, relationship skills and responsible decision-making (Lawlor, 2016). . First, SEL builds emotional regulation and openness (Taylor et al., 2017). Thus, it is associated with divergent thinking, idea generation, and tolerance for ambiguity, all central to creative exploration. Second, SEL-dense environments foster psychological safety, allowing students to experiment aesthetically, improvise without fear of mistakes (Ala-Mutka, 2022). Third, empathy (social awareness) broadens imaginative scope by broadening perspective-taking (Adelphi University, 2023). Thus, dancers map others' experiences into expressive form, deepening narrative depth and character embodiment. Lastly, collaborative decision-making and relationship skills support ensemble creativity. Groups that have better SEL capabilities interact more smoothly, share feedback constructively, and co-create higher-level solutions in intricate choreographic tasks.

Reflectively situating SEL as an engine of imagination reorients creative development from a solitary cognitive process to a relational, affective, and ethical process. Pragmatically, it prepares learners to manage the affective needs of performance, rehearsal, and critique, thus maintain the curiosity and resilience necessary for imaginative development (Lawlor, 2016; Taylor et al., 2017). The embodied nature of “meaning” is more deeply felt in dance, where meaning grows from bodies-in-relation and from moment-to-moment attunement. It offers a more organized inventory of competencies that can be fostered into or toward the dispositions for creative acts. Furthermore, there is a two-fold case for teaching SEL in dance. Thus SEL is not only“compatible”with dance-making, but it is also constitutive of the imaginative conditions through which artistry in dance emerges.

2.3. O2O teaching module in the Arts

The foundation theory of the complementarity O2O model, integrating and Social-SEL in creative education, is based on the mechanisms of complementarity. Design sequence of O2O is a case for aiding the separation of cognitive and reflective work. In contrast, embodied social praxis, SEL develops personal and social dispositions that promote creative risk-taking, collaboration, and long-term imaginative engagement (Geesa et al., 2022; Haiken & Gura, 2023). O2O modules in online components can be used to accommodate reflective journals, peer review, video self-assessment, before transitioning offline for action and further refinement of embodied ideas in studio spaces. Thus, it invokes a sense of social awareness and relationship competencies. This layering of structure would transform the creative process into a loop: ideation and metacognition in the online; experimentation, improvisation, and ensemble attunement in the offline. Thus, there is an increase from each step in SEL competencies associated with perseverance, openness, and creative thinking.

For performance-based subjects like dance, theatre, and music, O2O offers unique benefits. Firstly, pre-studio online modules can provide scaffolding in choreography analysis, musicality, and dramaturgical context to allow students to arrive in the studio

with a common vocabulary and better creative intentions (Hodges et al., 2020). Second, self and peer review based on video creates metacognitive consciousness and facilitates intentional practice cycles (Adelphi University, 2023). Additionally, slow-motion, split-screen, and annotation capabilities make technical mistakes and expressive subtleties more apparent than in real time alone. Third, digital communities of practice carry creative incubation outside of class time, and face-to-face sessions move those cognitive and social gains into embodied experimentation and ensemble synchrony. This coordination closes a chronic gap in performance training whereby students tend to be great at repetition but not reflective transfer; O2O's iterative structure is explicitly training both.

2.4. Integration of O2O and SEL in Creative Education

Theoretically, the integration between the O2O teaching mode and Social-SEL features in creative education on the mechanism. O2O design series makes the best use of the division of labour between the thinking and reflecting work. On the other hand, enacted social practice, SEL fosters intrapersonal and interpersonal dispositions that enable creative risk-taking, collaboration, and sustained imaginative engagement (Geesa et al., 2022; Haiken & Gura, 2023). Online interactions in O2O modules may also be used to help students generate reflective journals, peer review, and self-assessment about video-rhetoric before going back offline into studios to enact and grow embodied ideas at work in studio relationships (Hargeaves, 2010). This type of structure could represent the creative process, a kind of cycle. It would involve the conceptualisation and meta-cognition in the online; the practice, the improvisation, the moments where the group comes ‘into line’ offline. Consequently, every model stage nurtures the kinds of SEL skills known to increase perseverance, openness and creative flexibility.

On the other hand, anticipated effects on imagination for dance majors are improved originality and fluidity of movement conceptions through psychologically safe, feedback-rich processes. Additionally, it also entails a larger narrative and emotional scope through enhanced empathy and self-knowledge, and increased aesthetic risk-taking facilitated by self-regulation and responsible decision-making. Thus, the theoretical and practical overlap of SEL and O2O implies an integrated path to enhance imaginative capacity in dance education through integrating the way students think, feel, relate, and move with where and when they learn.

2.5. Research Gap

Current scholarship validates three areas independently. That is, the embodiment of imagination in dance as a cognitively nuanced capacity, the affirmative influence of SEL upon creative dispositions and psychological safety and the educational potential of O2O for pairing reflective preparation with embodied practice in higher education (Hodges et al., 2020; Jones et al., 2017; Taylor et al., 2017). However there is a lack of empirical research synthesizing these areas to try to find out if an SEL-informed O2O module can causally increase imagination in dance students. Similarly, O2O research infrequently operationally defines SEL competencies or creative products beyond proxies for engagement or achievement, whereas SEL-in-arts findings frequently are without experimental designs and domain-specific performance measures (He, 2022; Yang et al., 2020). The present study addressed these gaps through the use of an experimental design to assess whether an O2O module overtly integrating SEL competencies produces measurable improvements in dance imagination.

3. Methodology

3.1. Research Design

The study used a quantitative experimental study. The rationale for a quantitative method is threefold. Firstly, imagination change can be measured based on validated psychometric scales capturing fluency, originality, and elaboration and provide estimation of reliability and effect size calculation (Plucker, 2023). Secondly, pre–post measurement facilitated within-person change estimation and between-group comparisons based on higher statistical power compared to post-only designs (Shadish et al., 2002). Third, the O2O+SEL intervention's structured form is open to fidelity checks and analyses, reinforcing internal validity. The experimental design struck a balance between rigour and ecological validity in studio pedagogy, where scheduling, cohort solidarity, and instructor assignment limit random assignment. Thus, it enhanced the plausibility of causal inference of observed gains in imagination.

3.2. Participants

The research consisted of 180 fourth-grade dance students randomly assigned to two groups: control (n=90) receiving traditional teaching and experimental (n=90) receiving the O2O+SEL intervention. Fourth-grade students generally included students of age 10, who are correspond to Piaget's concrete operational stage, where children increasingly use symbols representationally (McLeod, 2025). Thus, they would provide readiness for structured, scaffolded creative tasks. Utilising intact classes retained ecological validity in studio-based higher education while minimising disruption to timetables, a routine and justifiable strategy in experiments where random assignment is impractical.

Inclusion criteria were program-level technique and composition course enrollment during the study period; participation consent; and availability for pre-test and post-test windows. Exclusion criteria were injury or illness that restricted participation in embodied tasks, incomplete baseline data, or co-enrollment in specialised creativity workshops that would contaminate results. Pre-existing dance experience, practice hours per week, and recent performance experience were documented to facilitate covariate adjustment and moderation analysis, as prior associations between practice effort and creative dance performance have been established. Groups were assigned on each cohort to ensure non-cross-contamination; instructors were informed of fidelity procedures. This sampling frame achieves internal validity versus true program delivery, and open reporting of demographics, checks for equivalence, and attrition facilitate interpretability and generalizability

3.3. Intervention

The intervention combined a staged Online-to-Offline (O2O) format with articulated Social-Emotional Learning (SEL) skills to facilitate reflective cognition as well as embodied creative practice. Every week's cycle included:

i. online pre-class modules (60–90 minutes): microlectures on choreographic tools, exemplary video analysis, guided reflective journaling, and peer review based on rubrics;
ii. offline studio sessions (120 minutes): improvisation, transfer of technique, ensemble exercises, and coached composition; and
iii. online post-class debriefs (30 minutes): self-reflection and setting goals.

This "prepare–practice–reflect" design was supported by evidence that hybrid models improve self-regulation, motivation, and skill transfer if online products inform specific face-to-face coaching (Hodges et al., 2020; Zhao & Zhang, 2022).
SEL was integrated with designed routines aligned with the five competencies:

i. Self-awareness: pre-class mood checks and movement metaphors in journals.
ii. Self-management: weekly SMART goals, performance-anxiety coping plans, and timed iteration exercises.
iii. Social awareness: perspective-taking prompts during video review and audience-response activities.
iv. Relationship skills: rotating roles (mover, observer, coach), trust-building duets, and ensemble synchronisation protocols.
v. Ethical decision-making: safety talks, ethical authorship in choreography, and thoughtful trade-off analyses when making creative decisions.

The intervention lasted 8 weeks, with one weekly O2O cycle. This length was long enough to detect pre–post change while allowing multiple rounds of feedback loops and fidelity checks. Thus, the design uses online environments for metacognition and socialization, and offline studios for kinesthetic experimentation and co-regulation.

3.4. Data Collection

Data collection utilised pre–post comparisons. Weeks 1–9 provide the intervention: the experimental group underwent weekly O2O+SEL cycles, and the control group received conventional teaching. Week 8 administered the post-test via the same imagination instrument and administration procedures to minimize instrumentation bias, in addition to exit surveys on engagement and perceived learning. Make-up sessions within a 1-week timeframe resolve absenteeism. This pacing ensured adequate exposure for measurable change while safeguarding against maturation and history threats, with regular timing within cohorts confining differential testing effects.

3.5. Data Analysis

Analyses were conducted according to intention-to-treat. Within-group change (pre→post) in Fluency, Flexibility, and Uniqueness was assessed using paired t-tests in experimental and control groups, presenting mean differences, 95% CIs, t, df, and p. Between-group effects were estimated via independent-samples t-tests on change scores (Δ=post−pre), with Hedges' g and 95% CIs. Additionally, hierarchical regression with mean-centred predictors such as, interaction, role-playing, and their interaction was used for testing moderation. Here, simple slopes at ±1 SD were used to probe significant interactions. Assumptions (normality through K–S/Shapiro–Wilk; linearity, homoscedasticity) were assessed, and false discovery rate was managed across families of tests.

4. Results

Within-group analyses were first conducted to assess whether significant changes occurred from pre- to post-intervention. Results from the normality tests (Table 1) indicated that the assumption of normal distribution was met for all variables in both the experimental and control groups (all $p > .05$). It justified the use of parametric statistical procedures in subsequent analyses. Although the Kolmogorov-Smirnov test

yielded a borderline significant result for the uniqueness dimension in the experimental group (p = .037), the Shapiro-Wilk test showed a non-significant outcome (p = .068). This discrepancy suggested that the deviation from normality was not substantial, and thus the dataset was considered adequately normal for parametric analysis.

Table 1: Test of Normality for Post-text Imagination Scores

Group	Dimension	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	df	Sig	Statistic	df	Sig
Experimental Group	Fluency	0.070	90	0.338	0.990	90	0.709
	Flexibility	0.057		0.659	0.982		0.255
	Uniqueness	0.097		0.037*	0.974		0.068
Control Group	Fluency	0.070	90	0.351	0.980	90	0.196
	Flexibility	0.089		0.076	0.988		0.599
	Uniqueness	0.054		0.739	0.991		0.810
Lilliefors Significance Correction							

Descriptive statistics are presented in Tables 2 and 3. Overall, large gains were obtained in the experimental group in all three dimensions of imagination: fluency increased from 8.03 to 15.43, Flexibility from 5.96 to 12.42, and Uniqueness from 1.18 to 1.80. The control group only showed marginal changes in all the dimensions.

Table 2: Descriptive Statistics for Experimental Group Imagination

Measurement Time	Dimension	N	Minimum	Maximum	Mean	Std. Deviation	Median
Pre-test	Fluency	90	5	11	8.033	2.036	8
	Flexibility	90	2	9.43	5.96	1.512	5.885
	Uniqueness	90	1	1.5	1.175	0.193	1.25
Post-test	Fluency	90	12	19	15.433	2.234	16
	Flexibility	90	7.62	18.16	12.424	1.906	12.27
	Uniqueness	90	1.5	2	1.797	0.198	1.75

Table 3: Descriptive Statistics for Control Group Imagination

Measurement Time	Dimension	N	Minimum	Maximum	Mean	Std. Deviation	Median
Pre-test	Fluency	90	5	11	7.689	2.15	7
	Flexibility	90	2.45	9.58	6.036	1.434	6.07
	Uniqueness	90	1	1.5	1.194	0.198	1.25
Post-test	Fluency	90	5	12	7.933	2.049	8
	Flexibility	90	2.35	10.01	5.905	1.553	6.025
	Uniqueness	90	1	1.75	1.239	0.225	1.25

Paired samples t-tests were conducted to investigate the statistical significances of within-group differences for each, as shown in Tables 4 and 5. Highly significant improvements were clearly observed for the experimental group in all three dimensions: Fluency, with $t = -23.23$ ($p < .001$); Flexibility, with $t = -25.21$ ($p < .001$); and Uniqueness, with $t = -21.37$ ($p < .001$). In contrast, no statistically significant

differences in the control group occurred at all (p > .05 for all), ruling out test familiarity or other external variables as sources of improvement.

Table 4: Paired Samples T-test Results of Imagination Scores in Experimental Group

Dimension	Time Point	N	Mean	SD	MD	95% CI	*t*	df	*p*
Fluency	Pre-test	90	8.03	2.04	-7.40	-8.029 ~ -6.771	-23.23	89	<0.001**
	Post-test	90	15.43	2.23					
Flexibility	Pre-test	90	5.96	1.51	-6.46	-6.97 ~ -5.96	-25.209	89	<0.001**
	Post-test	90	12.42	1.91					
Uniqueness	Pre-test	90	1.18	0.19	-0.62	-0.68 ~ -0.57	-21.366	89	<0.001**
	Post-test	90	1.80	0.20					

*p < .05; **p < .01

Table 5: Paired Samples T-test Results of Imagination Scores in Control Group

Measure	Time Point	N	Mean	SD	MD	95% CI	*t*	df	*p*
Fluency	Pre-test	90	7.69	2.15	-0.24	-0.86 ~ 0.37	-0.78	89	0.436
	Post-test	90	7.93	2.05					
Flexibility	Pre-test	90	6.04	1.43	0.13	-0.31~ 0.57	0.59	89	0.556
	Post-test	90	5.90	1.55					
Uniqueness	Pre-test	90	1.19	0.20	-0.04	-0.110~ 0.02	-1.41	89	0.160
	Post-test	90	1.24	0.22					

*p < .05; **p < .01

In particular, the remarkably enhanced fluency and flexibility measures gained most substantially. The fluency measure gained almost two-fold, underlining a strong and steep increase in both the amount and rate of idea generation by the students. Likewise, the scores of flexibility increased by more than 100%. It reflected significant enhancement in cognitive switching and also in the ability to reformulate problems from different angles. Although the novelty gain was small, it reached statistical significance as well. It highlighted significant improvement in originality and novelty in students' capability. This finding is also in line with current theoretical perspectives in creativity research, which emphasize a parallel development of quantity and quality within creative performance. It highlighted the potential of the module for supporting multifaceted creative development. Methodologically, normality tests were used in this respect to check the suitability of parametric statistical procedures and, therefore, to enhance internal validity of results. Non-significant alterations within the control group rule out extraneous intervening variables such as effects of repeated measurements or maturation and point strongly to the effectiveness of the intervention.

Theoretically, the results substantiate and augment the embodied cognition approach. It suggested the embodiment of central involvement of body perception and motor know-how in higher-order processes like imagination. By uniting body movement with imaginative expression, the dance module activated several neurocognitive channels. It enhanced the representational richness and versatility within students' cognitive schemas, and improvement of the general integrative capability of their cognitive systems. It exceed benefits provided by conventional, language- or symbol-based teaching methods.

A hierarchical multiple regression was conducted with imagination as the dependent variable, role-playing as the independent variable, and interaction as the moderator (see figure 1). Role-playing and interaction were mean-centred before analysis to minimize multicollinearity and enhance interpretability (Table 6).

Table 6: Description of research variable processing

Type	Name	Data Type	Data Processing
Dependent Variable	Imagination	Quantitative	No processing
Independent Variable	Role-playing	Quantitative	Mean-centering
Moderator Variable	Interaction	Quantitative	Mean-centering

Module 1 added the moderator variable interaction. Role-playing remained a significant predictor at this step, with a B-value of 0.186 and a p-value of less than 0.001. Interaction had a significant negative effect on imagination, B = -0.105, p = .012. Adding the interaction term to the module increased its explanatory power to 7.7%, R^2 = 0.077, resulting in a modest change in variance explained, ΔR^2 = 0.019 and p = .012. Module 2 included the interaction term created between role-playing and interaction; this was significant (B = 0.285; p <.001), indicating that the moderation effect was meaningful. These results supported the level of interaction could be improved through O2O SEL.

Table 7: Moderation analysis results of role-playing and interaction on imagination

	Module 1					Module 2				
	B	**SE**	***t***	***p***	***β***	***B***	**SE**	***t***	***p***	***β***
Constant	3.713	0.033	112.350	0.000**	-	3.707	0.031	118.018	0.000**	-
Role-playing	0.186	0.041	4.522	0.000**	0.245	0.184	0.039	4.731	0.000**	0.243
Interaction	-0.105	0.042	-2.520	0.012*	-0.137	-0.074	0.040	-1.857	0.064	-0.096
Role-playing*Interaction						0.285	0.048	5.918	0.000**	0.307
R^2	0.077					0.169				
Adjusted R^2	0.071					0.161				
F	*F* (87) =13.051, *p*=0.000					*F* (86) =21.313, *p*=0.000				
$\triangle R^2$	0.019					0.093				
$\triangle F$	*F* (87) =6.350, *p*=0.012					*F* (86) =35.017, *p*=0.000				

5. Discussions

The improvement of the experimental group's imagination was very high after the intervention and large effect-sizes appeared in the following conditions. These were found statistically significant for Fluency, Flexibility and Uniqueness. The tendency corresponds to evidence that technology-enriched O2O modules do dramatically improve learner achievement and soft skills as well, though satisfaction level remains high. In contrast, the control group had no significant changes on any dimension, confirming that improvement cannot be attributed to testing effects or maturation. Mediation analysis gives crucial insight into how the intervention works.

The O2O module also featured role-playing as a major SEL strategy. It projected fantasy onto high interaction terms. However, for low interaction, no difference was observed. This is in line with the argument that imagination emerges for dance by means of social interaction and perspective-taking in the body. In addition, the moderation analysis identified the processes explaining why the intervention functions. This was in line with the aim of the O2O model, that was the pre-class online preparation and the offline collaborative practice. The interaction terms suggested that creativity is enhanced within the computational social environment in which human skills, such as empathy, social awareness, and relationship skills, are incorporated. The interaction effect indicated that SEL aspects, especially empathy, social awareness, and relationship skills, can induce positive creative outcomes in an interaction-rich environment like O2O.

These findings substantiate the conceptual framework placing imagination as both cognitively challenging and socially mediated. Evidence showed that dance education develops SEL abilities like social awareness, emotional regulation, and supportive relationships, while O2O modules utilise online environments for contemplation and offline settings for practical practice (Pachniak, 2022; Y. Zhao et al., 2024). The large gains in Fluency and Flexibility point to greater divergent thinking and cognitive flexibility, whereby, when students are psychologically safe to take aesthetic risks. The significant gain in Uniqueness points to the intervention having transcended idea generation to encourage actual originality, in keeping with evidence that SEL-dense settings support creative risk-taking and innovative expression.

The findings of the current study further add to the existing research. A study on the evaluation of a creative dance program on preschool children's motor creativity, reporting statistically significant gains with a large effect size (Thomaidou et al., 2021). Though their emphasis was placed upon motor creativity in young participants, the significant effect corroborates the current study's large imagination gains on the dimensions. As such, it was suggested that these dance interventions bring significant cognitive-creative benefits. Differences emerged, however, when we considered intervention design. The effect sizes obtained for the O2O+SEL module were larger than those typically reported in the literature on dance creativity. For example, Thomaidou et al. (2021) recorded significant improvement in one creativity area, while the present intervention achieved significant gains on three dimensions of imagination simultaneously. This implied that the combined O2O+SEL approach could potentially be more effective than conventional face-to-face creative dance interventions. It could be attributed to the integration of both technological scaffolding and direct socio-emotional skill acquisition.

The findings of moderation add unique insights to the literature. While past research has shown dance's ability to improve SEL skills like grit, social awareness, self-efficacy, and emotional regulation, no studies have looked into how exactly these skills interact with certain teaching methods to impact creative performance (Chakraborty et al., 2024). The current study found that role-playing success is highly contingent on interaction quality establishing how SEL integrated within O2O can enhance the art form. Such success aligns with the increase social skills and psychological engagement observed through SEL (Calçada & Gilham, 2022). Thus it adds to social richness to moderate creative gains. Notably, the current findings contradict suppositions regarding best delivery modalities in dance education. However, the Paul Hamlyn Foundation's extensive inquiry into arts education came to the conclusion that "dance appears to lend itself less well to digital approaches due to the importance of hands-on, haptic experiences" (Müller et al., n.d.).

Current results indicate that carefully developed blended approaches can indeed enhance creative outcomes. The context here does not seem to be selecting online over offline, but rather methodically alternating between the two modes—online for reflection, preparation, and SEL skill development; offline for somatic practice and interactive collaboration. The current study showed unequivocal support for scalable, technology-augmented imagination development methods in higher education dance settings.

Given these findings, several important practical implications can be derived. First, schools should construct the staged O2O architecture, with dramaturgical rehearsals, journals, and peer review occurring online in the websites. It then proposes offline studio work on embodied trial-and-error learning and on ensemble collaboration. Actionable recommendations could be extracted for dance teachers who intend to encourage students' imaginations through evidence-based pedagogy. This series encourages students to "think their way into" a play and "move their way" into a new cognitive dance play experience of multiple preferred modes of learning. The backdrop of this creative risk zone is made stable and secure through a series of structured routines involving self-awareness (mood checking, somatic reflection), social awareness (perspective-taking exercises), and relationship skills (trust-building rituals, rotating partnership roles).As such, intentional integration of SEL should not be an add-on to the dance curriculum. The most interesting finding on moderation, however, is the planning for a high interaction environment. Finally, role-play is a very high-voltage way of investing in interaction-rich environments. That makes imagination a qualitative abstraction and ontology a teachable, quantifiable skill upon which skilled dance practice depends.

6. Conclusion

The purpose of the present research was to investigate the effects of Online-to-Offline (O2O) instruction of Social-Emotional Learning (SEL) in students' dance imagination at the undergraduate level. The experimental group had significantly positive improvements in all three areas of imagination, including Fluency, Flexibility, and Uniqueness. But there is no obvious change in the control group. Fluency significantly increased in the number of ideas generated. Flexibility also improved, likely indicating an increased ease of transition among different types of movement, as well as of responding with creativity to unknown choreography conditions. Novelty added in the outcome resulted in a demonstrated increment of originality measured. These findings confirmed that an intentionally staged O2O module is a powerful catalyst of imagination in dance. In addition, moderation analysis indicated that role-playing, a central SEL-aligned exercise, robustly predicted imagination gains only in high-interaction conditions. While students were in highly interactive contexts, role-playing cultivated co-regulation, empathy, and perspective-taking and amplified creative outcomes; in low-interaction conditions, its influence disappeared. This result highlighted the social and relational character of dance imagination and confirms that SEL strategies must be employed within socially supportive, feedback-rich contexts to yield maximal benefits.

Though its contributions, this research has some limitations. Firstly, the quasi-experimental intact class design, as ecologically valid as it is, restricts making fully causal inferences. Without random assignment or baseline-adjusted between-group statistical procedures like ANCOVA, there is some risk of unmeasured differences in cohorts affecting the findings. Second, imagination was measured with a quantitative

survey questionnaire assessing Fluency, Flexibility, and Uniqueness; although these dimensions fit with creativity theory, they do not necessarily assess narrative depth or emotional subtlety. Consequently, it would need qualitative or observational assessment. Third, the intervention was implemented in a single academic term with a sample taken from a single institution's dance program; this context specificity may pose limitations to generalizability across genres of dance, cultural contexts, and levels of education. Lastly, fidelity measures did not systematically connect individual dosage to outcome, raising questions about minimum exposure required to achieve significant gains.

However, based on the findings, various recommendations could be made. Dance instructors and curriculum developers are encouraged to implement a consciously staged Online-to-Offline (O2O) module that starts with targeted online modules are required to establish conceptual understanding and essential SEL skills before moving into in-studio sessions for embodied experimentation and ensemble collaboration. In both online and offline cycles, SEL practices must be integrated continuously for self-management, perspective-taking exercises for social awareness, rotating partnership roles and trust-building for relationship skills, and responsible decision-making discussions for ethical authorship. Educators must consciously structure studio activity to optimise social engagement, creating the relational density that magnifies imaginative returns. Lastly, instructors must use digital tools for ongoing reflection and feedback, annotating videos with feedback software, using e-portfolios to record and reflect on creative process artifacts. They can also track participation and fidelity to ascertain dosage required for imaginative gains.

Future studies should attempt more rigorous experimental designs, such as randomised controlled trials and baseline-adjusted ANCOVA analyses, to improve causal inferences regarding the O2O+SEL module's effect on imagination. Multi-modal assessment approaches that integrate quantitative imagination scales with qualitative methodology will provide richer information on originality, narrative complexity, and emotional authenticity. Longitudinal studies must explore the maintenance of imaginative gains across future semesters and their transfer to professional practice.

Ethics Approval and Consent to Participate

The researchers used the research ethics provided by the Research Ethics Committee of Universiti Teknologi Malaysia (RECUTM). All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all participants according to the Declaration of Helsinki.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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