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How Can Students Be Empowered in Relation to SDGs Through Active Learning? Psychological and Contextual Dimensions Associated with Teachers' Use of Storytelling in Europe

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Abstract

Promoting empowerment regarding the SDGs among students requires teaching practices based on a student-centered approach. Storytelling has gained prominence as a tool to increase student engagement, critical thinking, and more equitable school environments. While its benefits for students are well documented, less is known about the factors influencing teachers' willingness to adopt storytelling. The Erasmus+ project PLACES aims to support the implementation of the SDGs in Belgium, Denmark, Greece, and Italy. This study, conducted during the need analysis phase, investigates the psychological and contextual dimensions associated with teachers' use of storytelling as a practice to promote the SDGs. Self-efficacy, attitudes, time-related, didactic barriers, and the perceived organizational climate for innovation within schools were investigated by 5-point Likert scales. A quantitative analysis was conducted using hierarchical regression and moderation models based on data collected through a questionnaire administered to 138 primary and low-secondary schools' teachers from Italy, Belgium, and Greece. Results showed that teachers' self-efficacy is significantly associated with storytelling use, and this relationship is moderated by perceived school climate for innovation. Moreover, the lack of didactic support is relevant. These findings underline the importance of strengthening individual and contextual enablers in teacher training and school leadership to promote the SDGs.

Keywords: storytelling; sustainable development goals; organizational school climate; teachers' self-efficacy; facilitators; barriers

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1. Introduction

In the face of rapidly evolving global challenges, schools are increasingly called upon to prepare students not only academically but also as responsible global citizens. The integration of the United Nations Sustainable Development Goals (SDGs) into educational settings has emerged as a strategy, encouraging schools to foster awareness, critical thinking, and civic engagement among students (UNESCO, 2012). International recommendations have underscored the importance of Education for Sustainable Development (ESD) as a key priority in shaping inclusive, future-oriented education systems (UNESCO, 2017).

The principles of ESD closely align with the Student-Centered Learning approach (Dewey, 1997), which emphasizes the importance of active, inclusive, and participatory learning environments (UNESCO, 2017). Recent research reflects a growing interest in ESD, focusing on its integration into contemporary curricula (Agirreazkuenaga, 2019). Innovative and active methodologies have emerged as essential tools for translating ESD principles into practice (UNESCO, 2017). They engage students through collaborative, experiential, and problem-based activities that foster critical thinking (Barkley et al., 2014). Active learning also enhances student engagement, ownership of the learning process, and motivation (Khatter et al., 2024; UNESCO, 2017; Attard et al., 2010; Freire, 1970).

Storytelling has shown itself to be a particularly impactful active learning method. Far from simply telling stories (Agosto, 2016), storytelling is a narrative-based pedagogical approach that engages learners emotionally and cognitively, allowing them to interact with content in a meaningful and memorable way (Heo, 2009). While rooted in ancient traditions, storytelling remains a relevant strategy in modern education. It helps simplify complex ideas through structured, character-driven narratives and supports understanding by meaning-making (Bruner, 1990). Encouraging students to create their own stories further enhances their engagement (Oros, 2007).

Recent developments include the integration of digital storytelling and its combination with emerging technologies such as robotics, expanding its interdisciplinary applicability across a wide range of subjects, including STEM (Collins et al., 2023; Palioura et al., 2024; Sarıca, 2023). Although traditionally associated with early childhood education, storytelling has also demonstrated benefits for older students, fostering cognitive flexibility, creativity, and emotional involvement through playfulness and humor (Aquilina et al., 2024; Diamond, 2013; Proyer et al., 2019; Rose & Johnson, 2025). Several studies have highlighted its potential to develop students' self-efficacy, motivation, emotional regulation, and collaborative skills (Kotluk & Kocakaya, 2017; Niemi & Niu, 2021). Furthermore, by promoting critical reflection and imagination, storytelling aligns with key transversal competences associated with the Sustainable Development Goals (SDGs) (UNESCO, 2017). As a participatory and equity-oriented practice, storytelling is well-suited to address global challenges such as sustainability, health promotion, and active citizenship (Dunn & Cherup, 2023).

Despite this strong evidence for storytelling as a powerful tool for students' cognitive, emotional, and social development and empowerment, its potential can only be realized when teachers are able and willing to implement it effectively. This creates a clear gap between the documented benefits for students and the limited understanding of the factors that support teachers in adopting storytelling in everyday practice. Recent research recognizes the pivotal role of teachers in ESD implementation (García-González et al., 2020; Timm & Barth, 2021). Teachers are not merely facilitators of learning: they are key agents of change within the school context. This perspective aligns with the Health Promoting Schools (HPS) framework, which emphasizes the central role of school actors, including teachers, school principals, and community stakeholders, in fostering supportive environments that empower students and broader communities (IUPHE, 2021; World Health Organization, 1984).

Despite the growing recognition of teachers' central role in educational innovation, most research on storytelling has primarily focused on student outcomes, paying limited attention to the conditions that enable or hinder teachers' implementation of this methodology. While some studies report that teachers generally view storytelling positively—highlighting its potential to boost motivation, engagement, and classroom interaction (Alkaaf, 2017; Dilek Belet & Dala, 2010)—others have focused on practical challenges. These include overly complex activities, lack of time, lengthy narratives, and excessive questioning (Alkaaf, 2017).

Recent research focuses on teachers' self-efficacy as a dimension related to teachers' professional practice (Avanzi et al., 2013; Adl-Amini et al., 2025; Mastrothanasis & Kladaki, 2025; Tengler & Sabitzer, 2022). Teachers' self-efficacy is a multidimensional construct that refers to teachers' beliefs in their capacity to positively influence student learning and engagement, even in the face of challenging students or difficult classroom situations (Bandura, 1997; Skaalvik & Skaalvik, 2007). Teachers who feel confident in their ability to design, adapt, and deliver story-based activities are more likely to integrate storytelling into their teaching (Kotluk & Kocakaya, 2017). However, studies usually focused mainly on exploring teacher attitudes toward storytelling (Alkaaf, 2017; Dilek Belet & Dala, 2010) or have considered self-efficacy as an outcome variable rather than a predictor of actual storytelling implementation (Niemi & Niu, 2021).

Psychological factors alone are not sufficient to explain the adoption of innovative practices. The perceived support for pedagogical innovation within the school social environment, such as leadership encouragement, collaboration among colleagues, and access to adequate resources, also plays a crucial role in enabling or constraining teachers' engagement in active and creative pedagogical approaches, including storytelling (Nicolopoulou et al., 2015; OECD, 2019). Moreover, organizational dimensions, such as perceived support for innovation, have received limited attention in relation to storytelling, and their potential moderating role in shaping the relationship between psychological factors and practice remains underexplored.

To address this gap, the present study investigated the factors associated with teachers' use of storytelling in primary and middle school settings, addressing three main aims:

(1) To explore teachers' perceptions of storytelling by comparing attitudes, self-efficacy, perceived barriers, and organizational climate for innovation across school levels. Based on previous literature, we expected primary school teachers to report more positive attitudes, higher self-efficacy, and fewer didactic barriers compared to middle-school teachers. (2) To identify which individual and contextual variables are associated with the use of storytelling using a stepwise approach. We aimed to identify the specific contribution of each set of variables, clarifying how background characteristics (sociodemographic variables), individual dispositions (attitudes towards storytelling and teachers' self-efficacy), and contextual constraints (time-related and didactic barriers) uniquely relate to teachers' implementation of storytelling. We hypothesize that, beyond background characteristics, both contextual factors and personal resources will make an additional and meaningful contribution to explaining teachers' use of storytelling, highlighting how individual resources interact with practical constraints in shaping actual implementation. (3) To test whether the perceived organizational climate for innovation moderates the relationship between self-efficacy and actual implementation of storytelling in the classroom. Specifically, we hypothesized that the association between personal factors, such as self-efficacy, and storytelling use would be stronger when teachers perceive a more supportive and innovative school climate.

This approach allows for a comprehensive examination of both individual and contextual determinants, bridging the gap between the potential benefits of storytelling for student development and its practical adoption in educational settings.

2. Materials and Methods

2.1. The Project

This study is part of the Erasmus+ project "Playful LeArning and Storytelling that Create Engagement for the SDGs among children and young people" (PLACES), whose core pillars are the promotion of the Sustainable Development Goals (SDGs) and the adoption of the Health Promoting Schools (HPS) approach. The PLACES project involved seven

partners from Denmark, Belgium, Italy, and Greece. It aims to support the implementation of the SDGs in a European context, specifically addressing: SDG 3 "Good Health and Well-Being"; SDG 4 "Quality Education"; SDG 10 "Reduced Inequalities". The project is built upon four strategic pillars that guide its implementation and ensure its impact: (1) Sustainable Development Goals (SDGs) aligning the project with the United Nations' SDGs, providing a global framework to address social, environmental, and economic challenges through education. (2) Engagement, Feelings, and Action: the project aims to foster meaningful participation by creating experiences that evoke emotional responses and inspire action. It encourages active involvement from both students and educators. (3) Playful Learning and Design Thinking: learning through play is a core element of the project, promoting interactive and enjoyable educational methods that support natural and engaging knowledge acquisition. (4) Storytelling, used as a powerful pedagogical tool to convey values, knowledge, and lived experiences. It helps build emotional connections and deepen understanding of key concepts.

These pillars are supported by the Health Promoting Schools (HPS) model, which extends beyond individual health behaviors to encompass the entire school environment, including curriculum, teacher training, governance, and community engagement. The HPS Standards and Indicators emphasize values such as democracy, equity, empowerment and action competence, school environment, curriculum, teacher training, evaluation, collaboration, community involvement, and sustainability, providing a shared foundation for promoting health and well-being in schools.

The PLACES project included an initial Needs Analysis phase, which examined teachers' perceptions of the SDGs and storytelling. In addition, focus groups with primary and secondary school students were conducted to explore their needs, their familiarity with storytelling, and the themes they considered relevant. Based on the results of this analysis, the partnership developed a set of storytelling-based learning materials and delivered training sessions for teachers. Several whole schools were then involved in piloting and evaluating these materials.

The present study focused specifically on the Teachers' Needs Analysis and the questionnaire developed for this purpose.

2.2. The Questionnaire

The Needs Analysis survey investigated teachers' perspectives on storytelling and the Sustainable Development Goals (SDGs). The questionnaire was distributed between January and May 2023 across the project's partner countries, targeting teachers in primary and middle schools (students aged between approximately 6 to 14 years). The survey was distributed via Qualtrics and involved teachers across partner countries. Ethical approval for the study was granted by the Research Ethics Committee of the Psychology Department of the University of Milano-Bicocca (RM-2023-620). The dissemination strategy included digital channels such as online platforms, social media, and informal professional networks.

The questionnaire assessed teachers' knowledge of the SDGs, their information sources, training needs, and their opinions on the relevance and impact of SDGs in education. It also examined how SDG-related activities are implemented in schools, including teaching methods, subject areas, external collaborations, and time allocation. A dedicated section focused on storytelling, exploring teachers' familiarity, perceived benefits, self-efficacy, and barriers to using storytelling as a teaching method. Finally, the questionnaire gathered information on the actual use of storytelling, teachers' sociodemographic characteristics, and the organizational climate for innovation.

The questionnaire was originally developed in English and subsequently translated into the languages spoken in the participating countries. A standard back-translation

procedure (Brislin, 1970) was applied to ensure conceptual and linguistic equivalence across versions.

2.3. The Study and the Sample

This study adopted a quantitative, cross-sectional, and correlational design, and the present analysis specifically focuses on the section dedicated to storytelling.

A total of 198 teachers initially completed the questionnaire distributed across the four partner countries (Italy, Belgium, Greece, and Denmark). Danish teachers (N = 9) were excluded due to the small subgroup size, which would have resulted in unbalanced comparisons. An additional 51 respondents were excluded because their responses were incomplete or because they did not meet the inclusion criteria (e.g., teaching level outside the target range or missing values on key variables). The final analytical sample consisted of 138 teachers: 80 from Italy (58.0%), 23 from Belgium (16.7%), and 35 from Greece (25.4%).

Most teachers taught in primary school (54.3%), while 45.7% of the sample taught in middle schools. In line with international trends in the teacher population, most respondents were female (76.8%). Most of the teachers who responded had over 20 years of professional experience (38.4%). Additionally, nearly all participating teachers worked in public schools (92%). The most taught subject was Language and Literature. The data describing the sample are presented in Table 1.

Table 1. Descriptive Analysis of the sample.

		N	%
Gender	Female	106	76.8
	Male	21	15.2
	Other	11	8.00
School Level	Primary School	75	54.3
	Middle School	63	45.7
School Category	Public School	126	92.0
	Private School	11	8.00
Years of Professional Experience	0–5 years	27	19.6
	6–10 years	20	14.5
	11–20 years	38	27.5
	Over 20 years	53	38.4
Country	Italy	80	58.0
	Belgium	23	16.7
	Greece	35	25.4

Valid percentage. N = 138.

2.4. Measures

Attitude towards storytelling was assessed using a three-item scale developed ad hoc, rated on a 5-point Likert scale ranging from "Strongly disagree" to "Strongly agree". The scale captures teachers' general predisposition toward the use of storytelling (e.g., "I believe that the storytelling method should be included in teacher training programs"). A composite indicator was created by averaging responses across the three items, with higher scores reflecting more positive attitudes ($\omega = 0.73$).

Self-efficacy in using storytelling was measured with four items adapted from Heo (2009), rated on a 5-point Likert scale ranging from "Strongly disagree" to "Strongly agree". These items assessed teachers' perceptions of their own self-efficacy in using the storytelling method (e.g., "I believe curricular goals can be achieved using the storytelling method"). An overall indicator was computed as the mean of the four items ($\omega = 0.89$).

Barriers towards storytelling were assessed through a scale adapted from Seng (2017), comprising two barrier typologies: time-related barriers and didactic barriers. All items were rated on a 5-point Likert scale ranging from "Strongly disagree" to "Strongly agree". Mean scores were computed for each subdimension. Time barriers were assessed through a two-item scale, measuring teachers' perception of lack of time as an obstacle to implementing storytelling (e.g., "I think I do not have enough time to use the storytelling method") ($\alpha = 0.80$). Didactic barriers were measured using a four-item scale, assessing perceived instructional difficulties related to integrating storytelling within specific curricular contents (e.g., "I do not know how to relate storytelling to the content of specific topics"). A mean score was computed to represent the overall level of perceived didactic barriers ($\omega = 0.74$).

Perceived organizational climate for innovation was assessed with a four-item battery on a 5-point Likert scale from "Strongly disagree" to "Strongly agree" (AL-Takhayneh et al., 2022). The scale measured the extent to which teachers perceived their school institution as open to organizational change (e.g., "Our institution provides teachers with time and resources to structure, share/exchange, and experiment with innovative ideas/solutions"). A composite indicator was computed by averaging the four items ($\omega = 0.86$).

A 6-point scale ranging from "Never" to "Every week" was used to understand how frequently teachers use storytelling in their classrooms.

2.5. Analysis

Composite indicators were computed by averaging items within each scale after verifying internal consistency via McDonald's ω or Cronbach's α, following recommendations for reliability assessment in psychological research (Cronbach, 1951; McDonald, 2013).

Before conducting the analysis, the main statistical assumptions were evaluated. Linearity between the independent and dependent variables was assessed using scatterplots and residual plots, confirming an adequate linear relationship. Independence of observations was ensured by the nature of the data collection, with no repeated measures or correlated cases. Multicollinearity among predictors was within acceptable limits, with Variance Inflation Factor (VIF) values below 5 and tolerance values above 0.1 (Field, 2018). Residuals were examined for normality and homoscedasticity; histograms, Q-Q plots, and standardized residual plots indicated an approximately normal distribution and constant variance across predictor levels. Finally, potential influential outliers were assessed using Cook's Distance and leverage values, with no cases found to compromise the analysis.

To address the first research aim, Welch's *t*-tests were conducted to compare primary and secondary teachers on attitudes, self-efficacy, and perceived barriers.

At second instance, a hierarchical regression model was conducted to explore the relationship between teachers' attitude towards storytelling, teachers' self-efficacy in using storytelling, didactic and time-related barriers, and frequency of storytelling use. This analytic approach allowed us to examine the incremental contribution of each block of variables, showing how much additional variance in storytelling use is explained when adding individual factors (attitude and self-efficacy), followed by perceived barriers, and sociodemographic controls. A zero-order Pearson correlation was conducted between teachers' attitudes toward storytelling and self-efficacy in using storytelling.

Finally, to address the third aim, a moderation model was implemented. Sociodemographic variables were included in the analysis as covariate variables.

A post hoc sensitivity analysis was conducted using *"pwr"* package (version 1.3.0) in R to estimate the detectable effect size given the available sample. All assumptions were verified.

The analysis was conducted on R version 4.4.2.

3. Results

The main statistical assumptions, including skewness and kurtosis, were evaluated. These assessments indicated that the data presented in Table 2 were suitable for the analysis (Table 2).

Table 2. Descriptive Analysis.

	Min	Max	M	SD	skw	krt
How often do you use the storytelling method	1	6	3.27	1.69	0.16	−1.22
Attitude towards storytelling	1	5	3.99	0.65	−0.43	−0.21
Self-efficacy in storytelling	1	5	3.32	0.78	−0.73	0.75
Organizational Climate for Innovation	1	5	3.18	0.85	−0.30	−0.29
Time Barriers	1	5	2.63	0.91	0.18	−0.19
Didactic Barriers	1	5	2.92	0.75	0.04	−0.02

N = 138.

3.1. Teachers' Use and Perception Toward Storytelling

Descriptive analyses were conducted to examine how frequently teachers in primary and low-secondary schools use storytelling in their teaching activities. The distribution of responses is reported in Table 3.

Table 3. Storytelling frequency.

		N	%
Primary School	Never	5	6.70
	Few days a year	8	10.7
	Some days a year	23	30.7
	Once a month	11	14.7
	More than once a month	15	20.0
	Every week	13	17.3
Middle-School	Never	24	38.1
	Few days a year	12	19.0
	Some days a year	10	15.9
	Once a month	3	4.80
	More than once a month	10	15.9
	Every week	4	6.30

"How often do you use the storytelling method in your teaching activity?" Valid percentage. N = 138.

Welch's *t*-tests were conducted to examine differences between primary and secondary school teachers in their perceptions and use of storytelling. Results indicated that primary school teachers reported using storytelling significantly more frequently in their teaching (M = 3.83, SD = 1.49) than secondary teachers (M = 2.60, SD = 1.69, t(124.91) = 4.47, $p < 0.001$, d = 0.77). Primary school teachers reported significantly more positive attitudes toward storytelling (M = 4.14, SD = 0.53) than secondary teachers (M = 3.80, SD = 0.73, t(110.04) = 3.02, $p = 0.003$, d = 0.53). Primary teachers also showed higher self-efficacy in using storytelling (M = 3.63, SD = 0.60) compared to secondary teachers (M = 2.96, SD = 0.82, t(110.78) = 5.43, $p < 0.001$), with a large effect size (d = 0.95). Regarding perceived barriers, secondary teachers reported significantly higher didactic barriers (M = 3.08, SD = 0.75) than primary teachers (M = 2.79, SD = 0.73, t(130.03) = −2.26, $p = 0.026$, d = −0.39). In contrast, no significant differences emerged for time barriers (t(118.04) = −1.59, $p = 0.114$, d = −0.28). Finally, teachers in the two school levels did not differ significantly in their perceptions of organizational climate for innovation (t(135.94) = −0.90, $p = 0.369$, d = −0.15).

3.2. Facilitators and Barriers in the Use of Storytelling

To further explore the relationship between the two key facilitators, teachers' attitudes toward storytelling and their self-efficacy in using storytelling, a zero-order Pearson correlation was conducted. This preliminary analysis was necessary to assess the degree of association between these two theoretically related constructs before including them in the regression models. Establishing a significant correlation supports the assumption that these variables may be conceptually linked. The results indicated a statistically significant positive correlation ($r(136) = 0.51$, 95% CI [0.38, 0.62], $p < 0.001$), suggesting that teachers who hold more positive attitudes toward storytelling also tend to report higher levels of self-efficacy in its use.

To identify which individual and contextual variables were associated with the use of storytelling, a hierarchical regression analysis was conducted.

The first model (*mod1*), which included sociodemographic variables (gender, years of teaching experience, and school level), was statistically significant ($F(4, 133) = 5.81$, $p < 0.001$), explaining about 15% of the variance in the outcome ($R^2 = 0.15$). Among the predictors, only the school level was statistically significant, with teachers working in secondary school reporting lower scores ($\beta = -1.09$, $p < 0.001$).

The second model (*mod2*) added teachers' attitudes toward storytelling and storytelling self-efficacy. This model was also statistically significant ($F(6, 131) = 13.21$, $p < 0.001$), and accounted for a significantly greater proportion of variance ($R^2 = 0.38$), with a statistically significant increase in explained variance compared to Model 1 ($\Delta R^2 = 0.23$, $p < 0.001$). Self-efficacy toward storytelling emerged as a strong and significant predictor ($\beta = 1.01$, $p < 0.001$), while attitudes toward storytelling did not reach significance.

Model 3 (*mod3*) considered didactic and time-related barriers in addition to the previous variables. The model was statistically significant ($F(8, 129) = 12.21$, $p < 0.001$), explaining 43% of the variance ($R^2 = 0.43$), with a statistically significant increase in explained variance over Model 2 ($\Delta R^2 = 0.05$, $p < 0.01$). In this final model, both storytelling self-efficacy ($\beta = 0.65$, $p < 0.01$) and didactic barriers ($\beta = -0.60$, $p < 0.01$) were significant predictors. Full results are presented in Table 4, while the changes in explained variance across models are summarized in Table 5.

Table 4. Hierarchical Regression Model.

	Step 1			Step 2			Step 3		
	β	t	*p*	β	t	*p*	β	t	*p*
Constant	3.16	7.240	<0.001	−1.67	−1.79	0.07	1.54	1.17	0.24
Gender (Male)	−0.00	−0.01	0.98	0.02	0.06	0.94	−0.06	−0.20	0.83
School Level (Middle School)	−1.08	−3.82	0.00	0.31	−1.15	0.24	−0.38	−1.47	0.14
Years of Experience	0.20	1.68	0.09	0.20	1.98	0.05	0.15	1.43	0.15
Attitude	—	—	—	0.27	1.29	0.19	0.30	1.43	0.15
Self-efficacy	—	—	—	1.01	5.41	<0.001	0.65	3.13	0.001
Didactic Barriers	—	—	—	—	—	—	−0.59	−3.16	0.001
Time Barriers	—	—	—	—	—	—	−0.07	−0.49	0.62

VD = Frequency of storytelling use by teachers. N = 138.

Table 5. Change of R^2.

	Step 1		Step 2		Step 3	
R^2	0.14		0.37		0.43	
ΔR^2	—		0.23		0.06	
F	5.81	0.001	13.21	<0.001	12.21	<0.001

3.3. Organizational School Climate and Teachers' Self-Efficacy

To test whether the association between self-efficacy and storytelling use was moderated by perceived organizational climate for innovation, an interaction term was added to the model. The model was significant ($F(10, 127) = 10.71$, $p < 0.001$), explaining 46% of the variance ($R^2 = 0.457$, adjusted $R^2 = 0.415$). A significant interaction emerged ($\beta = 0.44$, $p = 0.018$), that the association between self-efficacy and storytelling use varies depending on the organizational climate for innovation. Didactic barriers ($\beta = -0.62$, $p = 0.001$) and organizational climate for innovation ($\beta = -1.65$, $p = 0.014$) also had significant main effects. Other covariates were not significant (Table 6).

Table 6. Moderation model.

	β	t	*p*
(Intercept)	6.54	2.73	0.001
Gender (Male)	0.06	−0.22	0.82
School level (Middle-School)	−0.35	−1.36	0.17
Attitude	0.31	1.50	0.13
Self-efficacy	−0.69	−1.14	0.25
Didactic Barriers	−0.61	−3.31	0.001
Time Barriers	−0.01	−0.11	0.90
Organizational Climate for Innovation	−1.65	0.66	0.01
Self-efficacy × Organizational Climate for Innovation	0.43	2.39	0.01

N = 138.

A post hoc sensitivity analysis was conducted in R following G*Power (3.1) conventions to evaluate the statistical power of the hierarchical regression models and the moderation test. For the baseline model (mod1), the explained variance was $R^2 = 0.15$, corresponding to a medium effect size ($f^2 = 0.175$; Cohen, 1988) and a statistical power of 98.4%. When adding attitude and self-efficacy (mod2 vs. mod1), the increase in explained variance was $\Delta R^2 = 0.23$ ($f^2 = 0.366$), with good power (>99.9%). The subsequent addition of didactic and time-related barriers variables (mod3 vs. mod2) yielded a smaller increase in explained variance ($\Delta R^2 = 0.054$; $f^2 = 0.095$), associated with a power of 88.9%.

The addition of the interaction term (self-efficacy × organizational climate for innovation) explained an incremental $\Delta R^2 = 0.027$, corresponding to a small effect size ($f^2 = 0.049$). The estimated statistical power for detecting this interaction was 60%. Although below the conventional 0.80 threshold (Cohen, 1988), this level is common in applied research when testing interaction effects with constrained samples (Aiken et al., 2010; Maxwell, 2004).

4. Discussion

This study examined the factors associated with teachers' use of storytelling in the primary and middle school settings, addressing three main aims: (1) exploring teachers' perceptions of storytelling by comparing attitudes, self-efficacy, and perceived barriers across school levels; (2) identifying the individual and contextual variables associated with storytelling use through hierarchical regression; and (3) testing whether the perceived organizational climate for innovation moderates the relationship between self-efficacy and actual implementation of storytelling in the classroom.

First, the results showed that primary school teachers reported more positive attitudes toward storytelling, higher self-efficacy, and fewer didactic barriers than secondary teachers. Moreover, they used storytelling more frequently. These differences are plausibly related to the pedagogical affordances of primary education, where curricula are more integrated and allow for greater methodological flexibility. In contrast, the more structured and discipline-based organization of teaching in secondary schools often reduces opportunities

for active, experiential, and cross-disciplinary methodologies (Crispiatico et al., 2020). This teaching organization may constrain the adoption of creative and narrative-based approaches, contributing to lower self-efficacy and lower actual use.

Second, hierarchical regression analyses revealed that self-efficacy was a significant positive variable associated with storytelling use. Teachers who reported higher self-efficacy in their teaching abilities were more likely to use storytelling.

In contrast, attitude toward storytelling was not significantly associated with storytelling use when considered alongside self-efficacy and other variables. Despite the strong positive zero-order correlation between attitude and self-efficacy, only self-efficacy was significantly associated with storytelling use. This supports the idea that self-efficacy, not just attitude, plays a central role in translating intentions into action. Although positive attitudes are well documented (Alkaaf, 2017; Dilek Belet & Dala, 2010), they do not necessarily translate into classroom use. Coherently, the Theory of Planned Behavior emphasizes that attitudes alone are insufficient to predict behavior (Ajzen, 1991). On the other hand, self-efficacy has consistently emerged as a factor associated with teachers engaging with innovative, interdisciplinary practices such as storytelling (Tengler & Sabitzer, 2022). This result suggests that traditional training or informational initiatives may not be sufficient unless they effectively strengthen teachers' sense of efficacy in applying storytelling in practice.

In addition to self-efficacy, perceived barriers emerged as significant negative predictors of storytelling use. Specifically, teachers who reported higher levels of didactic constraints (e.g., curriculum demands) were less likely to implement storytelling in their classrooms. This finding highlights the practical challenges that can hinder the translation of positive intentions and self-efficacy into actual teaching practice. While self-efficacy supports the motivation to innovate, structural and contextual barriers can limit its effect. These results are consistent with prior research indicating that both personal and environmental factors jointly shape the adoption of innovative teaching methods (Dilek Belet & Dala, 2010; Kotluk & Kocakaya, 2017). Surprisingly, time constraints did not emerge as a significant associated variable. This result suggests that even if teachers perceive time as a potential barrier, more specific didactic or organizational obstacles more strongly impede the integration of storytelling into classroom practice.

The findings also support the presence of a moderating factor of perceived school climate for innovation. Specifically, the interaction between self-efficacy and perceived innovation climate was significant. Teachers with high self-efficacy were much more likely to use storytelling in schools perceived as more conducive to innovation. This moderation aligns with social-cognitive models (e.g., Bandura, 1997), which emphasize that individual agency is shaped not only by internal beliefs but also by environmental resources, such as positive and collaborative school climate (Skaalvik & Skaalvik, 2007). Interestingly, perceived organizational climate alone exhibited a negative main effect. This result suggests that perceiving a supportive climate by itself does not increase storytelling use and is even associated with lower reported use. This may reflect a phenomenon whereby teachers in schools perceived as innovative feel constrained by institutional expectations or norms (DiMaggio & Powell, 1983; Fullan, 2007), limiting their autonomous implementation of storytelling. Research on the adoption of innovative teaching practices, such as storytelling, has often focused exclusively on either psychological or contextual dimensions. This result suggests that innovation in schools may be challenging for teachers when it implies changes perceived as demanding or difficult to manage. In line with implementation and change frameworks (Wandersman et al., 2008), successful adoption of new practices requires not only organizational support but also the strengthening of teachers' personal resources, particularly their self-efficacy in managing change. When innovation is accompanied by

opportunities to develop confidence, skills, and mastery experiences, teachers are more likely to engage with and sustain approaches such as storytelling. This is consistent with evidence from large-scale implementation studies showing that innovation becomes effective when teachers are supported throughout the change process and when their sense of competence is explicitly reinforced (Velasco et al., 2015).

4.1. Limitations

Despite the results, this study has several limitations. First, the sample size was relatively small, and post hoc power analyses indicated that the study reached an acceptable, but not optimal statistical power to detect medium-sized effects (Maxwell, 2004). In particular, the moderation model reached a power of approximately 0.60, which is below the conventional threshold of 0.80. Second, the study relied on self-reported data, which may be subject to social desirability bias and inflate associations among variables. Finally, the research has a cross-sectional design, preventing any hypothesis of causality. To gain a more complete picture, future research should employ longitudinal designs to examine the factors that support a sustained and consistent use of storytelling over time and to identify what promotes its integration into teachers' pedagogical practices. Furthermore, research should consider other factors that may influence the adoption of active teaching methodologies, such as teachers' role identity (Delbosq et al., 2024).

4.2. Practical Implications

The findings offer meaningful indications for professional development: enhancing teachers' self-efficacy and fostering an institutional culture of innovation may act synergistically to increase the use of storytelling and other innovative pedagogical practices. Teachers are more likely to translate self-efficacy beliefs into action when they perceive a supportive school climate and view potential barriers as manageable. Conversely, pushing for system-level-change without a parallel strengthening of teachers' sense of self-efficacy may have counterproductive effects, leading to overwhelming rather than empowering feelings. This intention–action gap suggests that positive attitudes alone are insufficient in the absence of both personal and contextual resources. School-wide, long-term initiatives that foster an innovative and cooperative climate may be more effective than isolated teacher-level interventions. Moreover, the differences between primary and secondary school teachers underscore the need for tailored strategies: teachers operating within stricter curricular structures, such as those in secondary education, may require targeted support aimed at increasing autonomy, flexibility, and opportunities to adopt narrative-based approaches.

Overall, the results highlight the importance of considering multiple perspectives and levels of school context to translate implementation policies into practice, thereby promoting an effective and suitable integration of pedagogical strategies and participative approaches (Bruun Jensen & Simovska, 2005). Effective and sustainable integration of storytelling therefore requires aligning personal resources with supportive school environments that enable teachers to translate their intentions into practice.

5. Conclusions

This study explored the facilitators of teachers' use of storytelling in the classroom. The findings highlight the importance of considering both individual psychological resources (e.g., self-efficacy) and the organizational climate when promoting evidence-based, engaging teaching strategies such as storytelling.

Overall, the results addressed the three aims of the study by showing (1) clear differences between primary and secondary teachers in attitudes, self-efficacy, and perceived barriers; (2) the central role of self-efficacy and the hindering effect of didactic constraints in pre-

dicting storytelling use; and (3) a significant moderating effect of the organizational climate for innovation, which strengthens the impact of self-efficacy on actual implementation.

These results guided the development of the PLACES project materials. The training package included practical guidance on how to use storytelling in the classroom, followed by a phase of field experimentation and qualitative evaluation through interviews and focus groups. The training was also designed to enhance teachers' self-efficacy and engagement, recognizing their central role in implementing change. In line with the differences observed between primary and secondary teachers, the training materials and activities were also tailored to the specific needs of each school level, ensuring targeted support and greater applicability of storytelling in both contexts.

Moreover, opportunities for group discussion were encouraged to strengthen shared understanding and reinforce teachers' self-efficacy in adopting storytelling. When feasible, the school principal was also involved to support alignment and facilitate the integration of the approach. However, this occurred only in specific cases rather than as a systematic, school-wide strategy.

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Abbreviations

The following abbreviations are used in this manuscript:

ESD	Education for Sustainable Development
SDGs	Sustainable Development Goals
PLACES	Playful LeArning and Storytelling that Create Engagement for the SDGs among children and young people

References

Adl-Amini, K., Meßner, M. T., & Hardy, I. (2025). A simulation game for placement decision-making: Fostering reflection and belief change about inclusion in teacher education. *International Journal of Inclusive Education*, *29*(7), 1197–1213. [CrossRef]

Agirreazkuenaga, L. (2019). Embedding sustainable development goals in education. Teachers' perspective about education for sustainability in the Basque Autonomous Community. *Sustainability*, *11*(5), 1496. [CrossRef]

Agosto, D. E. (2016). Why storytelling matters: Unveiling the literacy benefits of storytelling. *Children and Libraries*, *14*(2), 21. [CrossRef]

Aiken, L. S., West, S. G., & Reno, R. R. (2010). *Multiple regression: Testing and interpreting interactions* (Reprinted). SAGE.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. [CrossRef]

Alkaaf, F. (2017). Perspectives of learners and teachers on implementing the storytelling strategy as a way to develop story writing skills among middle school students. *Cogent Education*, *4*(1), 1348315. [CrossRef]

AL-Takhayneh, S. K., Karaki, W., Hasan, R. A., Chang, B.-L., Shaikh, J. M., & Kanwal, W. (2022). Teachers' psychological resistance to digital innovation in jordanian entrepreneurship and business schools: Moderation of teachers' psychology and attitude toward educational technologies. *Frontiers in Psychology*, *13*, 1004078. [CrossRef]

Aquilina, G., Dello Iacono, U., Gabelli, L., Picariello, L., Scettri, G., & Termini, G. (2024). "Romeo and Juliet: A Love out of the Shell": Using storytelling to address students' misconceptions and promote modeling competencies in science. *Education Sciences*, *14*(3), 239. [CrossRef]

Attard, A., Iorio, E. D., Geven, K. M., & Sánta, R. (2010). *Student-centred learning: Toolkit for students, staff and higher education institutions*. European Students' Union (ESU).

Avanzi, L., Miglioretti, M., Velasco, V., Balducci, C., Vecchio, L., Fraccaroli, F., & Skaalvik, E. M. (2013). Cross-validation of the Norwegian Teacher's Self-Efficacy Scale (NTSES). *Teaching and Teacher Education*, *31*, 69–78. [CrossRef]

Bandura, A. (1997). *Self efficacy: The exercise of control*. W. H. Freeman.

Barkley, E. F., Cross, K. P., & Major, C. H. (2014). *Collaborative learning techniques: A handbook for college faculty* (2nd ed.). Jossey-Bass.

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, *1*(3), 185–216. [CrossRef]

Bruner, J. S. (1990). *Acts of meaning*. Harvard University Press.

Bruun Jensen, B., & Simovska, V. (2005). Involving students in learning and health promotion processes—Clarifying why? What? and how? *Promotion & Education*, *12*(3–4), 150–156. [CrossRef]

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed., reprint). Psychology Press.

Collins, S., Steele, T., & Nelson, M. (2023). Storytelling as pedagogy: The power of chemistry stories as a tool for classroom engagement. *Journal of Chemical Education*, *100*(7), 2664–2672. [CrossRef]

Crispiatico, M. G., Bestetti, P., Velasco, V., Celata, C., Coppola, L., & Estensione Lst, G. (2020). La progettazione scolastica orientata alla promozione della salute. Un percorso di dialogo intersettoriale per l'allineamento delle competenze chiave per l'apprendimento e «life skill». *Journal of Educational, Cultural and Psychological Studies (ECPS Journal)*, *22*, 3. [CrossRef]

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297–334. [CrossRef]

Delbosq, S., Vecchio, L. P., Gruppo HBSC Lombardia 2022 & Velasco, V. (2024). Measuring the professional identity of italian teachers: The development of the Teacher Role Identity Questionnaire (TRIQ). *Identity*, *25*, 534–551. [CrossRef]

Dewey, J. (1997). *Democracy and education: An introduction to the philosophy of education*. Free Press.

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, *64*(1), 135–168. [CrossRef]

Dilek Belet, S., & Dala, S. (2010). The use of storytelling to develop the primary school students' critical reading skill: The primary education pre-service teachers' opinions. *Procedia—Social and Behavioral Sciences*, *9*, 1830–1834. [CrossRef]

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, *48*(2), 147. [CrossRef]

Dunn, T. M., & Cherup, S. (2023). Storytelling and success: How storytelling can be used to promote diversity, cross-cultural understanding, and confidence in the classroom. *Journal of Education*, *203*(3), 690–699. [CrossRef]

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE.

Freire, P. (1970). *Pedagogy of the oppressed: 30th anniversary edition* (M. B. Ramos, Trans.; 30th anniversary edition). Bloomsbury Publishing.

Fullan, M. (2007). *The new meaning of educational change* (4th ed.). Teachers College Press [u.a.].

García-González, E., Jiménez-Fontana, R., & Azcárate, P. (2020). Education for sustainability and the sustainable development goals: Pre-service teachers' perceptions and knowledge. *Sustainability*, *12*(18), 7741. [CrossRef]

Heo, M. (2009). Digital storytelling: An empirical study of the impact of digital storytelling on pre-service teachers' self-efficacy and dispositions towards educational technology. *Journal of Educational Multimedia and Hypermedia*, *18*(4), 405–428.

IUPHE. (2021). *Strategic plan 2021–2026: Advancing health promotion for sustainable development*. International Union for Health Promotion and Education (IUHPE). Available online: https://www.iuhpe.org (accessed on 27 November 2024).

Khatter, A., Thalaachawr, K., & Blyth, M. (2024). Student engagement and fostering ownership of learning. *Journal of Applied Learning & Teaching*, *7*(1), 291–302. [CrossRef]

Kotluk, N., & Kocakaya, S. (2017). The effect of creating digital storytelling on secondary school students' academic achievement, self efficacy perceptions and attitudes toward physics. *International Journal of Research in Education and Science (IJRES)*, *3*(1), 218–227.

Mastrothanasis, K., & Kladaki, M. (2025). Drama-based methodologies and teachers' self-efficacy in reading instruction. *Irish Educational Studies*, *74*, 1–17. [CrossRef]

Maxwell, S. E. (2004). The persistence of underpowered studies in psychological research: Causes, consequences, and remedies. *Psychological Methods*, *9*(2), 147–163. [CrossRef] [PubMed]

McDonald, R. P. (2013). *Test theory: A unified treatment*. Psychology Press. [CrossRef]

Nicolopoulou, A., Cortina, K. S., Ilgaz, H., Cates, C. B., & De Sá, A. B. (2015). Using a narrative- and play-based activity to promote low-income preschoolers' oral language, emergent literacy, and social competence. *Early Childhood Research Quarterly*, *31*, 147–162. [CrossRef] [PubMed]

Niemi, H., & Niu, S. J. (2021). Digital storytelling enhancing chinese primary school students' self-efficacy in mathematics learning. *Journal of Pacific Rim Psychology*, *15*, 1834490921991432. [CrossRef]

OECD. (2019). *TALIS 2018 results (volume I): Teachers and school leaders as lifelong learners*. OECD. [CrossRef]

Oros, A. L. (2007). Let's debate: Active learning encourages student participation and critical thinking. *Journal of Political Science Education*, *3*(3), 293–311. [CrossRef]

Palioura, M., Rapti, S., & Sapounidis, T. (2024, September 20–22). *Educational robotics integration into storytelling activities to promote kindergarteners' communication, collaboration, creativity, and critical thinking. A scoping review: 2014–2024*. 2024 9th South-East Europe Design Automation, Computer Engineering, Computer Networks and Social Media Conference (SEEDA-CECNSM) (pp. 134–139), Athens, Greece. [CrossRef]

Proyer, R. T., Tandler, N., & Brauer, K. (2019). Playfulness and creativity. In *Creativity and humor* (pp. 43–60). Elsevier. [CrossRef]

Rose, M. S., & Johnson, M. (2025). The power of storytelling: Creatively facilitating conceptual change in the classroom. *Journal of Educational Research and Practice*, *15*(1), 8. [CrossRef]

Sarıca, H. Ç. (2023). Emotions and digital storytelling in the educational context: A systematic review. *Review of Education*, *11*(3), e3430. [CrossRef]

Seng, C. S. H. (2017). *Teachers' and Students' Perceptions of Storytelling as a Language Teaching and Learning Resource* [Ph.D. thesis, University of Sheffield].

Skaalvik, E. M., & Skaalvik, S. (2007). Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout. *Journal of Educational Psychology*, *99*(3), 611–625. [CrossRef]

Tengler, K., & Sabitzer, B. (2022). Examining teachers' intention to integrate robotics-based storytelling activities in primary schools. *International Journal of Interactive Mobile Technologies (iJIM)*, *16*(06), 221–240. [CrossRef]

Timm, J.-M., & Barth, M. (2021). Making education for sustainable development happen in elementary schools: The role of teachers. *Environmental Education Research*, *27*(1), 50–66. [CrossRef]

UNESCO. (2012). *Education for sustainable development: Sourcebook*. United Nations Educational, Scientific and Cultural Organization.

UNESCO. (2017). *Education for sustainable development goals: Learning objectives*. United Nations Educational, Scientific and Cultural Organization.

Velasco, V., Griffin, K. W., Antichi, M., & Celata, C. (2015). A large-scale initiative to disseminate an evidence-based drug abuse prevention program in Italy: Lessons learned for practitioners and researchers. *Evaluation and Program Planning*, *52*, 27–38. [CrossRef] [PubMed]

Wandersman, A., Duffy, J., Flaspohler, P., Noonan, R., Lubell, K., Stillman, L., Blachman, M., Dunville, R., & Saul, J. (2008). Bridging the gap between prevention research and practice: The interactive systems framework for dissemination and implementation. *American Journal of Community Psychology*, *41*(3–4), 171–181. [CrossRef] [PubMed]

World Health Organization. (1984). *Health promotion: A discussion document on the concept and principles: Summary report of the Working Group on Concept and Principles of Health Promotion*. WHO Regional Office for Europe. Available online: https://iris.who.int/handle/10665/107835 (accessed on 19 March 2014).