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Fostering Artistic Reflection Skills in Student Pre-School Educators Seen as Artistic Competence Development

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Abstract: The purpose of the study is to identify how the instructional model influences students' reflective disposition and how the students perceived the intervention. The study addressed the research questions through the 'Artistic Reflection Scale' for student pre-school educators that consisted of four domains such as students' observation skills, critical analysis skills, evaluation skills, and the occupation application of artistic reflection, and the course satisfaction questionnaire. The study found that the technology of artistic reflection and image creation was effective in fostering students' artistic reflective thinking comprising observation skills, critical analysis, their art output evaluation skills with a focus on sharing their reflective experience with the preschoolers. The artistic reflection scale was proved to be a reliable instrument in measuring students' reflective thinking skills. The study found a change in the artistic reflective skills of the experimental group students was substantially greater than in the students of the control group. After the intervention, there was a shift from the basic level of artistic reflection to the higher levels in the experimental group students, and the proportion of the students being at this stage reduced, while the other proportions increased.

Keywords: *Artistic reflection, higher education, student pre-school educators, technology of artistic reflection, and image creation.*

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Introduction

Artistic competence is of primary importance for pre-school educators because the competence is intended to address the specifics of children's mental development that is mainly based on their emotional development, or emotional intelligence (Grujic, 2017; Vaskivska et al., 2018). The above implies that pre-school educators are supposed to bring up children through the encouragement of their self-expression through different individual, community-building artistic, and cultural activities such as painting, dancing, story-telling, drama, or festivals, cultural events, performances, or exhibitions. It leads to co-constructing or reconstructing pedagogical knowledge together with children's families and local communities. The ever-changing societal contexts make this work challenging for educators and raise the need for reflective competence as they are expected to constantly adjust to diverse, extremely complicated, and unpredictable settings (Yolanda, 2020). Given knowledge and 'practical skills are must-haves, preschool practitioners also need reflective skills which makes artistic reflection an indispensable job skill. The current conventional occupation training system in Ukraine underperforms in developing students' artistic reflection. It means that student pre-school educators are not provided with opportunities to develop their emotional intelligence and critical thinking skills, they are not equipped with psychological and pedagogical tools to analyse their individual emotional experiences and influence children's emotional sphere (Jingjing, 2016). This created a gap for the research.

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Literature review

Literature reveals the artistic competence of pre-school educators from the social pedagogical perspective which relies on the holistic approach to education and care of the preschoolers utilizing individual artistic and cultural activities. Krasovska et al. (2020) state that this approach combines explicit caring tasks with learning which requires a caring attitude to developing children's emotional, social, cognitive, motor, and creative spheres. The "State-wide standard for preschool education" (Pirozhenko et al., 2021) implies that the artistic competence of a pre-school educator unfolds in three dimensions such as didactic, psycho-social, and reflective. The key focus in the document is paid to the artistic reflection that is associated with the preschool practitioners' commitment-driven experiences gained through interpretations of the products of creative arts underpinned by values. These experiences transform into a certain reflective disposition that can be influenced and shared. In the preschool settings, the artistic reflection is important for both an educator and a child provided that it encourages the feelings of value-brining to the community, changing the behaviours and personality through fostering the feelings of belonging, involvement, well-being, and meaning-making in them (Vakkari, 2020). Although reflective practices are revealed in many studies, the review found no unanimity in using criteria and instruments to measure it.

Boud (2010) and Handal (2014) opine that reflective practices are important for instructors. The theoretical framework for artistic reflection relies on reflective theory for teacher training settings (Brandenburg et al., 2017). The theory explains reflection as a flow of four phases such as proactive reflection (or reflection-for-action), in-action and on-action reflection, and beyond-action reflection (Scrivener, 2000). Mirzaeia et al. (2014) outlined five essential reflective thinking skills such as observation, communication, judgment, decision making, and team working. According to Stephens and Tjøstheim (2020), (artistic) reflection involves using cognitive skills such as depiction, interpretation, critical analysis, synthesis, and evaluation. It suggests that artistic reflection involves a detailed examination of the artworks and cultural activities in the context of teaching and learning situations or experiences. This examination can be based on an analysis of undergraduates' personal experiences or feelings, their thoughts or judgments, and actions or behaviors in their future job contexts (Handal, 2014).

Despite the importance, artistic reflection skills have still been beyond the scope of the curriculum of students majoring in "Preschool education" at universities in Ukraine (Krasovska et al., 2020). Though the students are trained theoretically in their occupational fields such as music, dancing, drama, or visual artists, they lack reflective practices aimed at developing the students' reflective disposition and related to sharing the disposition with preschool children.

Therefore, the *purpose* of the study is to identify how the instructional model influences students' reflective disposition and how the students perceived the intervention.

The research questions were as follows:

a) to identify whether the designed artistic reflection scale for undergraduates in pre-school education was valid.

b) to identify how the instructional model influences students' influenced students' observation skills, critical analysis, their art output evaluation skills with a focus on sharing their reflective experience with the preschoolers;

c) to examine how the students perceived the intervention.

Methodology

The "Artistic Reflection Scale" (ARS) for student pre-school educators (see Appendix A) was designed under three criteria of reliable and accurate questionnaire outlined by Choy et al. (2019). These were as follows: short length, addressing various areas of reflection, and sufficient degree of reliability. The artistic reflection domains for the study were as follows: students' observation skills, critical analysis skills, evaluation skills, and the occupation application of artistic reflection.

Research design

Quasi-experimental research based on combination designs was used to organise the study (Price et al., 2015). This design was chosen because it combines the nonequivalent group design and the pretest-posttest design. It supposes that both the experimental group (EG) and control group (CG) are pre-tested and post-tested, but the CG are not involved in the intervention. The research lasted from September 2019 to the end of December 2020. The study consisted of three key phases such as the design and validation of the ARS for student pre-school educators, pretest and posttest type of intervention, and data analysis. The procedure of validation of the ARS involved two phases that relied on the reliability analysis, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA).

The outline of the technology of Artistic Reflection and Image Creation (ARIC)

The pretest and posttest intervention used the technology of artistic reflection and image creation (ARIC). It was embedded in the 4-credit ETCS course entitled "Methods of teaching art to preschool children" to upgrade it. The technology relied on individual abilities and features of preservice educators. It was intended to develop the EG

students' awareness of the importance of reflection for personal life and professional practice. The latter was supposed to achieve through the systematic training of Ss' empathy, influencing their self-insights, self-improvement, adequate self-esteem. The technology was supposed to form the Ss' reflexive skills, foster their ability to solve problem situations in personal and professional spheres, encourage them to implement their programmes of personal and professional self-development by drawing their focus on understanding the role of art as a significant tool in the formation of a common, pedagogical and reflective culture.

The ARIC technology was based on the principles which were as follows: 1) unity of three environments (educational; professional (training combined with professional practice and carried out in the appropriate forms) and social (indirect learning influences the formation of new values and meanings in life, as well as participation in organised communicative processes); 2) synthesis of educational approaches (taking into account the ideas of cultural, personality-oriented, competence, axiological, acmeological approaches); 3) systematicity, consistency, and continuity; relying on subjective experience; 4) electivity (providing the learner with a certain freedom to choose goals, content, forms, methods, sources, means, terms, time, place, and evaluation of learning outcomes); continuous support; 5) positive incentives; 6) creation of a corporate atmosphere of learning, mutual trust, and respect, cooperation, and mutual support; 7) creating a situation of success.

The development of future teachers' artistic reflection took place through four phases such as goal-setting, organizational, operational, and reflective, and prognostic. Figure 1 presents the activities that were used in each phase.

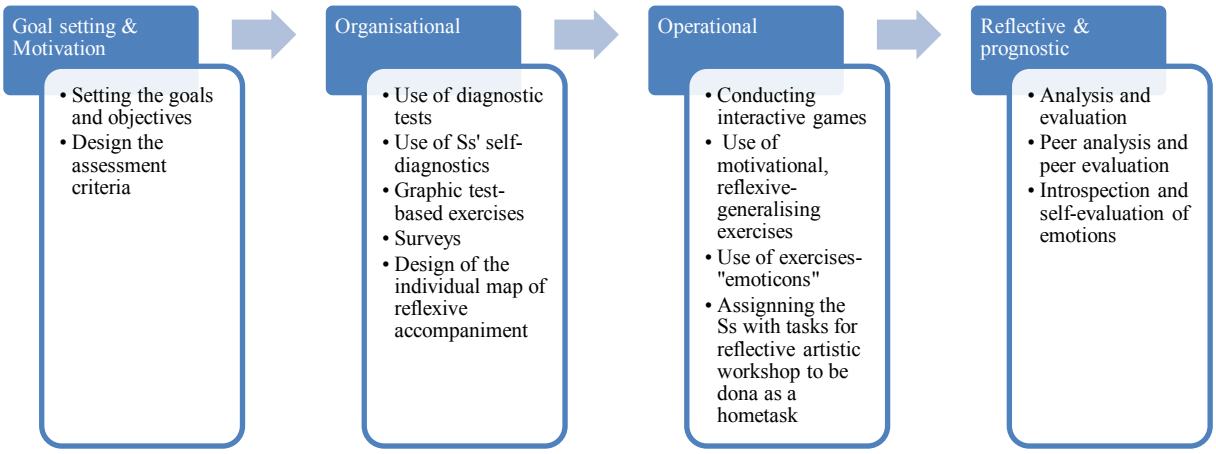

Figure 1. The outline of the phases of the development of future teachers' artistic reflection

The ARIC technology used the methods and activities as follows: 1) cognitive learning methods (methods of concentrated learning, critical thinking, commenting, heuristic observation, comparisons, facts, researches, hypotheses, predictions and mistakes) provided an effective solution to educational goals and develop information acquisition and processing skills; 2) cooperative learning methods (interviewing method; small group training; team learning; group generation of ideas; intergroup dialogue; projects, group puzzle or mosaic, I-You-We technique and oral diary of artistic impressions) formed the skills of cooperation, interaction, responsibility, moral support, dialogue, discussion, conflict resolution and management functions; 3) interactive learning activities such as "aquarium", "Brownian movement", "cluster", "Raven's dialogue", "Socrates' dialogue", "diagram of Vienna", "carousel", "corners", "microphone", "debate", "brainstorming", "unfinished sentences", "looping discussion", "the press", "Tornado", the "6x6x6" technique, and games such as "Six Thinking Hats" and "Six Pairs of Shoes" to create the learning environment for the future preschool educators to discover, acquire, and construct their knowledge and their competence in artistic self-reflection; 4) method of imitations or role-playing that involved the use of the method of a metaphor, games (role-plays, simulations, the business theater, blitz-performance); 5) psychological practices to develop empathy, psychological or pliable etudes through the psycho-gymnastics, meditation and relaxation exercises that are aimed to contribute to the modelling of various personal and professional situations, development of emotional culture skills; 6) method of graphic models or illustrative that used the frame approach, diagrams, table KWF, graphic exercises, poster symbolic visualization, projective techniques, art techniques to combine the verbal presentation of the learning content with its symbolically-verbal image so that the method facilitated the self-learning processes and forming relevant theoretical concepts; 7) diagnostic methods such as a biographical method (history of the act) along with the acmeological techniques, interviews, questioning, surveys, diagnostically-emotional exercises to determine the level of relevant characteristics and indicators of behavioral manifestations, conditions and future educator's development, stimulated for further self-education.

Ethical considerations

To pilot the ARS, informed consent was obtained from the respondents before the scale was administered. The students were informed about the volunteer basis of participation. Confidentiality and anonymity of any data they provide were guaranteed by the research team. The students were told that there were no correct or incorrect answers to the questions.

Sample

The first pilot of the "Artistic Reflection Scale" for student pre-school educators that included reliability analysis and Exploratory Factor Analysis (EFA) relied on the random sampling method. The method was used to hire 179 students seeking a Bachelor's degree in preschool education, teaching arts, drama, and music at Nizhyn Gogol State University (NGST) (Ukraine) and Bohdan Khmelnytsky National University of Cherkasy (BKNUCh) (Ukraine) to take the draft version. One hundred and sixty-one valid responses were obtained – from 76 students (7 males and 69 females) for NGST and 85 students (4 males and 81 females) for BKNUCh.

The second pilot of the ARS that attempted to perform the Confirmatory Factor Analysis (CFA) also used the random sampling method. In this phase the ARS was administered to 350 respondents who sought a Bachelor's degree in preschool education, teaching arts, drama, and music at the Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University (VSPU) (Ukraine), Hryhoriy Skovoroda State Pedagogical University of Pereyaslav-Khmelnytsky (HSPU) (Ukraine), and Zhytomyr Ivan Franko State University (ZhSU) (Ukraine). Totally 343 valid responses were returned from 88 students (12 males and 76 females) for VSPU, 132 students (33 males and 99 females), and 123 students (27 males and 96 females) for ZhSU.

The convenience sampling method was used to involve the students at Borys Grinchenko Kyiv University (BGKU) and the National Pedagogical Dragomanov University (NPDU) to participate in the experiment. Two classes of undergraduates majoring in preschool teaching and learning – doing the 4-credit ETCS course in "Methods of teaching art to preschool children" – were chosen to form experimental groups and control groups. The demographic characteristics of the sampled students are presented in Table 1.

Table 1. Demographic characteristics of the sampled students who participated in the experiment ($n = 119$)

Demographic features		**BGKY**		**NPDU**		**Mean**	**SD**
		EG (n, %)	**CG (n, %)**	**EG (n, %)**	**CG (n, %)**		
Year of study	3rd ($n_{pool} = 58$)	15 (25.85)	13 (22.41)	14 (24.12)	16 (27.57)	14.5	1.29
	4th ($n_{pool} = 63$)	16 (25.39)	14 (22.22)	17 (26.98)	16 (25.39)	15.75	1.25
Gender	Males ($n_{pool} = 5$)	1 (20.00)	2 (40.00)	0 (0.00)	2 (40.00)	1.25	0.95
	Females ($n_{pool} = 116$)	30 (25.86)	25 (21.55)	31 (26.72)	30 (25.86)	29.00	2.70

The grade point average (GPA) was calculated to measure the students' academic efficiency and to identify whether the groups were homogeneous. The GPA value was 3.54 for EG students and 3.49 for CG at BGKY. It was 3.58 for EG and 3.51 for CG at NPDU. Given that the GPA values for all groups at both institutions were approximately the same and the fact the students majored in the same specialism, the EG and CG were considered homogeneous.

Instruments

The "Artistic Reflection Scale" for student pre-school educators and the course satisfaction questionnaire (Polovina et al., 2021) was used to address the research questions. The Jamovi (2021) computer software (Version 1.8.2) and Statistical Package for the Social Sciences (SPSS, 2019) Statistics software (Version 26.0.0.1) were used to process data.

The scale (see Appendix A) was designed, piloted, and validated before the intervention to measure the students' artistic reflection skills. The scale consisted of 18 questions and four domains. The first three domains such as 'Observation skills', 'Critical analysis skills', and 'Critical evaluation skills' consisted of 5 items. The 'Occupational application' domain comprised 3 questions. The scale relied on 7-point Likert "Reflect Me" Scale with 1 meaning 'Very untrue of me'; 2 – 'Untrue of me'; 3 – 'Somewhat untrue of me'; 4 – 'Neutral'; 5 – 'Somewhat true of me'; 6 – 'True of me'; and 7 – 'Very true of me'.

The scores were interpreted as four levels of artistic reflection skills such as basic, developing, skillful and exemplary. The basic level of artistic reflection skills – Mean = 1 – 2.99 – is referred to as a student's inability to make a distinction of the differences and similarities in the art object or cultural event using two or more senses to observe it and using relevant tools to collect information about it. The level is also characterised by emotional indifference to the observed

art object or cultural event. The level suggests that a student lacks self-insightfulness when observing art objects or even, and lacks professional and psychological awareness and confidence which makes them ready to participate in arts-related discussions and debates. This level means that a student lacks initiative for their professional growth.

The developing level of artistic reflection skills – Mean = 3 – 3.99 – is referred to as a student's basic ability to make a distinction of the differences and similarities in the art object or cultural event using one sense to observe it and using one or two relevant tools to collect information about it. The level is also characterised by a controlled emotional engagement with the observed art object or cultural event. The level suggests that a student partially reflects on the observed art object or even, and partially reflects on their professional and psychological credo which makes them sometimes ready to participate in arts-related discussions and debates. This level means that a student still lacks initiative for their professional growth.

The skillful level of artistic reflection skills – Mean = 4 – 5.99 – is referred to as student's confident ability and awareness of making a distinction of the differences and similarities in the art object or cultural event using one sense to observe it and using one or two relevant tools to collect information about it. The level is also characterised by a moderately controlled emotional engagement with the observed art object or cultural event. The level suggests that a student most times reflects on the observed art object or even, and most times reflects on their professional and psychological credo which makes them generally ready to participate in arts-related discussions and debates. This level means that a student takes initiative for their cognitive, psychological, and professional growth.

The exemplary level of artistic reflection skills – Mean = 6-7 points – is referred to as student's proactive ability and awareness of making a distinction of the differences and similarities in the art object or cultural event using multiple senses to observe it and using multiple relevant tools to collect information about it. The level is also characterised by a full emotional engagement with the observed art object or cultural event. The level suggests that a student always reflects on the observed art object or even, and always reflects on their professional and psychological credo which makes them ready to contribute in arts-related discussions and debates. This level means that a student fully takes initiative and responsibility for their cognitive, psychological, and professional growth.

Course satisfaction questionnaire (Polovina et al., 2021)

The course satisfaction questionnaire consists of 5 questions asking the students to rate the educational effectiveness of the intervention and their satisfaction with the delivery mode, course content and design, and the cognitive and reflective change the intervention brought them. It used two 7-point Likert scales such as an effectiveness scale and a satisfaction scale. The values ranged from 1 meaning "Absolutely Useless/Extremely dissatisfied" to 7 meaning "Absolutely useful/Extremely Satisfied".

Five experts assessed the face validity, construct validity, and content validity of the questionnaire following the recommendation of Taherdoost (2016).

Results

The findings drawn from measurements that were administered before and after applying the ARIC technology proved the effectiveness of the instructional model. These results were supported by the results drawn from the course satisfaction survey. To respond to the first research question being whether the designed artistic reflection scale for undergraduates in pre-school education was valid, the validation procedure of the ARS was performed. It included the preliminary scale content validation, reliability analysis, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA). The scale content validation relied on the involvement of three external experts and two research team members in reviewing and rating the relevance of each item in the scale using the 4-point rating scale with 1 meaning "not at all relevant" up to 4 – "absolutely relevant". The procedure was conducted as recommended by Yusoff (2019). The calculations of the item-level content validity index (IL-CVI) of the scale and the Fleiss' Kappa coefficient was administered to the scale. The IL-CVI value was 0.844 which was sufficient (Polit & Beck, 2006). The Fleiss' Kappa coefficient was -.8105 which means a good level of inter-rater agreement among the raters (Gwet, 2014; Landis & Koch, 1977). The results of the reliability analysis using Jamovi software that relies on the first sample are presented in Appendix B.

The reliability analysis found that the Kaiser-Meyer-Olkin (KMO) measure of sampling index of adequacy was .703 which is satisfactory according to Glen (2016). Following that, EFA was conducted and relied on the data obtained from the second sample. It used a principal axis factoring extraction method in combination with a varimax rotation to identify the unsatisfactory item. A four-factor factor loading analysis with a factor loading of 0.4 was used as the reference value for variable acceptance (see Appendix C for Factor Loading data). The factors were identified along with the domains of the scale such as Observation skills used as Factor 1, 'Critical analysis skills' utilized as Factor 2, 'Critical evaluation skills' used as Factor 4, and 'Occupational application' regarded as Factor 4. Factor 1 scored 15.4 of cumulative %, Factor 2 accounted for 26.9%, Factor 3 accounted for 36.8% and Factor 4 accounted for 45.5%. The summary of model fit measurements is presented in Table 2.

Table 2. Model fit measurements

CFI	RMSEA	RMSEA 90% CI		TLI	Model Test		
		Lower	Upper		χ^2	df	p
0.948	0.0576	0.0582	0.0612	0.959	150	102	< .001

As can be seen in Table 2, the values for CFI (.948), TLI (.959); and the RMSEA (.0576) showed that the model is about a sufficient fit to the data (Coşkun & Mardikyan, 2016). Two outliers (q13, q14) were detected due to the reliability analysis. These items were rewritten differently before the CFA was conducted.

Confirmatory Factor Analysis also used the data drawn from the second sample. In this phase, the values for goodness-of-fit for the model were χ^2 = 240.66, df = 324, p<.001. The results of the confirmatory factor analysis are provided in Appendix D. The factor correlation results drawn from the CFA are presented in Table 3.

Table 3. Factor correlation results drawn from the CFA

Factor	1	2	3	4
Observation skills	1			
Critical analysis skills	.32	1		
Critical evaluation skills	.47	.14	1	
Occupational application	.14	–.17	–.21	1

As can be noticed in Table 3, the strongest correlation occurred between critical evaluation and observation skills ($r = .47$). Interestingly that occupational application correlated negatively with both critical analysis skills and critical evaluation skills ($r = -.17$ and $r = -.21$, respectively).

The model fit measurements provided in Table 4 showed that the scale exhibited a sufficient overall fit.

Table 4. Model fit measurements

CFI	SRMR	RMSEA	TLI	Model Test		
				χ^2	df	p
0.937	0.063	0.0452	0.941	240.66	324	< .001

The values for CFI (.937), TLI (.941), SRMR (.063), and the RMSEA (.0452) showed that the model is a sufficient fit to the data (Coşkun & Mardikyan, 2016; Xia & Yang, 2019). The value for Cronbach's alpha for the entire scale was 0.821 (Mean = 4.13, SD = 0.938) which indicated good internal consistency of the scale. The Item Reliability Statistics is presented in Appendix B. The Cronbach's alpha values (inter-item statistics) for each item that varied from .804 to .822 indicated that items conceptually correlated well with each other (DeVon et al., 2007). The reliability analysis, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA) of the Artistic Reflection Scale proved that it can be used as a valid instrument in this study.

The ARS was then used to identify how the instructional model influences students' influenced students' observation skills, critical analysis, their art output evaluation skills with a focus on sharing their reflective experience with the preschoolers which was the second research question. The Paired Samples T-Test statistics drawn from the pre-test and post-test measurements are presented in Table 5.

Table 5. Results of pretest and posttest measurements yielded from the intervention and based on ARS, EG ($n = 62$), and CG ($n = 59$)

Group	Mean		SD		t	Mean difference	SE difference	p	df
	Before	After	Before	After					
EG	3.54	5.64	0.809	0.692	11.43	–2.097	0.183	< .001	61.0
CG	3.48	3.85	0.729	0.549	2.31	–0.371	0.160	0.028	58.0

As can be seen in Table 5, the change in the artistic reflective skills of the EG is substantially greater than in the students of the CG (the Mean difference for the EG = –2.097 in contrast to –0.371 for the CG). The t-values also suggested that the EG students experienced a more marked change in their artistic reflective skills, $t(61) = 11.43$ than the CG students, $t(58) = 2.31$. The effect size d was also larger for the EG ($d = 2.053$) than for the CG ($d = 0.415$) which implied that

the instructional model influenced students' observation skills, critical analysis, their art output evaluation skills with a focus on sharing their reflective experience with the preschoolers.

It was also important for the study to identify what proportion of the students had basic, developing, skillful and exemplary levels of artistic reflection skills before and after the treatment in both groups (see Fig. 2.).

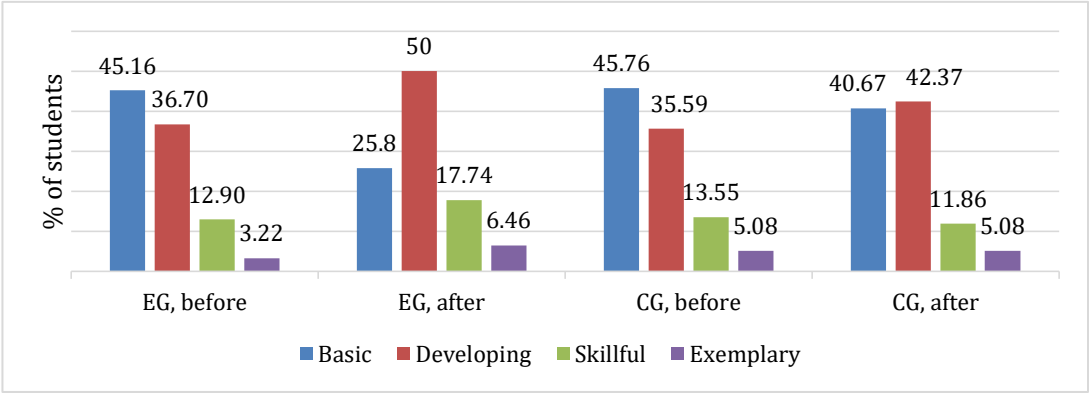

Figure 2. The proportion of the students with basic, developing, skillful, and exemplary levels of artistic reflection skills before and after the treatment in the EG and CG.

As can be seen in Figure 2, the majority of the students in both EG and CG were at a basic level of their artistic reflection skills (EG = 45.16% (28 students) and CG = 45.76% (27 students)) before the treatment. Approximately a third of the students had a developing level of reflection under the study (EG =36.70% (24 students) and CG = 35.59% (21 students)) in the pre-experimental phase, respectively. Approximately a tenth of the students performed artistic reflection at the skillful level (EG = 12.90% (8 students) and CG = 13.55% (8 students)). The rest of the sampled students showed an exemplary level of artistic reflective skills (EG = 3.22% (2 students) and 5.08% (3 students)). After the intervention, there was a shift from the basic level of artistic reflection to the higher levels in the EG, and the proportion of the students being at this stage reduced to 25.80% (16 students), while the other proportions increased (developing level = 50.00% (31 EG students), skillful level = 17.74% (11 students), and exemplary level = 6.46 % (4 students). In contrast to the above, the shift in the CG was slight with the figure of 5.09% of reduction for basic level – the figure decreased to 40.67% (24 students) in the CG, with a 6.78% increase in the developing level – the proportion increased to 42.37% (25 students), with a reverse trend in the "skillful" level that reduced by 1.69% - the proportion shrunk to 11.86% (7 students), and remaining the same the exemplary level proportion of 5.08% (3 students).

Course satisfaction survey results ($n = 34$)

Thirty-four randomly selected EG students were asked to complete the course satisfaction questionnaire online. The descriptive statistics yielded from the survey are presented in Table 6.

Table 6. Descriptive statistics yielded from the course satisfaction survey

	q1e	q2e	q3e	q4e	q5e	q1s	q2s	q3s	q4s	q5s
Mean	6.81	5.74	6.11	5.87	6.77	6.68	6.14	5.65	5.94	6.93
SD	1.17	1.03	1.14	0.957	1.05	1.01	1.00	1.14	1.09	1.02
Kurtosis	1.39	1.45	1.43	1.37	1.32	1.46	1.42	1.44	1.46	1.43
Std. error kurtosis	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221

As can be seen from Table 6, the Mean data screwed right on both scales indicating that the EG students found the technology of ARIC effective in developing their reflective thinking and they were satisfied with the delivery mode, course content and design, and the cognitive and reflective change the intervention brought them.

Overall, the above data implied that the ARIC technology was effective in fostering students' artistic reflective thinking comprising observation skills, critical analysis, their art output evaluation skills with a focus on sharing their reflective experience with the preschoolers. Additionally, the "Artistic reflection scale" for student pre-school educators' was proved to be a reliable instrument in measuring students' reflective thinking skills.

Discussion

The study attempted to address three research questions such as first, whether the designed artistic reflection scale for undergraduates in pre-school education was valid, second, how the instructional model influences students' influenced students' observation skills, critical analysis, their art output evaluation skills with a focus on sharing their reflective

experience with the preschoolers, and third, how the students perceived the intervention. The novelty of the study lies in the design and validation of the 'Artistic reflection scale for student pre-school educators' (ARS), and the use of technology of artistic reflection and image creation (ARIC) which is aimed at fostering students' reflexive skills, their ability to solve problem situations in personal and professional spheres using student-tailored programs of personal and professional self-development and promoting understanding the role of art as a significant tool in the formation of a common, pedagogical and reflective culture of a preschool educator.

The designed artistic reflection scale for undergraduates in pre-school education was proved valid due to the preliminary scale content validation, reliability analysis, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA). The scale content was found valid by the hired experts. Throughout performing the EFA and CFA, values for CFI, TLI, SRMR, and the RMSEA showed that the model is a sufficient fit for the data. Additionally, the strongest correlation occurred between critical evaluation and observation skills ($r = .47$). The value for Cronbach's alpha for the entire scale was 0.821 (Mean = 4.13, SD = 0.938) which indicated good internal consistency of the scale. The Item Reliability Statistics is presented in Appendix B. The Cronbach's alpha values (inter-item statistics) for each item that varied from .804 to .822 indicated that items conceptually correlated well with each other (DeVon et al., 2007).

The study found that the technology of ARIC had brought a substantially greater change in the artistic reflective skills of the EG than in the students of the CG (the Mean difference for the EG = –2.097 in contrast to –0.371 for the CG). The t-values also suggested that the EG students experienced a more marked change in their artistic reflective skills, $t(61) = 11.43$ than the CG students, $t(58) = 2.31$. The effect Size d was also larger for the EG ($d = 2.053$) than for the CG ($d = 0.415$) which implied that the instructional model influenced students' observation skills, critical analysis, their art output evaluation skills with a focus on sharing their reflective experience with the preschoolers. The study of what proportion of the students had basic, developing, skillful and exemplary levels of the artistic reflection skills before and after the treatment in both groups found that the majority of the students in both EG and CG were at a basic level of their artistic reflection skills (EG = 45.16% (28 students) and CG = 45.76% (27 students)) before the treatment. Approximately a third of the students had a developing level of reflection under the study (EG =36.70% (24 students) and CG = 35.59% (21 students)) in the pre-experimental phase, respectively. Approximately a tenth of the students performed artistic reflection at the skillful level (EG = 12.90% (8 students) and CG = 13.55% (8 students)). The rest of the sampled students showed an exemplary level of artistic reflective skills (EG = 3.22% (2 students) and 5.08% (3 students)). After the intervention, there was a shift from the basic level of artistic reflection to the higher levels in the EG, and the proportion of the students being at this stage reduced to 25.80% (16 students), while the other proportions increased (developing level = 50.00% (31 EG students), skillful level = 17.74% (11 students), and exemplary level = 6.46 % (4 students). In contrast to the above, the shift in the CG was slight with the figure of 5.09% of reduction for basic level – the figure decreased to 40.67% (24 students) in the CG, with a 6.78% increase in the developing level – the proportion increased to 42.37% (25 students), with a reverse trend in the 'skillful' level that reduced by 1.69% - the proportion shrunk to 11.86% (7 students), and remaining the same the exemplary level proportion of 5.08% (3 students). The course satisfaction survey showed that the Mean data for students' responses screwed right on both scales indicating that the EG students found the technology of ARIC effective in developing their reflective thinking and they were satisfied with the delivery mode, course content, and design, and the cognitive and reflective change the intervention brought them.

Additionally, to the measurements that were conducted and statistical data that were obtained and interpreted, there were observed some unmeasurable but influential factors that made the formation of the student's artistic reflection complicated. These were as follows: first, some students' hesitance in defining and naming, evaluating, and analysing their own impressions and emotions caused by artistic objects, second, lack of some students' willingness to exercise self-esteem, introspection, self-control, lack of motivation for artistic reflection, third, lack of some students' adequate self-image as a teacher, overestimated or lowered self-esteem, fourth, students' stereotypical idea of the method of conducting artistic classes at kindergartens.

The findings go in line with previous research. These agree with Krasovska et al. (2020) who opine that artistic reflection as a personality trait should be implemented into various activities such as artwork analysis (diary of artistic impressions, watching movies, listening to music, etc.), the world of student's personality and the role of art in it (retrospective reflection), image creation process (situational and perspective reflection), the use of the means of art for one's self-discovery as an individual and teacher (projective methods, artistic techniques), and student teacher's ability to use the artistic activities as a tool for cognition and expression of a child's own "SELF". The study goes in line with Vakkari (2020) and Buschkühle (2020) who state that artistic reflective skills are fostered when the learning environment is based on creating a positive students' mood in the class combined with the appropriate motivation, situation of success, mutual support, the predominance of the dialogical form of communication, individual, pair and group work; reliance on subjective experience in the educational process making this process personally meaningful for the learners. They associate reflection with a reasonable way of solving the tasks, forms, and methods of work, achievement or not the achievement of goals along with evaluation comparing to previous achievements and planned goals, assessment of accomplishments, methods of educational work, efforts made.

Conclusion

The ARIC technology is effective in fostering students' artistic reflective thinking comprising observation skills, critical analysis, their art output evaluation skills with a focus on sharing their reflective experience with the preschoolers. The "Artistic Reflection Scale" for student pre-school educators' was proved to be a reliable instrument in measuring students' reflective thinking skills. The descriptive statistics and results of the Paired Samples t-test based on the ARS showed a change in the artistic reflective skills of the EG which appeared to be substantially greater than in the students of the control group. The *t*-values also suggested that the experimental group students experienced a more marked change in their artistic reflective skills. The study of what proportion of the students had basic, developing, skillful and exemplary levels of the artistic reflection skills before and after the treatment in both groups found that the majority of the students in both experimental and control groups were at a basic level of their artistic reflection skills before the treatment. After the intervention, there was a shift from the basic level of artistic reflection to the higher levels in the EG, and the proportion of the students being at this stage reduced, while the other proportions increased. In contrast to the above, the shift in the control group students was slight.

Recommendations

The practitioners are expected to focus on sharing their reflective experiences with the preschoolers. Throughout the class sessions, the practitioners are supposed to help students overcome their hesitance in defining and naming, evaluating, and analysing their own impressions and emotions caused by artistic objects, second. The university tutors are recommended to encourage the students' willingness to exercise self-esteem, introspection, self-control, lack of motivation for artistic reflection. The practitioners should consider the lack of some students' adequate self-image as a teacher, overestimated or lowered self-esteem, and students' stereotypical idea of the method of conducting artistic classes at kindergartens when engaging them in classes. Further studies are needed on how peer reflection can influence preservice educators' reflective skills.

Limitations

The convenience sampling method and quasi-experimental research design can be considered limitations to the study because these are claimed to be vulnerable to selection bias (Grabbe, 2015; Saunders et al., 2012). Notwithstanding, the use of those methods and research design was justified in the study because it required a targeted approach to both.

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Conflicts of Interest

The authors report that they have no conflicts of interest of affiliation, legal, financial, or commercial origin that could be related to the research.

Authorship Contribution Statement

Savluk: Conceptualization, research design, running the experiment, data collection, and analysis, writing. Polovina: Running the experiment, experimental data collection, editing/reviewing, supervision. Kondratets: Running the experiment, data collection, editing/reviewing, supervision. Ukhtoms`ka: Running the experiment, data collection, editing/reviewing, supervision. Dovbnia: Running the experiment, data collection, editing/reviewing, supervision.

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Appendices

Appendix A. Artistic reflection scale for student pre-school educators

Domain		Item	7-point Likert "Reflect Me" Scale						
			1	2	3	4	5	6	7
Observation skills	1	I can pattern the observed art object or cultural event.							
	2	I use two or more appropriate senses to observe the art object or event.							
	3	I can distinguish the differences and similarities in the art object or cultural event.							
	4	I can use relevant tools to collect information about the art object or cultural event.							
	5	My emotions never hinder my impression/judgement of the observed art object or cultural event.							
Critical analysis skills	6	I question myself when observing the art object or event.							
	7	I question myself what opportunities the observed art object or even create for thinking.							
	8	I question myself what life sphere the observed art object or even reveals.							
	9	I question myself whether I agree or disagree with the way the idea that is revealed in the observed art object or even.							
	10	I question myself whether I can suggest the precise alternative to the way how the idea that is revealed in the observed art object or even is expressed.							
Critical evaluation skills	11	I ask myself questions regarding what the greatest strengths and biggest weaknesses of the observed art object or event are.							
	12	I question myself whether I have sufficient relevant knowledge so that I can evaluate art object or event objectively and unbiasedly.							
	13	I am always provided with positive feedback from my peers and teachers about my objectivity and unbiasedness of evaluation of the art object or event.							
	14	I never argue with my peers when evaluating art objects or events publically/in class.							
	15	I am very sensitive to the feedback given by my peers on what I have done/produced.							
Occupational application	16	I always try to find the connectivity between what I observe, analyse, evaluate and the context and settings of my future occupation.							
	17	I attempt to think about how I can be innovative in the way how I share my reflective disposition with preschoolers.							
	18	I am sure that my future mistakes in teaching Arts to preschoolers will change their lives and behaviours.							

Note: 1 – 'Very untrue of me'; 2 – 'Untrue of me'; 3 – 'Somewhat untrue of me'; 4 – 'Neutral'; 5 – 'Somewhat true of me'; 6 – 'True of me'; 7 – 'Very true of me'.

Appendix B. Item Reliability Statistics

Question	Mean	*SD*	Item-rest correlation	if item dropped	
				Cronbach's *α*	McDonald's ω
q1	4.27	1.90	0.360	0.815	0.819
q2	4.20	1.76	0.499	0.807	0.811
q3	4.17	1.84	0.548	0.804	0.807
q4	4.15	1.79	0.531	0.806	0.808
q5	4.12	1.89	0.516	0.806	0.810
q6	4.26	1.88	0.417	0.812	0.817
q7	4.17	2.00	0.370	0.814	0.819
q8	3.94	1.97	0.399	0.813	0.818
q9	3.92	1.90	0.469	0.809	0.814
q10	4.09	1.93	0.399	0.813	0.817
q11	4.09	1.79	0.416	0.812	0.817
q12	4.11	1.86	0.333	0.816	0.821
q13	4.16	1.84	0.227	0.822	0.827
q14	4.01	2.02	0.285	0.820	0.824
q15	3.94	1.97	0.419	0.812	0.817
q16	4.25	1.86	0.404	0.812	0.818
q17	4.24	1.82	0.392	0.813	0.818
q18	4.17	1.96	0.362	0.815	0.819

Appendix C. Factor Loading Statistics Drawn from Exploratory Factor Analysis

	Factor				Uniqueness
	1	2	3	4	
Q1	0.541				0.664
Q2	0.632				0.543
Q3	0.906				0.229
Q4	0.715				0.402
Q5	0.507				0.576
Q6		0.418			0.610
Q7		0.511			0.667
Q8		0.483			0.507
Q9		0.413			0.690
Q10			0.462		0.644
Q11			0.783		0.326
Q12			0.619	0.446	0.342
Q13				0.718	0.402
Q14				0.738	0.423
Q15		0.603			0.496
Q16		0.800			0.377
Q17		0.607			0.537
Q18		0.402			0.680

Note. 'Maximum likelihood' extraction method was used in combination with a 'oblimin' rotation

Appendix D. Results of the confirmatory factor analysis

Factor	Indicator	Estimate	SE	Z	*p*
Factor 1	Q1	0.577	0.1002	5.76	< .001
	Q2	1.115	0.0884	12.62	< .001
	Q3	1.634	0.0896	18.23	< .001
	Q4	1.482	0.1041	14.23	< .001
	Q5	0.948	0.0966	9.82	< .001
Factor 2	Q6	0.817	0.1298	6.30	< .001
	Q7	1.097	0.1496	7.33	< .001
	Q8	1.124	0.1606	7.00	< .001
	Q9	0.869	0.1402	6.20	< .001
	Q10	0.602	0.1294	4.65	< .001
Factor 3	Q11	0.466	0.1242	3.75	< .001
	Q12	1.049	0.1334	7.86	< .001
	Q13	1.595	0.1694	9.42	< .001
	Q14	1.249	0.1890	6.61	< .001
	Q15	0.506	0.1038	4.87	< .001
Factor 4	Q16	0.869	0.1538	5.65	< .001
	Q17	1.369	0.2124	6.44	< .001
	Q18	0.700	0.1840	3.81	< .001