

Exploring the impact of possibility thinking training on educators' creative self-perceptions: A mixed methods action research study in Maltese schools

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ABSTRACT

Creativity in education aims to foster mindsets and practices that envision and enact “what could be”. Possibility Thinking(PT) offers an outlet for teachers to hone in on their own self-perceptions while also cultivating environments that nurture creativity and possibility thinking in their students. Despite a sound body of conceptual literature (Craft, 2001, 2013; Glăveanu, 2017) and scant empirical studies (Burnard et al., 2006; Gregoriou, 2023) related to possibility thinking, there is a paucity of empirical studies employing mixed-methods to explore possibility thinking within authentic contexts. This article presents findings from a twelve-month mixed-method project conducted in four Maltese primary schools with a total of 304 educators. Qualitative and quantitative data were integrated to offer a comprehensive perspective. Adopting a pragmatism-informed approach and guided by the Five As of creativity (Glăveanu, 2012) – Actor, Action, Artefact, Audience, Affordances, this study integrates qualitative and quantitative methods to offer a holistic understanding of how PT training can be embedded in education to enhance creative self-perception and agency among educators. Quantitative data were collected through validated self-report scales measuring the creative self, creative mindsets, and PT dispositions. Qualitative data, gathered via reflective journals, observations, and thematic analysis, captured the contextual and emotional dimensions of practice. While no statistically significant group or time effects were found across quantitative measures in a two-way between-subjects ANOVA, PT and its subdimensionsshowed strong intercorrelations ($r = .85$ to $.93$, $p < .01$) and moderate associations with growth mindset ($r = .26$ to $.34$, $p < .05$) and creative self ($r = .30$ to $.53$, $p < .01$) at both pre- and post-test. Thematic analysis revealed four key themes: emotional engagement, practical relevance, structural constraints, and the importance of institutional support. These findings suggest that PT training, especially when embedded within reflective and supportive environments, can foster gradual yet meaningful shifts in teachers' creative self-perceptions and pedagogical agency. Implications are discussed for professional development and creativity research in education.

1. Introduction

In contemporary educational discourse, creativity is increasingly recognised as a critical competency that supports problem-solving, and the generation of new ideas (Long et al., 2022). As school systems strive to prepare students for an uncertain future (Hatch et al., 2021), educators are tasked with cultivating environments where creative thinking is not only encouraged but also developed (Craft et al., 2013). Translated to theoretical concepts, educators are tasked with developing their students' creative experience (Glăveanu and Beghetto, 2020) which

involves meaningful interactions between individuals and their environments characterised by open-ended exploration, non-linear processes, multiple viewpoints, and a forward-looking orientation.

Traditional models of teacher professional development often focus on skill acquisition or subject-specific expertise, often in formal learning settings. Emerging research suggests that fostering an orientation towards ‘possibility thinking’ (PT) may offer a more transformative pathway (Craft et al., 2013; Glăveanu & Beghetto, 2021) both in how teachers execute their teaching and also for use in their personal lives.

Possibility thinking (PT), is defined as an openness to exploring

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“what could be”, “What might have been”, and “what might yet become” (Glăveanu et al., 2024). Unlike conventional approaches that centre the acquisition of correct answers or procedural knowledge, PT emphasizes the imaginative generation of multiple perspectives and the deconstruction of existing assumptions (Craft and Chappell, 2014). In the classroom this orientation can lead teachers to re-envision their roles from mere conveyers of content to facilitators of creative exploration, thereby fostering a more dynamic and engaging learning environment (Glăveanu et al. 2024).

Despite theoretical advances in the conceptualisation of PT and its potential to transform educational practices (Gregoriou, 2023), there is limited empirical research exploring its implementation in education using mixed-methods designs. By integrating quantitative measures and qualitative insights, mixed-methods research offers a comprehensive approach to understanding complex phenomena (Timans et al., 2019), particularly through lived experiences (Plano Clark and Ivankova, 2016). This is also the case with pedagogical approaches (Green, 2007). One approach where data can be mixed to obtain a comprehensive understanding of a particular setting is through action research, where cyclical processes of planning, acting, observing, and reflecting allow for adjustments that can better capture the evolving nature of educational interventions (Hill, 2014).

The current study addresses two interrelated gaps in the literature. First, while the literature on creativity in education has expanded significantly (Starko, 2021), to-date, studies have not focused on the integration of PT into teacher professional development through a mixed-methods approach. The second gap we identified relates to the lack of research that has relied on qualitative accounts. Although representative of populations, most quantitative studies, do not include reference to lived experiences that contribute to the understanding of ‘why’ and ‘how’ things may unfold in the real world. By bringing together introspection through the use of self-report scales and qualitative accounts, we capture the dynamic perspectives of the sample population. Therefore, our study seeks to shed light on how PT training can influence teachers’ creative self-perceptions and practices through a carefully designed mixed-methods intervention.

Guided by the Five A’s of creativity framework (Glăveanu, 2012), which posits that creative processes are shaped by the interplay among Actor, Action, Artefact, Affordances, and Audience, this study explores how these elements interact in the context of primary school education. We explore the ways in which PT training impacts teachers’ creative self-concept, their self-perceptions about their engagement with the possible alongside qualitative insights.

Current research predominantly addresses creativity in educational settings by focusing on measurable constructs like creative self-efficacy and creative mindset (Karwowski, 2014; Karwowski et al., 2018). However, the nuanced process through which teachers engage with PT and contextual dynamics that either enable or constrain this process have received considerably less attention. While action research is a well-established method for facilitating and documenting change in educational practices (Hill, 2014), its application in creativity studies, particularly those referring to PT has not been realised yet. Action research (AR) is a tool for change and improvement at the local level (Cohen et al., 2007). It involves conducting systematic enquiries in one’s own practices to enhance their effectiveness. Cohen and colleagues go on to state that this method can be used in most settings involving people, tasks, and procedures. As a method, AR is iterative and supports reflection aimed at improving practice (Feldman et al., 2008).

Action research provides the opportunity to document the challenges and successes over a period of time instead of giving a one-time snapshot.

To this end, two overarching research questions were identified to drive the study.

1. How can mixed-methods action research principles be applied to explore educators’ engagement with PT in a primary school setting?

This question aims to explore the processes by which teachers and researchers became active participants in the research process. We seek to document how teachers reflect upon, adapt and embed PT strategies in their practice.

2. How does PT training influence primary school teachers’ creative self-perceptions and engagement with “pedagogies of the possible”?

Through this question, we hope to investigate the impact of a structured PT training program on the way teachers perceive their creative abilities and, consequently, how they modify (it at all) their instructional practices. The identified mixed-methods approach is aimed to provide a comprehensive understanding of the effects that PT training may have.

By addressing these research questions and the hypotheses outlined in the methods, our study aims to contribute to a deeper understanding of how PT training can be operationalized in primary school education. Furthermore, it highlights how action research can serve as a vehicle for a potential change in pedagogical practices.

2. Background

Possibility Thinking (PT) is linked to creative experience, which involves open-ended, future-oriented, and meaningful interactions between individuals and their environments (Glăveanu and Beghetto, 2020). While this definition aligns with standard conceptions of creativity, it emphasizes meaningfulness alongside novelty and effectiveness. Current literature offers limited work on “pedagogies of the possible,” which aim to develop new possibilities through open, reflective, and critical engagement with diverse perspectives. This gap is particularly notable when training teachers to develop creative self-perceptions through exposure to PT methods. Drawing upon Glăveanu’s (2012) Five A’s framework—Actor, Action, Artefact, Affordances, and Audience—this study explores via a pragmatic approach how these elements interact with PT, focusing on their reciprocal influence on the educational environment.

2.1. Creativity research in schools

As part of an action research project, this article focuses on the correlation between dispositions to possibility thinking, the creative self and creative mindsets, and their influence on teachers’ engagement with PT. Moreover, this article complements the findings from quantitative methods with qualitative observations. Most empirical PT studies have focused on students (Cremin et al., 2006), with limited attention to how teachers experience and enact PT in practice (Fischer, 2020). Given their pivotal role, understanding teachers’ self-perceptions and practices is essential to cultivating PT in classrooms. In today’s volatile and uncertain world (Grant, 2023), educators are urged to redesign practices that foster creative resilience and possibility (Mangion and Valqueresma, 2023).

2.2. Creative self-beliefs and mindsets

Creative self-beliefs reflect one’s confidence and identity as a creative individual, rooted in Bandura’s (1997) concept of self-efficacy and elaborated by Tierney and Farmer (2002). These beliefs include both creative self-efficacy and creative personal identity (Karwowski et al., 2013), which are essential for teachers engaging in creative practices.

To foster creative growth, individuals must believe that creative abilities can be developed (Karwowski, 2022). Creative mindsets are implicit beliefs, often unconscious and difficult to express. Katz-Buonincontro et al. (2020) found that teachers hold varied beliefs about students’ creative potential, ranging from growth-oriented to fixed, and in line with Karwowski’s (2014) notion of simultaneity, some embraced both. Their study highlights how teachers’ beliefs are shaped by

intersecting personal and professional influences, including family background, genetics, and educational experience.

Recent empirical work has shown that inducing a creative mindset can positively shift individuals' beliefs about creativity, though these shifts may not always translate into immediate changes in creative performance. (Katz-Buonincontro et al., 2024)

2.3. Possibility thinking and possibility spaces

Introduced by Craft (2001), PT refers to imaginative engagement with 'what might be' rather than 'what is', using prompts such as 'What if?' and 'As if?' to explore creative possibilities. Originally applied to student learning, PT has been extended to explore problem finding and generative thought (Burnard et al., 2006; Craft et al., 2013; Gregoriou, 2023).

Possibility Spaces (Glăveanu, 2023) are structured, yet flexible interventions designed to engage participants with 'the possible', fostering creativity, imagination, and wonder to cultivate PT. These spaces are adaptable across ages and contexts, including schools and communities. Rooted in Possibility Studies, these spaces integrate reflection, action, and interaction, drawing on models such as Futures Literacy Labs (Miller, 2018a,b) and Pop-Up Labs (Staunas and Kofoed, 2007).

Exploring 'the possible' can equip societies with skills for navigating 21st century complexities by envisioning and enabling desirable futures. We propose that Possibility Spaces enhance PT by strengthening individual creative self-concept and mindsets, constructs that influence each other bidirectionally. Similarly, the relationship between Possibility Spaces and PT is mutually reinforcing. This conceptual interplay informs the framework guiding this study (see Fig. 1).

3. The research context

The study draws on professional development sessions for teachers. Four primary schools offering an education to students throughout their primary years informed the Action Research (AR) project with one school acting as the experimental school while the other three were control schools.

The experimental school, Alpha, engaged in the AR project for two scholastic years. The findings in this paper reflect the first year of the project. School Alpha expressed a commitment to receive training explicitly about the cultivation of Possibility Thinking. To this end, an AR project involving the collection of data on dispositions to PT, and the creative self, together with training interventions for teachers and training for young students, took place between November 2023 and May 2024. The director of all the primary schools in the district facilitated access to three other primary schools. These schools (Beta, Gamma, Omega) acted as a control group. A notable factor that influenced all staff working at the experimental school is that in early 2024, they were informed that the school they were working in, would be demolished. An alternative location was not given at that time, and this

constituted a considerable emotional burden on the staff. Notwithstanding these circumstances, they kept on working on PT throughout the scholastic year.

4. Method

4.1. The methodological approach

Grounded in AR principles, this study evaluates the effectiveness of PT training on primary school teachers' creative self-perceptions. It seeks to understand how the training influences engagement with "pedagogies of the possible," specifically through Possibility Spaces—interactive frameworks that foster transformative experiences and engagement with creative possibilities (Glăveanu, 2023). Consensus on a single definition of AR has not yet been reached (Altrichter et al., 2002). However, it can be a democratic predominantly participative methodology that allows participants to build knowledge in action (Bradbury, 2015). Other research traditions outline the methodological approach before a study is initiated. In contrast, since AR is intuitive to the context within which it is held, methodologies unfold while the research is being conducted (Herr and Anderson, 2005).

4.2. Study design

We employed a convergent parallel mixed-methods design (Creswell and Plano Clark, 2011), where qualitative and quantitative data were collected and analyzed separately but integrated during interpretation. This design was chosen for its strength in providing a comprehensive understanding of both measurable outcomes as well as gaining contextual nuance. Fig. 2 outlines the mixed-method design used. This approach was embedded in a cyclical action research framework, enabling simultaneous collection and integration of qualitative and quantitative data. This approach aligns with pragmatist epistemology and the study's dual aims of understanding both process and outcome.

By adopting a pragmatism-informed approach, this study integrates qualitative and quantitative methods to offer a holistic understanding of how PT training can be embedded in education to enhance creative self-perception and agency among educators. The pragmatism approach balances quantitative and qualitative perspectives, allowing the production of actionable knowledge that can inform and improve educational practices (Gillespie, Glăveanu and de Saint Laurent, 2024), supporting the exploration of "Possibility Spaces" in a way that is both theoretically robust and practically relevant. Within an AR approach, this study follows a mixed-methods design, integrating quantitative self-report scales with qualitative data from researcher notes, teacher exchanges, and observations. The methods and results section in this paper is organised into two methods segments.

4.3. Measures and interventions

All schools engaged with an initial pre-test administered between November 2023 and January 2024, and a post-test in April 2024 as indicated in Fig. 3. Moreover, the teachers in each school underwent training as part of their professional development. School Alpha received two full-day training sessions on PT, including theoretical foundations, practice on how to implement PT initiatives, and explicit links to the curriculum and how PT could be nurtured in class. Apart from these two intensive training days, as part of the AR project, School Alpha had access to additional school visits where the Primary Investigator (PI) could observe teachers in their classrooms and have meetings with the school management, teachers, and the students.

On the other hand, School Beta received one workshop of six hours on PT, and School Gamma and School Omega received a two hour workshop on teaching creatively and critical thinking, respectively.

Quantitatively, we measured creative self-beliefs. We used the Short Scale of Creative Self (Karwowski et al., 2018) to measure two aspects of

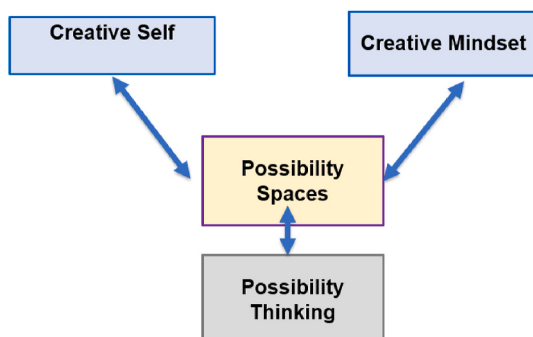


Fig. 1. Conceptual framework.

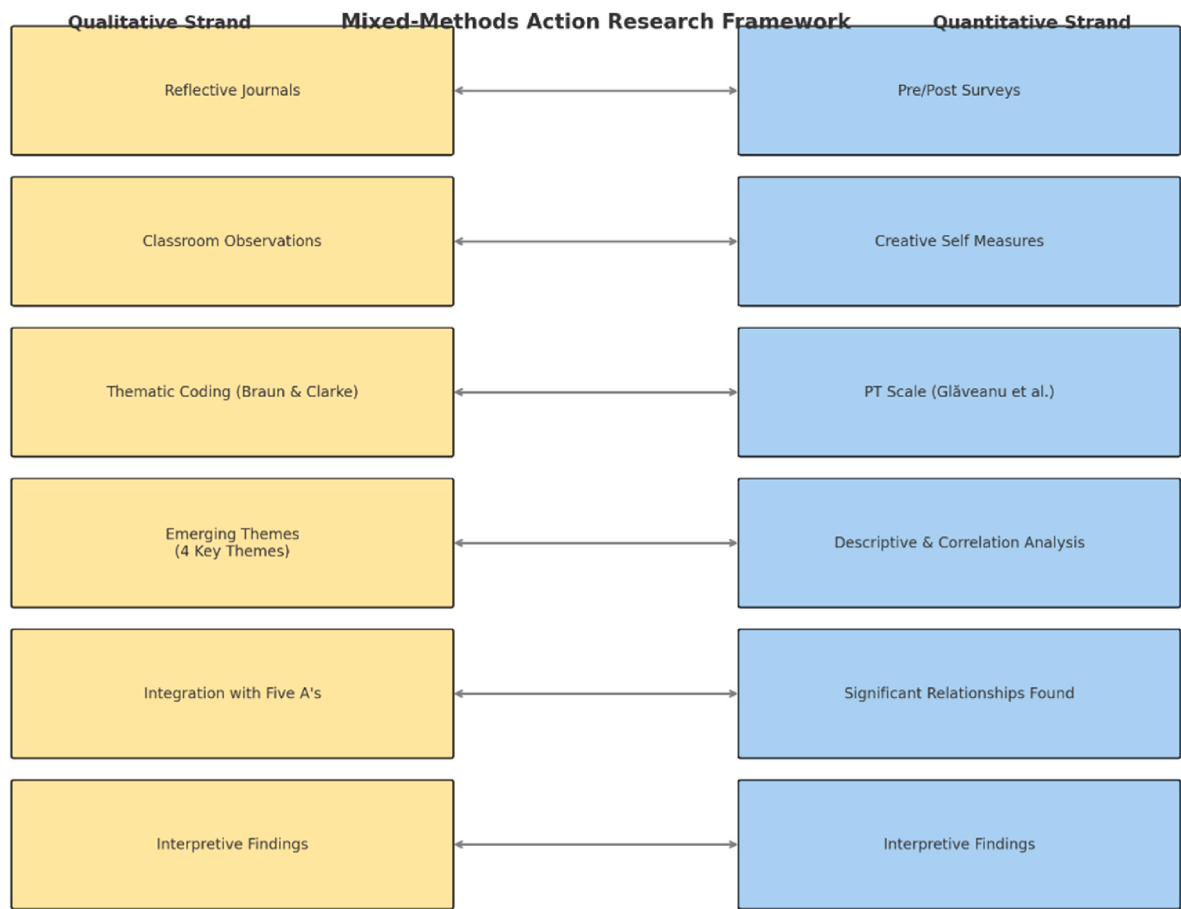


Fig. 2. Overview of the mixed method design adopted.

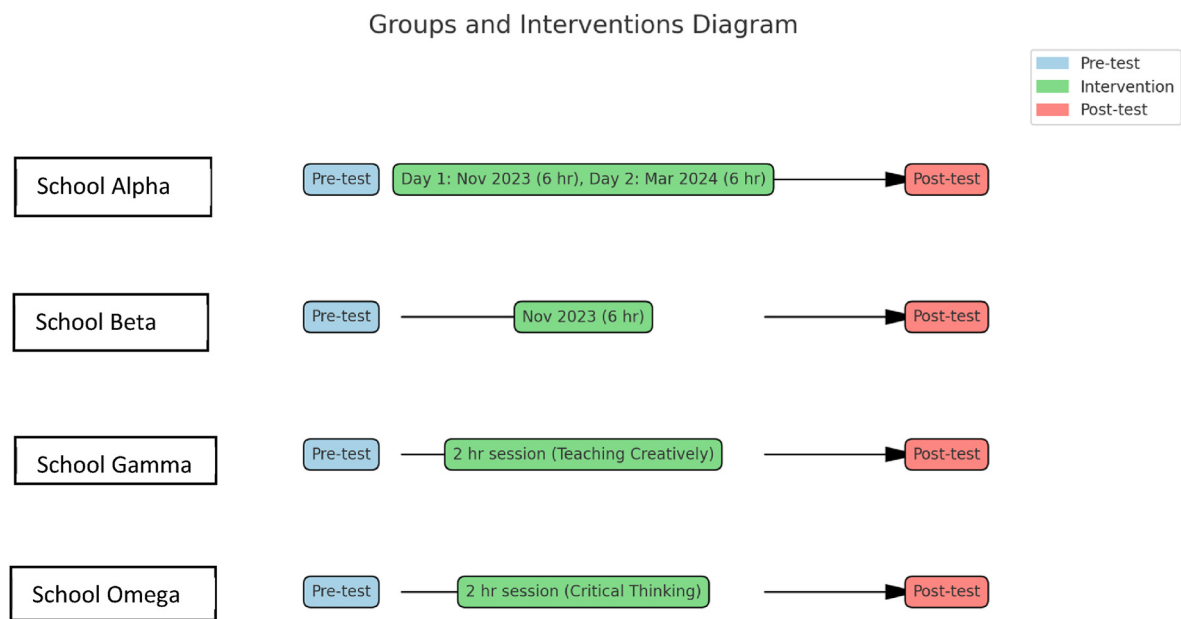


Fig. 3. Summary of the pre/post-test and training interventions.

teachers’ creative self-beliefs: creative self-efficacy and creative personal identity. We also used the Creative Mindset Scale (Karwowski et al., 2013) to measure further two aspects: a growth mindset and a fixed mindset. Finally, we used the Possibility Thinking Scale (Glăveanu et al. 2023) to measure three more aspects: awareness of the possible,

excitement about the possible, and exploration of the possible. Qualitatively, context specific data was collected through the use of reflective journaling, classroom observations, and the field notes.

5. Qualitative data analysis

The AR project involved various visits to the experimental school taking part in the study. After each visit, the PI would dedicate time to “debrief” to review and reflect on the visit. To structure the reflective process, a journal was kept throughout the project. Setting this approach apart from other forms of journaling was the deliberate use of [Gibbs \(1988\)](#) reflective cycle, paired with mindful methodology loosely based on [Lemon’s \(2017\)](#) procedure. This practice facilitated insights still fresh in mind after each session. These insights were promptly captured and logged. While this method required dedicated time, diligence, and effort to maintain, the benefits of organising thoughts and capturing fresh insights outweighed these slight challenges. A sample journal entry clearly indicating how the model by [Gibbs \(1988\)](#) was employed to take mindful notes after each session indicates the detailed account of the observations is available in the Supplementary Materials linked to this article.

5.1. Coding protocol

Qualitative data included reflective journals, classroom observations, and field notes. We adopted [Braun and Clarke’s \(2006\)](#) six-phase framework to conduct a thematic analysis. [Braun and Clarke \(2006\)](#) define thematic analysis as “a method for identifying, analysing, and reporting patterns (themes) within data” (p. 6). Adhering to [Braun and Clarke’s \(2006\)](#) six-phase thematic analysis framework, a semantic approach was taken. Two coders, the PI and an expert in the field of creativity in education, were involved in the analysis of the qualitative data. The two coders went through the [Braun and Clarke \(2006\)](#) protocol separately. Essentially, coders first familiarised themselves with the data by reading through the observation notes. This led to the initial generation of codes and their definition ([Table 1](#)) followed by the search for emerging themes. The themes were reviewed, defined and named as can be seen in [Table 2](#) below. Discrepancies between the coders were resolved through consensus. This process was followed by the writing of the findings for the purpose of this article. The analysis remained focused on the explicit content of the data.

The emerging themes were broadly defined to help clarify the scope and focus of each one in relation to the study ([Table 2](#)). This procedure offered a structured perspective on how PT unfolds and is perceived by the participants of the study based on the notes of the PI.

5.2. Emerging themes

The following themes reflect teachers’ perceptions and engagement with PT, as observed through reflective practice, classroom observation, and journaling. An overview of the emerging codes, which were subsequently grouped into categories can be observed in [Table 3](#) below. The categories led to the emergence of themes. From the data four overarching themes emerged. The themes were predominantly informed by observation notes from visits to schools, particularly School Alpha’s classroom sessions and meetings with teachers, as well as by the reflective journals kept by the PI. They reflect not only participants’ perceptions but also how they engaged with and enacted Possibility Thinking. Each theme captures distinct, yet interrelated elements of the participants’ experiences and the contextual factors that shape their engagement based on the researcher’s observations.

The first theme, *Enthusiasm and Emotional Journeys*, was primarily informed by observation data and reflective entries from School Alpha. It emerged early on in the analysis as teachers often presented moderate to high levels of curiosity and engagement when introduced to the creativity/PT oriented techniques. The observations indicated that the teachers “participated enthusiastically” in the initial group discussions. This positivity, however was tempered by moments of fatigue particularly towards the end of the sessions and after January 2024 when the staff at the experimental school was informed that they would be

Table 1
Definition of the codes.

Code	Definition for this study
Teacher Engagement	The degree to which teachers actively participate in workshop activities, discussions, and classroom applications related to possibility thinking.
Enthusiasm	Expressions of excitement, curiosity, or motivation among teachers and/or students when introduced to new methods or ideas.
Fatigue	Physical or mental tiredness noted among teachers or students, often linked to timing (e.g., late-day workshops, extended sessions).
Concerns About Workload	Fears or reservations regarding the additional effort or responsibilities that might accompany adopting new teaching methods (e.g., possibility thinking).
Scheduling/Time Constraints	Challenges arising from limited time availability, competing demands in the school day, or the timing of workshops that impact participation and effectiveness
Interactive Activities	Practical, hands-on tasks—such as group discussions, role-playing, or playful exercises—that encourage engagement and collaborative learning.
Playfulness	The willingness to embrace imaginative, open-ended, and sometimes seemingly ‘frivolous’ elements (e.g., creative prompts), which can foster innovation and break routine thinking
Practical Examples	Real-world or classroom-based scenarios used to illustrate how possibility thinking can be integrated seamlessly into daily teaching practices.
Support from SMT	The extent of backing and endorsement provided by the Senior Management Team (SMT), enabling or hindering the successful implementation of new initiatives
Fear of Appearing “Silly”	Hesitation or anxiety about sharing creative, unorthodox ideas in front of peers, stemming from concerns about judgement or seeming unprofessional
Safe Space for Creativity	The creation of an environment—both physical and psychological—where participants feel comfortable experimenting, making mistakes, and exploring new ideas without ridicule.
Student Hesitation	Initial reluctance or nervousness among pupils when asked to engage in possibility thinking tasks, especially those requiring imaginative leaps or playful participation
Positive Emotional Responses	Indicators of satisfaction, relief, optimism, or excitement after experiencing workshops or lessons that successfully incorporated possibility thinking

relocated and that the school they were working in would be demolished. This had a hard impact on the teachers and their morale. The concerns related to this matter along with others did not stop the teachers’ willingness. One of the worries of the teachers who were most keen was related to how they would keep up the momentum of the project. These emotional highs and lows provided insight into the psychological dimensions to be acknowledged when adopting new approaches.

The second theme, *Practical Application and Relevance*, underscored how critical it is for the methods related to PT training to be directly applicable in the day-to-day classroom practice. Real-life examples such as linking prompts on how to use PT methods to existing learning objectives, increased buy-in among teachers and students alike. When teachers could see explicit links to the curriculum, they were more likely to embrace PT as a worthwhile addition rather than an extra task. Conversely, when workshops lacked clear demonstrations of how to integrate such strategies within their existing workloads, participant expressed scepticism about their feasibility.

The third theme, *Constraints and Concerns*, captured the barriers that potentially inhibited uptake and transfer of the technique to practice PT. While teachers were broadly receptive, reflections reference the difficulties posed by scheduling constraints, limited resources, and a fear of increased workload. Some participants worried that play-based activities could be perceived as too time-consuming amidst packed timetables due to the extensive curriculum to be covered and the pressure for excellence in examination performance. These tensions between valuing creative approaches and contending with real-world pressures emerged

Table 2
Definition of themes.

Theme	Definition
1. Enthusiasm and Emotional Journeys	Encompasses both the initial excitement and curiosity observed when teachers and students encounter new, creative methods, as well as the emotional challenges (e.g., fatigue, apprehension) that may arise. This theme reflects the spectrum of emotional reactions—from eagerness to trepidation—shaping individuals’ engagement with possibility thinking.
2. Practical Application and Relevance	Focuses on how teachers and students contextualise and integrate possibility thinking into everyday classroom practices. It highlights the importance of tangible examples, direct links to existing curricula, and the demonstration of measurable outcomes, emphasising how perceived relevance drives acceptance and successful adoption of creative methods.
3. Constraints and Concerns	Addresses the barriers that hinder or slow the integration of possibility thinking, including scheduling issues, time pressures, fears of increased workload, and scepticism about methods perceived as too “playful” or “frivolous.” This theme underscores how systemic and personal constraints can create hesitancy or resistance, even amid overall interest in innovation.
4. Support and Reflective Growth	Highlights the role of supportive leadership (e.g., SMT), peer collaboration, and ongoing reflection in sustaining motivation and deepening teachers’ commitment to possibility thinking. Emphasizes the value of a safe space, open dialogue, and iterative feedback loops, showing how continuous learning and collective endorsement enable long-term changes in classroom practice.

Table 3
Overview of the codes, categories, and themes.

Theme	Categories	Codes	Sample Extracts
Enthusiasm and Emotional Journeys	Engagement and Emotions	Enthusiasm, fatigue, fear of appearing ‘silly’, open-mindedness	“Teachers participated enthusiastically ... but towards the end, many appeared tired.”
Practical Application and Relevance	Practical Implementation	Real-life examples, interactive activities, connecting to existing curricula	“Demonstrating real-life learning outcomes illustrated the value of possibility thinking.”
Constraints and Concerns	Challenges and Constraints	Scheduling/time constraints, workload concerns, resource availability, scepticism about ‘play’	“Fears around an increased workload created hesitation.”
Support and Reflective Growth	Support Structures and Reflection	SMT support, peer collaboration, reflective practice, safe space	“The SMT appeared cautiously supportive ...”; “Ongoing reflection ... fosters curiosity, confidence, and risk-taking.”

as a consistent undercurrent in the data, often shaping participant’s overall perceptions of PTs sustainability.

Finally, the fourth theme, *Support and Reflective Growth*, highlighted the importance of backing from the school leadership, as well as opportunities for peer collaboration and reflection. Teachers felt reassured when the Senior Management Team actively endorsed the workshops and identified possibilities for integrating creativity into the school’s broader goals including creative writing practices. Teachers who engaged in dialogue with the PI or with colleagues showed a stronger

commitment to experimenting further with PT. They also showed greater confidence in adapting the techniques to suit their classroom needs.

The themes indicate concurrent distinctiveness and complementarity from one another. The findings indicate that successful embedding of PT requires initial enthusiasm coupled with strategic planning, tangible examples, and a culture that values play and reflective practice.

5.3. Quantitative data analysis

5.3.1. Participants and sampling

This study involved a total of 304 primary school educators from four schools across Malta, with 227 participants completing the pre-test and 77 completing the post-test. Participants were selected through purposive sampling based on their willingness to participate in a professional development initiative focused on Possibility Thinking (PT). This purposive sampling strategy was deemed appropriate given the study’s action research orientation, which prioritizes contextual depth and practitioner engagement over statistical generalisability. In line with best practices in mixed-methods research, sample adequacy was determined based on the anticipated need for data triangulation and the ability to explore variation across intervention and non-intervention contexts.

All participating educators were invited via internal communication channels coordinated by school leadership. Participation was voluntary and anonymous, and no personal identifying information was collected (in accordance with institutional ethical guidelines and the European Code of Conduct for Research Integrity), making it impossible to track individuals across the two time points. As a result, pre- and post-test responses were treated as independent samples in all statistical analyses. Participants included teachers, learning support educators (LSEs), and senior leadership team (SLT) members. The sample was diverse in terms of teaching experience, educational roles, and age range. While detailed demographic matching between the pre- and post-test groups was not feasible due to anonymity, both samples were drawn from the same school populations and representatively reflected the staff structures within their respective institutions. All participants were exposed to the same school-wide intervention protocol, though only a subset were directly engaged in the core experimental condition.

As shown in Table 4, participants across both phases were

Table 4
Demographic characteristics of participants by data collection phase.

Variable	Pre-test (n = 227)	Post-test (n = 77)
Gender		
Female	208 (91.6 %)	72 (93.5 %)
Male	18 (7.9 %)	3 (3.9 %)
Prefer not to say	1 (.4 %)	2 (2.6 %)
Age Group		
18–25 years	27 (11.9 %)	4 (5.2 %)
26–35 years	69 (30.4 %)	23 (29.9 %)
36–45 years	72 (31.7 %)	22 (28.6 %)
46–55 years	43 (18.9 %)	18 (23.4 %)
56–65 years	16 (7.0 %)	10 (13.0 %)
Role in School		
Head of School	2 (.9 %)	3 (3.9 %)
Learning Support Educator	89 (39.2 %)	26 (33.8 %)
Member of the Senior Leadership Team	15 (6.6 %)	6 (7.8 %)
Teacher	121 (53.3 %)	42 (54.5 %)
Teaching Area		
Kindergarten	81 (35.7 %)	26 (33.8 %)
Early Years (grade 1–3)	80 (35.2 %)	31 (40.3 %)
Junior Years (grade 4–6)	66 (29.1 %)	20 (26.0 %)
Years of Experience		
Up to 2 years	49 (21.6 %)	15 (19.5 %)
3–5 years	40 (17.6 %)	13 (16.9 %)
6–10 years	58 (25.6 %)	18 (23.4 %)
11–15 years	46 (20.3 %)	18 (23.4 %)
16 years and more	34 (15.0 %)	13 (16.9 %)

predominantly female, representing 91.6 % ($n = 208$) of the pre-test sample and 93.5 % ($n = 72$) of the post-test sample. Most participants were aged between 26 and 45 years, with 62.1 % ($n = 141$) at pre-test and 58.5 % ($n = 45$) at post-test falling within these age groups. Regarding professional role, the majority identified as teachers (53.3 %, $n = 121$ pre-test; 54.5 %, $n = 42$ post-test) or learning support educators (39.2 %, $n = 89$ pre-test; 33.8 %, $n = 26$ post-test). Most participants taught in kindergarten or early years classes, accounting for 70.9 % ($n = 161$) of the pre-test and 74.1 % ($n = 57$) of the post-test groups. Participants reported a broad range of teaching experience, with a relatively balanced distribution across experience levels; for example, 25.6 % ($n = 58$) at pre-test and 23.4 % ($n = 18$) at post-test reported 6–10 years of teaching experience. Overall, the demographic profiles were broadly comparable across both phases.

5.3.2. Measures

To assess participants' creative self-beliefs, mindsets, and dispositions toward Possibility Thinking (PT), a battery of three validated self-report instruments was administered. All measures used a 5-point Likert response scale (1 = strongly disagree, 5 = strongly agree) and were selected based on their relevance to the constructs explored and their demonstrated psychometric robustness.

5.3.2.1. Possibility Thinking Scale (PTS). The Possibility Thinking Scale (PTS) (Glăveanu et al., 2024) is a 12-item instrument designed to assess individuals' engagement with PT across three subdimensions: awareness of the Possible (PT Awareness) (e.g., "I often reflect on how things could be different"); excitement about the Possible (PT Excitement) (e.g., "I feel energized by imagining new possibilities"); exploration of the Possible (PT Exploration) (e.g., "I enjoy experimenting with different ways of doing things")

The PTS has demonstrated strong internal consistency in the original validation study, with Cronbach's alpha coefficients of $\alpha = .87$ for Awareness, $\alpha = .90$ for Excitement, and $\alpha = .88$ for Exploration. In the current study, the total scale showed excellent internal reliability ($\alpha = .91$), and subscales ranged from $\alpha = .84$ to $\alpha = .89$.

5.3.2.2. Short Scale of Creative Self (SSCS). The SSCS (Karwowski et al., 2018) is an 11-item measure capturing two core aspects of the creative self-concept: creative self-efficacy (CSE) (e.g., "I am good at coming up with new ideas") and creative personal identity (CPI) (e.g., "Being a creative person is an important part of who I am"). The SSCS has demonstrated strong internal consistency in prior studies (CSE: $\alpha = .91$; CPI: $\alpha = .89$). In the present sample, internal consistency was excellent: CSE ($\alpha = .92$), CPI ($\alpha = .90$), and total scale ($\alpha = .93$). The scale has been widely used in educational and psychological research, and its factor structure has been confirmed across diverse populations.

5.3.2.3. Creative Mindset Scale (CMS). Developed by Karwowski (2014), the Creative Mindset Scale includes 10 items distributed across two subscales: growth mindset (e.g., "Anyone can learn to be more creative") and fixed Mindset (e.g., "You either are creative or you are not—there's not much you can do about it"). The CMS allows for independent assessment of implicit beliefs about creativity. Prior studies reported Cronbach's alphas of .84 for the Growth Mindset and .79 for the Fixed Mindset. In this study, both subscales demonstrated good internal consistency (Growth: $\alpha = .86$; Fixed: $\alpha = .78$). The scale has shown discriminant validity from general intelligence beliefs and general mindset constructs, confirming its domain specificity.

5.4. Quantitative analysis procedure

Quantitative data were analyzed using IBM SPSS Statistics (Version 30). Given the anonymous nature of the survey and the inability to match individual responses across time points, pre- and post-test data

were treated as independent samples. Initial analyses focused on computing descriptive statistics—means, standard deviations, and frequency distributions—for all key variables to provide an overview of central tendencies and variation within each time point.

To explore associations among the core constructs of the study, Pearson correlation analyses were conducted separately for the pre-test and post-test samples. This allowed for examining the strength and direction of relationships between Creative Self (creative self-efficacy and creative personal identity), Creative Mindset (growth and fixed), and Possibility Thinking at each phase of data collection.

In addition, a series of one-way between-subjects ANOVAs were performed on post-test scores to assess whether statistically significant differences existed between the experimental and control groups across the outcome variables. This inferential approach was appropriate given the independent nature of the samples and the study's aim to detect potential effects of the intervention.

6. Results

Pearson correlation coefficients were computed to examine the associations among the study variables at both pre-test and post-test. Table 5 presents the correlation matrix for Possibility Thinking (PT), Creative Mindset, and Creative Self variables at both assessment moments.

At the pre-test, all PT subdimensions (awareness, excitement, and exploration) were strongly and positively correlated with overall PT scores ($r = .85$ to $.93$, $p < .01$). These subdimensions were also moderately correlated with growth mindset ($r = .30$ to $.34$, $p < .01$) and creative self ($r = .44$ to $.53$, $p < .01$). Notably, PT dimensions demonstrated low but significant correlations with creative mindset ($r = .19$ to $.25$, $p < .01$). Fixed mindset showed a strong positive correlation with creative mindset ($r = .82$, $p < .01$), but exhibited no significant relationship with PT or creative self dimensions.

Post-test correlations revealed a similar pattern, with slightly attenuated but still significant relationships. PT subdimensions continued to show strong intercorrelations ($r = .85$ to $.92$, $p < .01$) and maintained moderate associations with growth mindset ($r = .26$ to $.34$, $p < .05$) and creative self ($r = .30$ to $.42$, $p < .01$). Fixed mindset again correlated strongly with creative mindset ($r = .88$, $p < .01$), while its correlations with PT and creative self remained weak or non-significant, ranging from $r = -.14$ to $-.03$.

Across both timepoints, growth mindset showed consistent positive correlations with creative self-efficacy and identity, particularly at post-test ($r = .27$ to $.29$, $p < .05$), supporting the expected relationships among theoretically related constructs. These results suggest a stable pattern of associations among PT, growth mindset, and creative self constructs, with fixed mindset primarily related to lower openness and unrelated to possibility-oriented measures.

Regarding the ANOVA's analysis, prior to performing them, Levene's test was verified and indicated that assumptions of equal variances were satisfied across all dependent measures.

For PT, the ANOVA revealed no statistically significant effects. Group condition (experimental vs. control) did not significantly influence performance [$F(1, 300) = 2.27$, $p = .13$, $\eta^2p = .008$]. Similarly, pre and post-test conditions showed no significant impact, [$F(1, 300) = .13$, $p = .71$, $\eta^2p = .000$], while the interaction between group and timing was also non-significant [$F(1, 300) = .12$, $p = .73$, $\eta^2p = .000$].

In terms of the Creative Mindset, the analysis showed no significant effects. The group main effect approached significance but remained non-significant [$F(1, 300) = 3.16$, $p = .08$, $\eta^2p = .010$]. Likewise, assessment timing [$F(1, 300) = .88$, $p = .35$, $\eta^2p = .003$], and the interaction effect, [$F(1, 300) = .28$, $p = .60$, $\eta^2p = .001$], were non-significant. However, experimental participants demonstrated higher scores ($M = 3.68$, $SD = .04$) than control participants ($M = 3.57$, $SD = .05$).

The analysis of overall Creative Self revealed no significant effects.

Table 5
Pearson correlations, means, and standard deviations for study variables at pre- (N = 227) and post-test (N = 77).

Variable	M (Pre)	SD (Pre)	M (Post)	SD (Post)	1	2	3	4	5	6	7	8	9	10
					Pre/ Post	Pre/ Post	Pre/ Post	Pre/ Post	Pre/ Post	Pre/Post	Pre/ Post	Pre/ Post	Pre/ Post	Pre/ Post
1. Possibility Thinking	3.91	.58	3.85	.55	–									
2. PT Awareness	3.97	.59	3.93	.58	.85**/ .85**	–								
3. PT Excitement	3.82	.68	3.74	.62	.93**/ .91**	.68**/ .63**	–							
4. PT Exploration	3.94	.67	3.88	.64	.92**/ .92**	.66*/ .66***	.80**/ .80**	–						
5. Creative Mindset	3.64	.45	3.61	.45	.24**/ .06	.21**/ .01	.25**/ .06	.19**/ .08	–					
6. Fixed Mindset	3.05	.87	3.01	.89	.04/- .08	.02/- .14	.07/- .06	.02/- .03	.82**/ .88*	–				
7. Growth Mindset	4.24	.47	4.22	.39	.34**/ .29**	.30**/ .34**	.33**/ .26**	.30**/ .19	.38**/ .30**	-.17* / .12	–			
8. Creative Self	3.90	.57	3.89	.55	.53**/ .35**	.44**/ .30**	.51**/ .32**	.48**/ .31**	.06/.13	-.05/ .05	.18**/ .31**	–		
9. Creative Self-Efficacy	3.80	.58	3.81	.58	.58**/ .42**	.49**/ .41**	.54**/ .35**	.54**/ .38**	.09/.14	.01/.08	.13/ .27**	.91**/ .91**	–	
10. Creative Personal Identity	4.02	.68	3.99	.63	.38**/ .19	.31**/ .12	.39**/ .22	.33**/ .17	.03/.09	-.09/ .01	.20**/ .29**	.91**/ .89**	.65**/ .62**	–

Group membership did not significantly influence scores, $[F(1, 300) = .32, p = .57, \eta^2p = .001]$. Assessment timing, $[F(1, 300) = .01, p = .92, \eta^2p = .000]$, and interaction effects $[F(1, 300) = .04, p = .84, \eta^2p = .000]$, were non-significant. Moreover, mean scores were comparable between experimental ($M = 3.87, SD = .05$) and control ($M = 3.91, SD = .06$) participants.

Thus, factorial analyses across the three primary outcome measures revealed consistent non-significant results. Effect sizes remained small across all measures, with corrected R^2 values below .015. The creative mindset analysis yielded the largest effect size ($\eta^2p = .010$), though it did not achieve statistical significance. These findings indicate that the measured constructs showed minimal variation between experimental conditions within the study timeframe.

6.1. Mixed methods integration

The integration of quantitative and qualitative data suggests that although teachers’ self-perceptions of creativity were positively associated with PT, the training alone did not significantly shift these perceptions. Environmental factors and assessment limitations were likely contributors to this outcome. This study highlights the need for more nuanced methods of measuring PT and creative self-perceptions. By incorporating the Five A’s framework, it underscores the importance of context and interaction in shaping creative self-concept and pedagogical engagement.

Table 6 below illustrates the core elements of the study’s mixed-method design by directly aligning the qualitative themes with corresponding quantitative findings. This integration was essential in exploring how PT training influenced teachers’ creative self-perceptions and pedagogical engagement in real classroom settings.

Qualitative insights about teachers’ emotional engagement and fluctuating motivation that are captured under the theme *Enthusiasm and Emotional Journeys* are interpreted alongside quantitative correlations between PT excitement and exploration and creative self-efficacy. In a similar way, systemic challenges like time pressure and workload concerns under the theme *Constraints and Concerns*, facilitate an explanation why no significant changes emerged in some measurements.

This dual-layered interpretation linking lived experiences with statistical patterns outlines a holistic understanding of the intervention’s impact. It shows that while numerical shifts in self-perception may be

Table 6
Mixed methods integration.

Qualitative Theme	Description	Linked Quantitative Findings	Interpretive Commentary
Enthusiasm and Emotional Journeys	Captures emotional highs and lows, such as excitement about PT and fatigue related to workload and school uncertainty.	Strong correlation between PT Excitement/ Exploration and Creative Self-Efficacy ($r = .51, p < .01$)	Teachers who emotionally engaged with PT were more likely to perceive themselves as capable of creativity.
Practical Application and Relevance	Emphasizes real-world relevance of PT activities; teachers preferred concrete, curriculum-linked strategies.	Teachers with higher PT scores reported greater creative self-beliefs, suggesting perceived utility of PT methods.	Concrete examples helped teachers see PT as actionable, correlating with higher Creative Self scores.
Constraints and Concerns	Focuses on barriers such as time, pressure from exams, and scepticism toward playful methods.	No significant correlation between PT and Creative Mindset, possibly reflecting systemic constraints on creative beliefs.	Practical constraints likely explain weak link between PT and mindset; beliefs may be harder to shift than practices.
Support and Reflective Growth	Highlights the value of peer and SMT support, and the role of reflective practice in sustaining PT engagement.	Positive associations between PT and Creative Personal Identity ($r = .38, p < .01$), suggesting institutional support may reinforce identity.	Reflective spaces and institutional support foster deeper identification with creativity, reinforcing PT engagement.

subtle, meaningful pedagogical and emotional changes were observed through reflective narratives.

The table is a bridge between measurable outcomes and context-rich realities of school-based professional development that justify the project’s mixed-method and action oriented design.

7. Discussion

This study explored how Possibility Thinking (PT) training influences primary school teachers' creative self-perceptions and their engagement with pedagogies of possibility. We employed a mixed-method action research framework guided by Glăveanu's (2012) Five A's creativity model within a pragmatist paradigm. To make this conceptual framework more explicit, below is an outline of how each of the four qualitative themes aligns with the Five As of Creativity as stipulated by Glăveanu's (2012).

Enthusiasm and Emotional Journeys reflects the Actor dimension, as it captures the evolving emotional and psychological engagement of individual teachers in the PT process. This includes both excitement and hesitation, central to the creative identity and agency of participants.

Practical Application and Relevance links to both Action and Artefact, as it encompasses the implementation of PT strategies and the generation of concrete outputs or classroom practices that reflect creative thinking in pedagogical design.

Constraints and Concerns is most closely tied to Affordances, focusing on the systemic, institutional, and logistical factors that enable or limit opportunities for creative practice like time constraints, workload, and policy expectations.

Support and Reflective Growth maps onto Audience and Affordances. The role of the Senior Management Team, peers and the broader institutional culture supported or inhibited the uptake of PT, while reflective practices cultivated affordances that extended teachers' capacity for creative engagement.

While our quantitative data revealed moderate to strong associations between PT and creative self-efficacy, the qualitative findings offered a richer understanding of how teachers' experiences, emotional states, and institutional environments shape their engagement with PT practices. The study explored two research questions. The first exploring the application of AR to Possibility Thinking through a mixed-method approach. This question was addressed by documenting iterative cycles of reflection and feedback during the time of the first cycle of the AR project. The second question, examining how PT influences creative self-perceptions, was addressed through integrated findings that showed significant correlations between PT dimensions and creative self-efficacy, as well as thematic insights into teachers' evolving beliefs and practices.

To provide a clearer synthesis of our findings and contributions, we have organized this discussion into four sections

7.1. Theoretical Implications: Reframing Possibility Thinking as a Situated Creative Disposition

The findings of this study appear to support a growing body of literature suggesting that fostering PT can positively influence both teachers' and students' creative engagement thus enhancing individuals' creative experiences (Glăveanu and Beghetto, 2020). Our thematic analysis from the first cycle of an AR project, led to the identification of four key themes: *Enthusiasm and Emotional Journeys*, *Practical Application and Relevance*, *Constraints and Concerns*, and *Support and Reflective Growth*. Together these themes provide qualitative insight into how PT can be operationalized and sustained in a primary school context. This discussion situates our results within the wider literature on creativity.

Linking the emerging themes to broader literature, in relation to Theme 1, consistent with research highlighting the importance of emotional engagement in creativity, our participants displayed initial excitement and curiosity when introduced to PT strategies. This enthusiasm was particularly evident in interactive workshops and classroom activities. This echoes the emphasis on openness to exploring "what could be" that underpins PT. However, it was noted that participants also experienced fatigue and apprehension. This presents a dual emotional trajectory, an aspect that informs the conative feature (Long

et al., 2022) of the individuals undergoing the training. Emotional ebbs and flows underscore that while creativity-driven interventions can energise the practitioner, they also require sensitive scheduling and pacing, especially given the everyday pressures that teachers face (Green, 2007) and in the case of this study, in view of extraordinary circumstances, here related to school relocation.

In relation to the second main theme, *Practical Application and Relevance*, readiness to embrace PT hinged on seeing clear, tangible benefits like how PT lessons could be integrated into established curriculum or used to achieve existing learning objectives. In our data, teachers actively sought practical examples of PT, particularly real-life scenarios showing how to transition from imaginative prompts to assessable learning outcomes. Craft's (2001) notion that PT involves turning "what is this?" into "what can I do with this?" was observable in teachers' contributions during the workshops and school visits. This indicates that relevance is a possible catalyst for genuine adoption of creative methods.

When exploring the theme *Constraints and Concerns*, it was noted that despite the overall enthusiasm, timetabling and other time constraints, and concerns about an increasing workload emerged as barriers to the engagement with PT. Moreover, the looming demolition of the experimental school site and the uncertainty surrounding relocation, teachers experienced heightened stress consistent with the broader notion of BANI contexts (Grant, 2023). From a different perspective, some teachers worried that playful or 'frivolous' methods might consume valuable classroom hours meant for exam preparation. The dual demands of delivering compulsory content and experimenting with creative pedagogies highlight what Cremin et al. (2006) referred to as the tension between problem finding and problem solving in PT and rigid curriculum benchmarks. Institutional flexibility is arguably required as well as broader conversations about balancing standardized outcomes with creative growth as the way of doing things is addressed (Beatty et al., 2016).

The fourth theme related to *Support and Reflective Growth* also addresses the need for institutional support. Encouraging support from the Senior Management Team (SMT) and peer collaboration could be important to sustain teachers' interest in PT. This might enhance the levels of creative self-efficacy and willingness to engage echoing the findings by Cayirdag's (2017). This extends the contention by Tierney and Farmer (2002), that self-efficacy is shaped not only by personal ability but also by contextual factors. As Glăveanu (2023) suggests in his elaboration on Possibility Spaces, co-constructing creative interventions with participants of all ages can foster an environment that is continually open to new possibilities. In our study, teachers who engaged in ongoing reflection deepened their commitment to PT reinforcing the idea that reflection, feedback, and shared practice are essential for embedding pedagogies of the possible (XXX).

Moreover, discussions about the creative self-concept (Karwowski, 2022) and creative mindsets (Karwowski, 2014, 2022; Katz-Buonincontro et al., 2020) took shape naturally during these reflections. Some participants noted that as they explored PT strategies, they had the opportunity to reassess their own beliefs to generate possibilities. These shifts facilitated by supportive dialogue, echo Bandura's (1997) proposition that efficacy beliefs can be reshaped through social modelling and positive feedback. This notion highlights how Possibility Spaces offer a place for imaginative exercise that can arguably influence an individuals' self-perceptions.

Overall, our results both support and extend emerging theories that frame PT not as a static trait but as a situated, relational disposition influenced by context, affect, and perceived agency (Craft et al., 2013; Glăveanu and Beghetto, 2020). Quantitatively, one of the most notable outcomes of the study was the strong and significant association between PT and Creative Self-Concept, particularly its subdimensions of Self-Efficacy and Personal Identity. These findings support theoretical work that situates PT as a transformative orientation toward action and imagination in teaching and learning (Craft et al., 2013; Glăveanu &

Beghetto, 2020). The observed correlations suggest that educators who engage more deeply with PT tend to see themselves as more creative and capable of generating novel solutions within their professional roles. Specifically, the highest correlations were found between PT (particularly the Excitement and Exploration subdimensions) and Creative Self-Efficacy, implying that emotional and behavioral dimensions of PT may play a critical role in shaping teachers’ confidence in their own creativity.

However, when exploring the relationship between Possibility Thinking and Mindset Beliefs, our findings showed that while PT was positively correlated with Growth Mindset, the relationship was only moderate in strength.

This suggests that teachers who are more open to envisioning possibilities also tend to believe that creativity can be developed through effort and learning, which is aligned with the idea that a growth-oriented mindset fosters a willingness to explore new ideas and take creative risks. Furthermore, the significant associations between PT and Growth Mindset also suggest that integrating PT practices in teacher training may promote greater openness to pedagogical experimentation, though this effect appears to be weaker for more deeply held beliefs.

Remarkably, there were no significant correlations between PT and Creative Mindset (as a general construct) or Fixed Mindset, indicating a potential divergence between domain-specific self-perceptions (e.g., “I am creative”) and general beliefs about the nature of creativity (e.g., “Creativity is malleable”). This distinction raises important theoretical and practical questions. It is possible that PT is more experiential and contextual—grounded in practice—whereas mindset beliefs are more ideological and abstract, and thus less susceptible to change through experience alone? Future interventions might need to explicitly integrate mindset reflection components to provoke shifts at the belief level.

Put together the two data collection methods used offer a complementary view of how PT can shape pedagogical practice. On one hand, qualitative data revealed how teachers’ emotional trajectories, perceived workload concerns, and levels of institutional support influence whether they adopt PT based strategies (Craft, 2001, 2015; Glăveanu and Beghetto, 2020). On the other hand, quantitative data indicated that teachers who more fully engage with PT tend to develop stronger self-efficacy and creative identity. This aligns with the notion that a strong sense of capability underpins deeper engagement.

Where growth-oriented mindsets showed only moderate correlations with PT, the qualitative analysis highlights potential justifications of the why. This emerged through the entrenched systemic pressures like time constraints, fear of ‘appearing silly’ and the stressful BANI context. These issues can influence how fully teachers can enact their otherwise growth-oriented beliefs. This suggests that while teachers may intellectually endorse the idea that creativity can be developed, practical realities may be a barrier for consistent implementation. In contrast, the strong quantitative associations between PT and creative self-efficacy highlights that teachers who do manage to adopt PT consistently may experience a boost in their self-beliefs, which may encourage sustained engagement.

These two strands of evidence show how PT interventions can strengthen teachers’ self-beliefs (supported quantitatively) and inspire classroom culture shifts (evidenced qualitatively). This mixed-methods approach evidenced not only the “what” through measurable outcomes but also the “why” and “how” of these shifts as captured through the teachers’ lived experiences.

7.2. Practical implications: embedding PT in realistic, reflective, and supported professional development

Our qualitative themes—*Enthusiasm and Emotional Journeys*, *Practical Application and Relevance*, *Constraints and Concerns*, and *Support and Reflective Growth*—reveal that successful implementation of PT requires more than conceptual alignment. It demands emotional resonance, contextual adaptation, and sustained institutional support.

Teachers showed heightened engagement when PT methods connected clearly to curriculum objectives or literacy goals, validating Craft’s (2001) framing of PT as a transition from “What is this?” to “What can I do with this?” However, constraints including scheduling limitations, exam pressures, and fears of appearing “unprofessional” when using playful methods often limited deeper application—particularly in BANI contexts characterized by instability and uncertainty (Grant, 2023).

The emotional ebbs and flows observed in the experimental school (Alpha)—especially following news of the school’s planned demolition—highlight how contextual stressors impact innovation adoption. Despite these challenges, teachers’ continued engagement and reflective journaling suggest that emotional investment in PT can foster resilience and renewal.

On the other hand, Senior Management Team support emerged as a crucial enabler. When leadership endorsed the initiative and connected it to whole-school goals, teacher agency increased. This affirms Glăveanu’s (2023) concept of “possibility spaces” as co-constructed environments where creativity isn’t merely permitted but actively fostered.

7.3. Linking the findings to practice

To bridge the gap between thematic insights and actionable outcomes, we identify strategies that can inform both practice and future research. Table 7 outlines the measures and recommendations that were derived from the qualitative themes, providing direction for future implementation and research.

7.4. Methodological reflections: the power and limitations of mixed-methods action research

While the AR approach offer context-rich insights, it naturally involves limited transferability to other settings, as each school context comes with unique dynamics. Moreover, the impending demolition of the experimental school introduced an atypical stressor that may have amplified concerns or emotional fatigue. Our study demonstrates the value of integrating quantitative and qualitative approaches within an action research framework to capture both measurable outcomes and lived pedagogical experiences. Using self-report scales alongside reflective fieldwork allowed us to triangulate between “what” changed (e.g., increased PT scores) and “why” or “how” such change unfolded (e.g., through enthusiasm, reflection, and peer dialogue).

Yet, we must acknowledge several methodological limitations. First, our study faced the natural constraints of action research, including limited transferability and high context-dependency. The relocation crisis in the Alpha school introduced a confounding variable that may have heightened emotional responses or affected engagement in ways difficult to quantify.

Second, while our self-report measures yielded high internal

Table 7
Linking emerging themes to measures and practice.

Theme	Emerging Measures	Practical Suggestions
Enthusiasm and Emotional Journeys	Emotional engagement scale; reflective journal sentiment analysis	Encourage emotional reflection during PD; validate emotions as part of the creative teaching process
Practical Application and Relevance	Lesson plans incorporating PT; student engagement surveys	Provide time for teachers to trial PT in real contexts; co-create lessons with students
Constraints and Concerns	Affordance audits (time, space, support); stress/workload measures	Adjust school timetables to support engagement with the possible and creativity
Support and Reflective Growth	Quality of peer feedback; frequency of collaborative reflection	Establish peer networks or communities of practice focused on PT

consistency, their susceptibility to social desirability bias or ceiling effects may have masked subtler changes. Future studies might benefit from behavioral observations, video diaries, or artefact analysis to more objectively capture practice-based shifts.

Finally, our mixed-methods design would have been strengthened by more explicit use of joint display matrices or meta-inferences to make connections between data strands more transparent. Nevertheless, the combination of breadth (quantitative) and depth (qualitative) remains a critical strength of this study.

7.5. Future directions: expanding possibility thinking in education research

Future studies could expand the demographic scope by involving secondary schools or different contexts for such studies. Additionally, future studies may focus on how PT training influences both subjective experiences and objective indicators of teaching practices.

Implications for teacher professional development, policy design, and future research underscore the value of incorporating cyclical reflective practices to support transformative learning. The study also highlights the broader applicability of AR in various psychological domains, indicating how an evidence-based PT framework can enhance pedagogies of the possible. Recognising the potential impact of environmental conditions and the limitation of self-report measures, future inquiries should employ alternative data collection methods to better capture shifts in the three constructs observed, possibility thinking, creative self-concept, and creative mindsets. In this light, future research should explore the long-term effects of PT training across different educational stages and demographic contexts. Extending the intervention longitudinally could clarify whether mindset changes follow self-concept shifts, or whether deeper cultural change is necessary for these beliefs to evolve.

Additional work is needed to clarify the bidirectional relationship between PT, creative self-efficacy, and creative identity. Do teachers with stronger creative self-beliefs naturally gravitate toward PT, or does PT training lead to these beliefs developing? Experimental or longitudinal path models might help disentangle this relationship.

Finally, professional development programs should explicitly integrate reflective and emotional components—not only to foster teacher well-being but to sustain pedagogical innovation despite systemic constraints. Creating possibility spaces that are emotionally safe, intellectually engaging, and professionally relevant appears key to embedding creativity in meaningful and lasting ways.

7.6. Cultural and replication considerations

While this study was situated within a particular educational and cultural context, the underlying principles of PT, reflective practice, and the development of creative self-perceptions and a creative mindset may possibly be applied to other settings. Replicating this intervention in other settings including different school setups and different cultures would require careful consideration and sensitive adaptation to localized educational values, and policy constraints among other elements.

More exam-oriented systems or those with rigid curricular mandates, may require that PT is integrated in existing subjects or framed in terms of enhancing learning outcomes. Moreover, the translation of concepts like ‘possibility thinking’, ‘possibility spaces’, and ‘creativity’ would need to account for pedagogical and cultural differences. A flexible AR model as used in the current study, would allow space for these contextual calibration efforts. A carefully planned comparative study across major cultural representations could yield important findings that could lead to further theoretical and policy-oriented development as a result of the different understandings and voices of the participants involved.

8. Conclusion

This study contributes to the growing body of research on creativity in education by providing empirical evidence of possibility thinking’s pivotal role in reshaping teachers’ self-perceptions and pedagogical practices. Through a mixed-methods design and the first cycle of an Action Research (AR) project, it illustrates how creativity can be nurtured in everyday classroom settings, even under systemic constraints and external pressures. By capturing both qualitative and quantitative data, the research offers a nuanced view of the complex interplay between teachers’ subjective experiences and measurable outcomes of PT training. AR emerged as a vehicle for implementing PT training, mirroring the cyclical, adaptive nature of creative processes as described by (Glăveanu and Beghetto, 2020).

While not all outcomes were statistically significant, the integrated findings suggest that PT fosters meaningful shifts in how teachers perceive themselves and their role as creative agents. Indeed, our findings advocate for professional development models that prioritize imaginative engagement, contextual grounding, and emotional support, thereby opening new pathways for cultivating creativity in our increasingly complex educational landscape. Thus, embedding reflective checkpoints in the cycle of the AR, where teachers can discuss successes, challenges, and adaptations, fosters sustained engagement. Moreover, the deliberate use of mindful reflection (Lemon, 2017) and systematic journaling on the part of the PI, captured insights in real time.

CRedit authorship contribution statement

Margaret Mangion: Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Andreia Valqauesma:** Writing – review & editing, Methodology, Formal analysis, Conceptualization. **Vlad P Glaveanu:** Writing – review & editing, Methodology, Conceptualization.

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Declaration of competing interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.metip.2025.100198>.

Data availability

Data will be made available on request.

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