

Original Article

The Transformative Power of Storytelling-Based Design Thinking: Using Diverse Feedback to Impact Aggression and Empathy in Students

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Abstract

Background and Aim: In recent decades, school aggression has increased dramatically, and the use of new practical approaches, such as design thinking, has increased. Therefore, this research was conducted to achieve more objective and comparable results to previous research and to investigate the effect of educational intervention based on design thinking using storytelling on aggression and empathy with feedback adjustment.

Materials and Methods: The researchers administered the Aggression and Empathy Scale to 120 students at a public school in Tehran. After evaluating the initial results, selected students (n: 80) were randomly assigned into four groups. Designing and implementing an intervention program Positive results were obtained by implementing a one-semester intervention program based on design thinking and storytelling which incorporated diverse feedback for one semester.

Results: The results showed that training based on the design thinking approach using storytelling effectively reduces aggression and increases empathy. Feedback also moderates this relationship. The results of the MANOVA test for aggression $F=8.214$, $\eta^2 = 0.250$ showed a significant difference in students' performance after the intervention program. Also, empathy data $F(1, 72) = 6.712$, $\eta^2 = 0.214$ confirmed the difference in empathy levels after training. ($p < 0.05$).

Conclusion: Design thinking using thinking and creativity skills as an innovative and promising educational approach can influence positive outcomes for children's social and emotional development. The study also underscores how feedback can be used to shape students' behavior and feelings, making it relevant to teachers and those involved in policy-making concerning education.

Keywords: Aggression, Design thinking, Empathy, Feedback, Self-assessment, Written-feedback Story telling.

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Introduction

Aggression is one of the most notable risk factors in the psychopathology of adolescents and a common and distressing behavior among deviant behaviors in humans (1). Aggression in adolescents can cause physical and social harm (2, 3). In psychology, the term aggression refers to overt verbal or physical behaviors that can lead to physical and psychological harm to oneself, others, or objects in the environment and is considered a predictor of severe violent behavior in youth (4). Recent studies in several countries have shown an increase in aggression among adolescents (5, 6). It is worth noting that aggressive behavior peaks during middle school (7). In Iran, Torshizi and Maleki (8) have reported a prevalence of aggression among adolescents at 41% and 31% for physical aggression, respectively. Generally, the results of some studies indicate an increase in aggression in Iranian schools (9).

School aggression can hinder students' academic progress by reducing their concentration levels (7). On the other hand, during adolescence, one factor that protects against aggression is empathy, which is defined as the cognitive and emotional "sharing" of the negative experiences of others (10). According to available evidence, empathy plays a vital role in promoting adolescents' psychological and social adaptation (11). Additionally, the relationship between aggression and empathy, especially among young people, has been well documented (12).

Given the widespread adverse effects of aggression in the classroom and society, Also the effect of empathy on aggression, it is necessary for parents and the community to provide vital support in preventing adolescent aggression and effectively managing problems resulting from it, especially for middle school students who are in critical stages of their mental and physical development (13). In this regard, schools can provide an unparalleled opportunity to implement and evaluate the effectiveness of prevention and educational programs for adolescent aggression (14). When adolescents are taught specific cognitive-behavioral strategies, they are likely to exhibit weaker aggressive behavior. Design thinking is one of these innovative cognitive approaches that has gained popularity.

Design thinking is an approach that prioritizes developing empathy for users, working in collaborative multidisciplinary teams, and using "action-oriented rapid prototyping" of solutions (15). DT increases students' creative thinking, problem-solving, collaborative, and communication skills and supports them in developing empathy and metacognitive skills (16). These definitions indicate a trend in which DT design thinking is increasingly accepted in various fields globally and is increasingly seen as an essential and general skill (17). Some studies in the field of education have shown that when teachers use design thinking in the process of creating educational materials and delivering lectures to students, the quality of classroom sessions improves (18).

Design thinking can be adopted as an effective strategy to help students learn by solving real-world problems. The design has become an innovative trend in schools in various countries (19). Therefore, by embracing design thinking education, schools can strengthen their students' innovative and collaborative problem-solving abilities from a fresh perspective and effectively address complex needs that may lead to aggression and conflicts. Research focused on teaching design thinking to prevent and reduce aggression is limited (20). However, design thinking can help prevent bullying, which is a part of aggression.

Previous research has highlighted the impact of design thinking on problem-solving (21) collaboration (16); and empathy (22), as well as cooperation (23). In this regard, there are also results of design thinking as a valuable strategy for problem-solving and decision-making. Design thinking exemplifies a semantic problem-solving approach (17). According to a study by Shé et al. (24), design thinking is a versatile methodology highlighting the significance of empathizing with students.

It is beneficial to consider research on the effects of empathy and problem-solving on reducing aggression, most of which emerged in the past decade. In addition, an increase in problem-solving skills has been found to reduce aggressive behavior (25). Problem-solving has been one of the vital parts of preventing violence. Furthermore, research by Zambrano & eta (26) highlights the use of design thinking (DT) tools for violence prevention. Design thinking includes various execution tools such as stakeholder mapping, empathy

mapping, five whys, journey mapping, and interviewing. In this regard, storytelling is among the design thinking tools, and their use as a design thinking tool has been highlighted in numerous studies (27).

Storytelling emphasizes the relationships between individuals, groups, and society. Storytelling is used in various fields, such as history, philosophy, sociology, and design (28). Storytelling writing reconstructs and defines culture, customs, and traditions through students' experiences and understanding of the environment. Using storytelling writing as a tool can reveal students' perspectives on human-environment interactions, which promotes reflection. Storytelling blends mental content with objectivity and identifies personal perceptions, emotions, and facts that define a field. "Stories and storytelling are not just representations of experience; they are also interpretations". Stories deepen our understanding of who we are, connect, encourage, and inspire. Storytelling is a design thinking tool that joins together ideas and pieces of information to enhance observation and enable thinking in action, bringing elements of the world together in the imagination to reveal their potential for interaction. Discovering Storytelling creates different possible scenarios for design concepts and is the best way to bridge analysis and synthesis (29). Therefore, Storytelling can be used as a tool for design thinking . Storytelling is a discovery process for the speaker and performs an investigative function. Storytelling can be used anywhere in the thinking process. It can be used initially when exploring the deeper needs of the audience when generating ideas about how to meet these needs or when asking for feedback for a prototype designed to provide better solutions (30). Also, in a case study using storytelling writing as a design tool, strategies to promote empathy have been suggested (31).

Moreover, the study by Koivula & et al (32) examined the use of Storytelling in supporting children's social-emotional reasoning and helping them practice social skills. The results demonstrated that Storytelling enables children to engage with, experiment with, and reflect on the emotions and strategies needed to develop socially sustainable solutions. Research has consistently shown that Storytelling effectively

controls aggression (33). This underscores the practical applications of Storytelling in promoting empathy and reducing aggression, making it a valuable tool in various contexts.

In this regard, the design thinking cycle can help increase support for this space by transforming the learning experience through the discovery of students' stories (34). Storytelling can also help students become more compassionate and reduce aggression (35). Therefore, the main objective of this research was to understand the effects of design thinking-based storytelling writing on aggression and empathy. After selecting the approach and educational tool in this study, feedback can be used to assess the quality of teaching and learning in educational situations.

Despite the wide amount of research conducted on topics related to aggression, there is still much to be learned and understood in this field. Firstly, There is a lack of objective and comparable results regarding the effect of educational interventions based on design thinking on aggression and empathy. Previous research in this area may have been limited in scope or methodology, making it difficult to draw firm conclusions about the effectiveness of such interventions. However, conducting further studies to examine the current situation and influential factors in confronting violence among middle school students is important to obtain alternative results. Secondly, most studies have shown that empathy, problem-solving, and collaboration are effective in reducing aggression, and the design thinking approach has gained particular popularity in education. This study employs quantitative research methods and measurement tools to analyze the impact of design thinking using semi-structured story tellings, a method where students are given a starting point and are encouraged to develop a story that reflects their understanding of the topic, in confronting aggression among Iranian high school students, with the aim of creating more tangible and comparable results that can easily be discussed both within and outside the country and promoted in the future. Furthermore, although many pieces of evidence indicate that diverse feedback can be effective in improving learning quality, quantitative studies focus on the role of feedback as a moderator. Therefore, by revealing the situation and impact of design thinking on confronting aggression through different types of

feedback, we can fill the gaps in social damages caused by adolescent aggression, and the results of the study can be inspiring for deeper research in this area in the future and help in the development of education and psychology.

One of the researchers has been teaching in middle schools for over 17 years. After COVID-19, he has noticed well-known aggressive behaviors such as using offensive language, teasing, threatening, not following school rules, conflicts, and criticism, which have become extremely common. Additionally, there have been repeated complaints from teachers about inappropriate student behavior in classrooms and an increase in violent behavior among peers in Iranian public schools, which inspired this study. In this regard, teachers who have faced aggressive students shared their teaching experiences with the author. Furthermore, based on a review of current literature, design thinking, due to the presence of empathy in the DT cycle, was identified as a potential source for reducing aggression (36).

Based on this, researchers have begun to investigate how to use design thinking in a unified way to achieve greater results for a range of students. Therefore, this study implemented a design thinking-based intervention program with story telling writing tools to reduce student aggression in middle schools. The aim of this study was to build on this existing evidence, especially the evidence from Paracha et al. (37), who documented the benefits of design thinking in relation to positive changes in bullying and aggression through a study. We also intend to measure the impact of story telling-based design thinking education on empathy. All of the above was conducted within the framework of a controlled randomized trial, which is significant because (insert significance of the trial). So, The question that this research seeks to answer is: What is the impact of the intervention on students' aggression and empathy?

Methods

This study employed a rigorous quasi-experimental pretest-posttest design, featuring three experimental groups and one control group. The research variable was systematically applied to the experimental groups, and the resulting data was meticulously

compared, ensuring a comprehensive analysis.

The current research community was The school environment was a government-run girls' school with cultural diversity, located in the southwest of Tehran province in Baharestan city. Most of the students in this area are economically disadvantaged, and the area is ethnically diverse, as Iran has 31 provinces. Baharestan city is close to the capital, so people can easily migrate to this city and be close to the capital. Therefore, different ethnic groups live in Baharestan city. This study used a sample of the available middle school, consisting of 19 classes from seventh, eighth, and ninth grades. The researcher used teachers' opinions to select classes with a higher likelihood of aggression. The culture of the class and the student's inclination to collaborate with the teacher, one of the researchers, were also considered. Finally, four seventh-grade classes were selected as the sample, and 80 female students (aged 13-15, $M = 14.50$) participated in these classes. It should be noted that allocating students to different classes was utterly random and outside the researcher's control.

This study was conducted immediately after the first semester exams and was carried out in late January 2023.

These students were randomly assigned to three experimental groups and one control group. The control group received no treatment and participated in regular classes according to the school schedule. However, the experimental group was trained by the author, who had expertise in the program's content, based on the intervention program for the remaining second semester to ensure proper use of the techniques in the class. Additionally, the experimental group was exempted from attending their regular classes for technology and work, which were held once a week for 90 minutes. Finally, just before the end of the term, in May 2023, it was done.

To do this study used the design thinking activities proposed by the Stanford d.school and the storytelling and scenario writing techniques that have been successfully implemented in various studies for operationalizing design thinking and improving intervention programs to reduce aggression (37). In the first step to start research, After coordinating with the school principal and obtaining their verbal consent, a meeting was held for the parents to explain the students'

participation in the project. The points of the consent form were discussed, and the participants expressed their consent for their children's participation. Also explained that if someone does not want to cooperate, they can withdraw from the research. The activities were selected based on their usefulness in the Iranian context, relevance to the average high school students, and effectiveness for students with aggression. After extensive deliberation, it was decided to involve the students in writing their own stories. The author divided 120 students into groups of four and requested that they write stories in four 90-minute sessions focusing on aggression in school and society and related factors such as empathy, tolerance, self-awareness, and premature judgment. After collecting the students' handwritten stories, the author consulted with two educational psychologists and school counselors and selected 12 final stories to ensure the optimal selection. Thus, the five stages of the Stanford d.school design thinking model - empathy, define, ideate, prototype, and test - were used so that in the first session, the teacher wrote the first two lines of the story on the board. The students continued writing the story with empathy and discussion within their group. In story writing, the design thinking model was used in which the students empathized with the characters in the story and then identified the problem. Each group member contributed to the story by brainstorming ideas and creating a wall of ideas to continue the story. Then, a final story was chosen by combining the ideas and writing. In the next session, each group read their story aloud, and the teacher

asked questions appropriate to the story and engaged in discussion with the students. Based on the discussion and the students' stories, a task was also assigned to the students. This stage was the evaluation and revision stage. A summary of the main processes and design thinking techniques used in this study through storytelling is provided in the Table1.

Also, The intervention conditions for this study consisted of four groups. Group 1 received design thinking training with teacher-written feedback and self-assessment by students. Group 2 received the same training with teacher-written feedback only, and Group 3 received only the design thinking training. Group 4 did not receive any training.

A self-assessment strategy was implemented in the classes by providing the students with a draft of expected class criteria based on design thinking literature. The self-assessment was conducted individually and once per session. After each story, the teacher explained the evaluation criteria to the students, and at the end of the second session, the students rated their experience and wrote about it. Group feedback from the teacher was also provided in written form at the end of each session. A draft form based on the design thinking process was prepared and presented to the groups. The teacher considered the students' work process in each session and conveyed the strengths and weaknesses of each group's activities to the group members in written form, indicating what points they should consider to improve their work and group performance.

Table 1. Summary of training sessions

Sessions	Activities
1	In the first session, grouping of students was done. The steps and methods of work were fully explained to the students. Also, the pre-test was distributed during this meeting, and the students were instructed to complete the questionnaires.
2	writing stories: The students were sitting in the classroom when suddenly Zahra shouted and said to Maryam: Why did you scribble in my notebook? Maryam said:
3	Group discussion and evaluation of the story process: How did you write the story like this? How did you empathize? What if this did not happen? What would happen if he thought a little?
4	writing stories: My father called from the company. I was in a hurry, there was traffic, and a motorcycle turned in front of me. I saw red, I got angry and... Assignment: What were the ten works you decided and did early, and what was the result? What will you do

- if it happens again?
- 5 Group discussion and evaluation of the story process:
Why was there a fight in the story?
How do we think when we are angry?
What was the result of fighting and aggression?
How could we avoid fighting and aggression?
- 6 writing stories:
Aida bumps into Shima without realizing it, and Shima falls to the ground and thinks...
Assignment: Don't retaliate once, and write your feelings.
How do you make the other party realize his mistake without retaliation?
- 7 Group discussion and evaluation of the story process:
Why does the hero of the story think that he did the work on purpose from his friend?
Do friends also influence decision-making and behavior?
Why do you think you must repay your friend's work?
- 8 Discussion and discussion about what happened during the school holidays regarding aggression:
What occurred during the Eid holidays that caused anger and fights?
What do you consider the cause of aggression and the solution to prevent anger and fights?
- 9 Discussion and discussion about what happened during the school holidays regarding aggression:
What occurred during the Eid holidays that caused anger and fights?
What do you consider the cause of aggression and the solution to prevent anger and fights?
- 10 Group discussion and evaluation of the story process:
Can jealousy cause aggression?
How can this feeling be controlled to prevent aggression and fighting?
Does the feeling of inferiority and self-deprecation cause aggression?
- 11 writing stories:
I made a small joke with my friend yesterday; he was insulting. We fought. I came home, picked up my phone, and chatted with him. My mom broke the silence, saying to put the phone away and help me. I got confused and said,
Assignment: Resolve a dispute by speaking and writing the result.
- 12 Group discussion and evaluation of the story process:
What caused the fight and aggression in this story?
How can we not continue the discussion in such cases?
What will people think of you if you do not continue the discussion? How do you feel?

Materials

The Aggression Questionnaire (AQ) was developed by Buss and Perry (38). The questionnaire has 29 questions, and the options are arranged in a way that only partially describes the individual's position on each question on a 5-point scale from 1 (completely untrue) to 5 (entirely accurate). The results of Buss and Perry's (1992) psychometric analysis showed that this questionnaire has a high internal consistency of 0.89. Psychologists and educational researchers in Iran have widely used the translated version of this measure. In the present study, the validation results using Cronbach's alpha were 0.84.

The Empathic Concern Scale by Baron-Cohen and Wheelwright (39) is a 26-item questionnaire that aims

to evaluate empathy from different dimensions. The retest method was used to examine the validity of the scale in the Persian version, and the coefficient was 0.80 after four weeks (40).

In the present study, the validation results using Cronbach's alpha were 0.82 in total. Our data analysis was conducted using the powerful SPSS version 23, a widely recognized and trusted tool in the field of data analysis. This tool allowed us to delve deep into the data and calculate descriptive statistics. We began by conducting the Kolmogorov–Smirnov and Levene's tests to ensure the data met the necessary assumptions for parametric tests. Once these were confirmed, we ran a Multivariate Analysis of Variance test to identify significant differences between and within groups of students. The Scheffe Post hoc analysis was also a crucial part of our process.

Results

This study was meticulously designed to understand the effects of educational intervention. We based our approach on design thinking using storytelling writing, a method that we believe holds great potential. With the added element of feedback moderation, we aimed to gain a comprehensive understanding of its impact on aggression and empathy. The results of the descriptive statistics for the control and experimental groups are demonstrated in Table 1 to identify any changes in their aggression and empathy. According to the results, the experimental group1 (M = 84.7240, SD = 14.60322), the experimental group2(M= 68.4000, SD =14.88341). The experimental group3 (M = 80.2740, SD =17.92917) performed better than the control group (M = 77.0500, SD=18.81342). That indicates the level of aggression experienced by the experimental group was alleviated.

For empathy According to the results, the experimental group1 (M = 86.8492, SD = 12.54213), the experimental group2(M= 82.4500, SD =11.03809). The experimental group3 (M = 83.6492, SD =8.73196) performed better than the control group (M= 72.9492, SD=11.11368). That indicates the increased level of empathy experienced by the experimental group. To test the significance of these results, a MANOVA was run after considering the required assumptions regarding normality (p = 0.2) for aggression and (p = 0.098) for empathy. For there more homogeneity of variances (p = 0.43) for post-aggression and (p = 0.85) for empathy by Levene's test, Box's Test of Equality of Covariance Matrices (p = .812), Tests of Between-Subjects Effects F(1,72) =

.957, p = .533 respectively. It was found that there were significant differences in students' performance (dependent variable aggression) after the intervention program, F= 8.214, P<0.05, η² = 0.250. Thus, the results demonstrate a large effect size with significant improvements in the decrease of aggression in the experimental group.

We also analyzed the empathy data before and after the intervention program. Based on the results (Table 2). After considering the assumptions of analyzing, ANCOVA was run to explore the significance of this increase in empathy (dependent variable). The results were significant for the posttest F(1, 72) = 6.712, P<0.05, η² = 0.214,. Thus, the results demonstrate a large effect size with significant improvements in increased empathy in the experimental group. In general, with significant difference between the experimental and control groups by Wilks' Lambda test, F(1,72)=6.712, p = 0.91, η² = .333 (Table 3).in general MANOVA significant difference between the experimental and control groups by Wilks' Lambda test, F(1,72) = 6.712, p = 0.91, η² = .333, showed that training with design thinking based on storytelling can effect on aggression and empathy(Table 4).

To determine which type of feedback had a different and meaningful effect on the level of aggression and empathy of the participants in the research, the Scheffe post hoc test was used. The results are presented in Table 5.

As can be seen in Table 5, the group that received written feedback and both types of written feedback and self-evaluation had a substantially lower level of aggression and a higher level of empathy than the control group and the group that was only trained with the design thinking method.

Table 2. Descriptive statistics for pre- and post-test aggression & Eympath scales based on feedback

		pre_aggression	post_aggression	pre_eympathy	post_eympathy
Both types of feedback	N	20	20	20	20
	Mean	84.7240	70.4500	78.3484	86.8492
	The standard deviation	14.60322	13.42219	10.44411	12.54213
Written feedback	N	20	20	20	20
	Mean	79.9500	68.4000	79.7500	82.4500
	The standard deviation	14.69506	14.88341	11.82270	11.03809
Just education	N	20	20	20	20
	Mean	81.7240	80.2740	83.7992	83.6492
	The standard deviation	17.41250	17.92917	11.84849	8.73196
Control group	N	20	20	20	20
	Mean	77.3980	77.0500	72.4500	72.9492
	The standard deviation	18.71375	18.81342	11.17551	11.11368

Table 3. Analysis of covariance (ANCOVA) tests of between-group experimental for aggression and empathy change mechanism outcomes

	Dependent Variable	Sum of Squares	df	Mean Square	F	significance	Partial Eta Squared
group *	post_aggression	2622.674	3	874.225	8.214	.001	.250
feedback_Type	post_Sympathy	1347.337	3	449.112	6.712	.001	.214

Table 4. Analysis of (MNOVA) tests of between-group experimental for aggression and empathy change mechanism outcomes

Multivariate Tests^a							
Effect		Value	F	Hypothesis df	Error df	significance	Eta2
group * feedback_Type *	Wilks' Lambda	.500	12.323 ^c	3.000	74.000	.001	.333

Table 5. Scheffe Post hoc tests of between-group experimental for aggression & empathy change mechanism outcomes based on type of feedback

Multiple Comparisons / Dependent Variable				
	(J) feedback_Type	Mean Difference (I-J)	Standard Error	significance
Scheffe	both	7.85000*	4.53692	.001
	written feedback	12.90000*	4.53692	.000
post_aggression	just education	3.02602	4.53692	.190
Scheffe	both	-14.10000*	3.52435	.003
	written feedback	-9.70000*	3.52435	.033
post_Sympathy	just education	-10.80078	3.52435	.301

*. The mean difference is significant at the 0.05 level.

Discussion

The present study aimed to investigate the transformative potential of design thinking training, mainly through the engaging storytelling medium with open-ended narratives. This approach was hypothesized to foster empathy and reduce students' aggression. The study also sought to compare the impact of this training in groups that received different types of feedback. The results of the research indicate that teaching design thinking through stories has indeed led to a reduction in students' aggression and an increase in empathy. The first question was whether this intervention affects students' aggression. As anticipated, the training had a positive influence on aggression levels. Our findings align with previous research (36). about the effects of design thinking on the performance of teenagers' aggressiveness in the school context. These studies emphasized that through participating in design thinking programs, students can learn the cognitive reconstruction of the required skills, which involves the process of relearning and adapting their problem-solving strategies and

expanding the range of their behaviors. They can approach problem-solving differently, without resorting to anger, and consider other people's perspectives. This result leads to social adaptability and more desirable behaviors from a social point of view. It also helps them more accurately evaluate, understand, and accept their limitations and abilities. Previous studies (21) have shown that design thinking can moderate negative tendencies associated with aggression among adolescents by providing strategies to manage the mental and physical changes that trigger anger and hostility. Thinking skills reduce the possibility of direct aggressive behavior. Furthermore, the results are substantial and consistent with previous literature showing that design thinking education provides opportunities and experiences that increase social interactions (41). Design thinking allows people to practice the necessary strategies and skills in all environments and real-life situations. Therefore, design thinking training is based on real experiences. By creating and telling stories, students indirectly encounter social and emotional situations. This exposure can help them better understand other people's feelings and motivations. For example, when a student writes a story about an aggressive character, they must

consider their motivations and background. This process leads to reduced prejudices and better understanding. Teenagers who learn social rules and establish appropriate relationships with family and community members are likelier to show a high degree of social compromise. Hence, learning how to communicate effectively with others and having an expressive interpersonal style enables people to express their personal feelings and opinions while defending their rights without violating the rights of others. Moreover, evaluation is a crucial stage of design thinking. To implement this step, after writing the story, students evaluate their story using class discussions and their classmates' comments. This approach not only corrects students' misconceptions but also compares perceptions with feedback, thereby strengthening their belief in their ability to perform specific activities in a social setting. Our results align with previous studies by Smith & et al (42), which indicated that reflective activities integrated into the entire design thinking process, particularly feedback, lead to significant behavior change.

Regarding the second goal, the results of this study showed that design thinking training increases empathy. These findings are consistent with previous studies on design thinking and increased empathy (22). Empathy reduces arbitrary interpretation of issues by creating a correct understanding of others. It increases the chances of understanding and accepting behaviors (39), which leads to a reduction in aggressive behaviors. The researcher observed that students showed a hostile bias in response to provocative and ambiguous situations in the stories. They distorted and interpreted their behavior, ignoring the aggressive nature of their actions. Aggressive behavior against others was considered retaliation for the other person's actions and a response to threats and provocations. However, participants in the design thinking training, equipped with skills such as active listening, respect for feelings, and empathy, could understand the feelings of others in various situations. Empathy enables individuals to align themselves with others' thoughts and feelings, enabling effective communication with the social world and preventing harm to others (43). Therefore, in this study, teaching design thinking using story writing can help students find better ways to manage anger and anxiety instead

of suppressing or suddenly expressing emotions. Storytelling activities allow them to express their feelings in a safe space, which can reduce emotional tensions. The study investigated using self-evaluation and teacher's written feedback in a training course to improve performance and learning. The group that received both types of feedback showed the most substantial changes in aggression and empathy. Feedback guides learners toward appropriate study or practice and helps identify areas of deficiency, enhancing learning strategies (44). The results of this Research also supported the effectiveness of teachers' written feedback. It highlighted points students may have overlooked, leading them to focus on those areas. Similar research has shown that written evaluation by teachers improves students' accuracy (45-47). Feedback is vital in the student's learning process as it enables them to identify their weaknesses. Providing written feedback allowed instructors to provide detailed and personalized guidance to students. This feedback included constructive comments on students' work, suggestions for improvement, and praise for their efforts. Also, the teacher's written feedback provides tangible history for students to reflect on and provides a personalized approach to addressing individual learning needs. In implementing the plan, attention should be paid to such things as the availability of the appropriate story and the teacher's ability to accurately and correctly implement design thinking to achieve the benefits of this approach. Also, the selected stories should be appropriate to the environment and culture of each nation so that the implementation of this approach is understandable for students. The importance of cultural relevance in implementing design thinking must be considered. As a first example, the theater of the oppressed was supposed to be used for this research. However, consulting some students and experts in educational sciences made it clear that this theater and story needs to be more comprehensible and practical for Iranian students. It should be noted that design thinking is not the only solution, but when used carefully and implementation constraints are considered, it can help reduce aggression. In addition, other forms of design thinking can be used for this purpose, but storytelling and narrative writing were considered for this research. Every research study includes some limitations, such as the following: This research was focused on the

students of a public school in Tehran; therefore, the transfer of the results to other environments and communities may be disputed. There may also be a need for more time to assess long-term changes in students' behavior and emotions. In addition to needing more control of all variables, other unknown factors outside the school may also affect the results. Future research could investigate the long-term effects of design thinking programs on the development of empathy and aggression in students and the active student involvement during assessment, and employ various classroom feedback methods. Additionally, studies should explore the appropriate use of self-assessment, promote infrastructure for effective feedback implementation is crucial, and it should be reviewed and implemented through evaluation. Finally, educators can integrate design thinking programs into their curriculum. This study shows a foundation for further research and practice in design thinking and social behavior among students, highlighting the potential benefits of incorporating such programs in educational settings.

Conclusion

The above article presents a comprehensive study that examines the effect of teaching design thinking through storytelling with open stories on students' empathy and aggression levels. These are very important in application because they introduce a new and effective tool in adolescent psychotherapy. These findings provide insights for researchers in learning analytics for educators who wish to use self-assessment and written teacher assessments for more effective learning. Therefore, the results of this research provide a robust framework for promoting positive social-emotional outcomes in educational and social environments by promoting thinking skills.

Ethical Approval

The research was approved by an institutional review board. We warrant that the material contained in the manuscript represents original work, has not been published elsewhere and is not under concurrent consideration for publication elsewhere. Further, we have complied with the American Psychological

Association Ethical Standards in the treatment of the participants. To support the participants, informed consent was obtained from their parents, who were made aware of the details of the research. They were informed that they could withdraw from the study at any time. Additionally, the school administration provided their consent to proceed with the research.

Data Availability

Statement Stories and writings that children created in class are available, along with written feedback.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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