The Algorithmic Muse: Using AI to Support Divergent Thinking and Creativity in Year 8 Girls' Digital Design Problem Solving

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Abstract

Current research and literature in girls' education identify a trend where the true creative potential of female students remains hidden. Perfectionism and the pressure to conform often mask their actual abilities, creating a gap between what they are capable of and what they express. This action research project addressed this disparity within a Year 8 digital design cohort at St Margaret's Anglican Girls School. The study investigated whether an anonymised, AI-mediated space could mitigate a reluctance to take academic risks and foster divergent thinking. Over a semester, I implemented five divergent thinking challenges where students engaged with a custom AI chatbot and text-to-image generation as creative collaborators. This research found that the anonymised AI environment functioned as a psychologically safe space and supported students to improve their creative potential. This research offers a scalable pedagogical framework for girls' education, demonstrating how generative AI can be leveraged to dismantle gendered barriers to risk-taking and empower girls to reclaim their creative confidence.

Glossary

Divergent Thinking: A cognitive process defined by the ability to generate multiple, varied, and novel solutions to a given problem. It is a key indicator of creative potential.

Potential-Expression Gap: A theoretical framework describing the discrepancy between a student's inherent creative potential and their actualised creative output. This gap is often caused by social evaluation pressures in the classroom that lead to a collective reluctance to engage in public ideation.

Masked Creativity: A phenomenon where creative impulses are suppressed in educational settings that implicitly reward behavioural conformity and agreeableness.

Psychological Safety: The perception of a non-judgemental and private space where students feel free to engage in idea generation without fear of social evaluation.

Fluency: A core metric of divergent thinking representing the quantitative volume of ideas generated.

Flexibility: This metric measures the ability to look at a problem from different angles and produce a variety of categories of ideas.

Creative Self-Efficacy: This term describes a student's internal belief in their own creative abilities.

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The cornerstone of innovation is human creativity. We exist in an era characterised by rapid technological advancement and, therefore, it is essential for educators to recognise that "digital design is at the heart of modern innovation" (Bower et al., 2025, p. 2). Consequently, integrating digital design into educational practice is vital to prepare students for future success. With the emergence of generative artificial intelligence (AI), new research is required to assess the impact of this technology on the development of creativity and divergent thinking in students as they progress through their education. Hubert et al. (2024) explain that divergent thinking, the ability of a person to develop multiple creative solutions, is a key indicator of a person's creative potential. There are very few certainties in the years ahead, yet it is safe to predict that in this new epoch, the careers of the future will consider "flexibility, resourcefulness and imagination at a premium" (Bloom & VanSlyke-Briggs, 2019, pp. 90–91). This certainty means that educators are obliged to ensure they are empowering their students to become innovative creators with emerging technology. This indicates that students need support to be more than just "passive consumers" of technology (Bower et al., 2025, p. 1).

This action research focused on the idea of empowering students' creativity and examined if the integration of generative AI in educational settings could address gender disparities in creative potential. Specifically, it investigated how providing anonymised ideation spaces mitigated the conformity pressures that affect female students' divergent thinking development. Motivated by the rapidly changing educational and technological landscape, I designed a semester unit for Year 8 digital design students founded on my research question: *How does critical engagement with AI encourage divergent thinking in digital design tasks for Year 8 girls?*

Central to this unit design was a consideration of which AI tools would be ethically aligned to both the students' and St Margaret's Anglican Girls School's values, and the

privacy and data security of all involved. For these reasons, the study utilised Adobe Education Firefly and a custom-built creativity collaborator bot.

Reflecting on my observations of how girls in my previous classes engaged in problem-solving activities and their reliance on worked exemplars as scaffolding, I designed five challenges to be completed across the semester. Each challenge was purposely open-ended and allowed students to tackle them in many unique ways. Through each challenge students would engage in ideation cycles that required them to be directors of their learning process and to critically evaluate their work outcomes. This plan was designed to support both the girls' growth in divergent thinking and their ability to see evidence of divergent thinking and creativity in their own work.

To assist students to develop critical awareness and agency, a creativity self-reflection rubric was constructed (see Appendix A). This was designed as an accessible tool that enabled students to find evidence of divergent thinking and creative indicators in their own work. It also provided an opportunity for both the students and me to track and reflect on their growth across the unit.

By employing Mertler's (2020) action research process throughout this project, I was able to test my research question in the classroom and evaluate the outcomes in the context of current academic research and theories relating to girls, creativity, and the recent introduction of AI into the educational landscape. Through this project I hoped to remove some of the fears that exist around AI in the education space. I also hoped my findings would have the potential to empower educators of girls to purposely employ AI to embolden their students to take academic risks and reach their creative potential.

Literature Review

The importance of developing creativity in our students is not solely founded on equipping them with the skills they need for their future employment; it is also strongly linked to an increased engagement and joy of learning (Bower et al., 2025). Creativity and divergent thinking are skills that can be developed in students through well-planned learning programs

that engage students in “intellectual risk taking,” independent problem solving, and the use of creative thinking to deal with ambiguity (Bloom & VanSlyke-Briggs, 2019, p.91).

Early researchers of creativity considered it a trait that was predominantly endowed to men as a form of genius—what psychologist Vlad Glaveanu (2010, cited in Tregenza et al., 2025, p. 31) called the “He paradigm.” This paradigm historically positioned creativity not merely as a male trait, but as a specific set of behaviours culturally coded as masculine, such as assertiveness, disruption, and solitary risk-taking. Glaveanu notes, the He paradigm privileges a specific type of confidence that equates volume with value, celebrating the individual “disruptor “ over the collective “builder.” In contrast, emerging research contends creativity is developed through interactions within complex social systems.

Glaveanu’s (2010, cited in Tregenza et al., 2025) perspective suggests that creativity arises from the interactions within a social setting, such as a classroom. It considers not just individual skills, knowledge, and motivation as being important for students, but relates to the importance of social and environmental factors. This indicates that schools and classrooms can be fertile spaces for creative growth in a far more gender-inclusive way (Tregenza et al., 2025). A critical tension exists, however, in modern education. While schools profess to value collaborative social systems (often framed as 21st-century skills), assessment structures frequently remain tethered to tenets of the He paradigm, with students often graded on individual performance and public articulation of ideas. For female students, who are socialised towards “agreeableness” and community cohesion rather than disruptive individualism, this creates a structural disadvantage. They are asked to perform “risky” creativity within an assessment framework that penalises the very messiness required to generate it (Ashcroft et al., 2025; Gralewski & Karwowski, 2013; Paek & Bao, 2023).

Research indicates that there are no significant differences in divergent thinking potential between female and male students (Roue, 2014). It does suggest, however, that this equal potential must be contextualised within broader literature showing persistent gender gaps in creative expression and achievement (Gralewski & Karwowski, 2013; Paek & Bao, 2023). This discrepancy suggests that while girls possess equal creative potential,

female creativity is often “masked” in educational settings where behavioural conformity is perceived to be more important than creative expression (Gralewski & Karwowski, 2013).

The notion of masked creativity aligns with a broad range of research studies that highlight the rate of perfectionism in girls is significantly higher than that of boys in educational contexts (Chęć et al., 2025). Paek and Bao (2023) reinforce the strong correlation between educational context and girls' perceptions of their creative capacity. Their findings reveal that when education systems encourage agreeableness, they suppress extroversion and academic risk-taking. Consequently, girls demonstrated lower creative achievement across maths, science, writing, visual art, music and technology. These findings support the premise that if technology, specifically AI, can be used to anonymise the brainstorming and ideation phase of the learning process, girls can perceive this as a safe space to express their creativity and divergent ideas without concerns they are being evaluated by peers and teachers (Nykvist et al., 2025). Using AI as a targeted strategy during this pivotal learning phase may also address concerns that over-reliance on AI diminishes creativity, as the technology would be employed in a narrowly defined capacity (More, 2024).

Amabile's (2012) componential theory of creativity identifies three prerequisites for creative expression: domain-relevant skills, creativity-relevant processes, and crucially, intrinsic task motivation, with this last component being particularly vulnerable to social evaluation pressures. This theoretical framework provides insight into the documented disparity between female students' creative potential and their actualised creative expression (Gralewski & Karwowski, 2013; Paek & Bao, 2023). If the education environment prioritises conformity through curriculum restraint and academic efficiencies, intrinsic motivation is diminished and creative risk-taking is suppressed (Ashcroft et al., 2025).

Collaborative engagement between students and AI during brainstorming and ideation phases of learning can potentially significantly reshape creative learning by expanding their capacity to take risks with divergent ideas. If, as the literature suggests, girls possess equal creative potential that is suppressed by conformity pressures (Gralewski & Karwowski, 2013; Roue, 2014), then anonymous AI platforms may provide the judgement-

free context needed to bridge the potential-expression gap. Within these digitally mediated spaces, girls can explore novel ideas without concerns about peer judgement or teacher assessment, potentially allowing them to engage more freely with their creative abilities.

Through careful lesson design, AI could be integrated to address the documented challenges girls face when attempting to express creativity. Given that educational environments encouraging agreeableness have been shown to suppress creative achievement in girls (Paek & Bao, 2023), and that AI has demonstrated strong capabilities in performing divergent thinking tasks (Hubert & Zabelina, 2024), there is potential for AI to serve as a tool at the point when girls need support to transition from conformity into exploring non-conforming, new and novel ideas. By providing this judgement-free context, girls can employ AI as a collaborative tool to enhance their creative endeavours.

Research Context

This action research project was conducted within the digital design curriculum at St Margaret's Anglican Girls School, a combined boarding and day school located in Ascot, Brisbane, Queensland. The school serves a diverse population of 1,465 students (as of late 2025), drawing from international, rural, regional, and local communities. This diversity presents a pedagogical challenge. While the students are united by the school context and are considered high consumers of technology, their digital consumption masks their varied creative confidence, making many hesitant creators.

The research was undertaken during Terms 3 and 4 of 2025, focusing on a cohort of 25 students in Year 8 digital design. This year group is particularly pivotal for girls, often marking the transition from unstructured childhood creativity to the self-conscious performativity of adolescence. The project involved 90 minutes of contact time per week across the semester, supplemented by online tasks integrated into the homework program.

Permission from both parents and students was acquired prior to the project's launch, with a clear summary of the process communicated to all stakeholders. In adherence to the principles of voluntary participation, students or parents could opt out at any time without

disadvantage. To ensure privacy and psychological safety all data gathered were anonymised, and students retained the right to access their data at any time.

The Action

Research highlights a gap between the creative potential and expressed creativity of female students due to constraints related to social conformity and risk-aversion in educational settings (Gralewski & Karwowski, 2013; Paek & Bao, 2023). This research project aimed to explore whether generative AI could disrupt this trend by fostering divergent thinking and creative confidence in girls when used as a collaborative tool in an anonymous space.

The students were tasked with completing five distinct divergent thinking challenges across a semester. I designed the challenges to be increasingly complex, moving from concrete problems to abstract conceptualisation. Challenge themes ranged from *sustainable living,* to the *evolution of art, culture,* and *entertainment*. For example, the art challenge promoted imaginative thinking about how technology might redefine human expression, while the *global crisis* challenge encouraged students to move beyond incremental changes to envision transformative, radical solutions.

Each challenge followed a structured expansion-contraction cycle:

1. **Deconstruction & Public Brainstorming**: As the teacher-researcher, I facilitated a class discussion to deconstruct the theme. This established a baseline of public ideation, often characterised by safe, conventional responses.
2. **Anonymous AI Collaboration:** Students then moved into individual working processes. They utilised a customised creativity AI collaboration chatbot (built on a large language model architecture) and Adobe Firefly for image generation. The AI was programmed to act as a provocateur to ask clarifying questions and suggest wildcard variables. It was directed not to provide direct answers.
3. **Documentation:** Each solution, along with the prompt log of the interactions, was recorded in a OneNote portfolio. This required students to explain their process and their use of the AI tools, ensuring they remained the directors of the creative act.

4. **Reflection:** At the end of each challenge, students completed a creativity self-reflection rubric (see Appendix A) to track their growth in fluency, flexibility, originality, elaboration, and creative confidence.

The action phase concluded with each student collating a portfolio of the ideas they perceived to be their most creative and novel and a critical reflection task where students had to evaluate whether AI served as a creative collaborator whilst ensuring they maintained ownership of their ideas and innovations.

Data Collection

During the action phase that tracked the development of divergent thinking through AI-mediated learning environments, I employed a polyangulation approach integrating both qualitative and quantitative data collection methods (Mertler, 2020). This methodological choice ensured that a broad range of data was captured, analysed, and accurately reflected the complex interplay between creative potential and expression (Gralewski & Karwowski, 2013; Paek & Bao, 2023).

The quantitative component of the data collection centred on the creativity self-reflection rubric (see Appendix A), which systematically measured students' development across five dimensions:

- Fluency: The number of ideas generated,
- Flexibility: The variety of idea categories,
- Originality: The novelty of the ideas,
- Elaboration: The detail added to ideas, and
- Creative Confidence: The student's self-assurance in sharing ideas.

Students self-assessed using structured categories (beginning, growing, thriving), which enabled the statistical tracking of changes throughout the action phase. This captured measurable shifts in creative capabilities, allowing me to identify macro-trends across the participant group.

To help add nuance to the rubric data, I collected rich qualitative data that comprised survey responses, class observations, student interviews, student work samples, and prompt

logs. The survey was completed at the beginning, middle, and end of the action phase. This timing allowed me to track the trajectory of creative confidence across the semester. The questions were a combination of Likert scale and open-ended questions. The open-ended questions specifically invited unstructured narratives that would capture students' intrinsic motivations in relation to their creative development. These data were crucial for identifying the masking phenomenon related to girls that was identified in the literature.

I recorded class observations in a journal. These observations focused on behavioural indicators of risk-taking, questions asked, and engagement with AI. These observations recorded qualitative data that might not have come through in student interviews. Two sets of semi-structured student interviews occurred during the action phase. The interview questions provided recorded and transcribed data that served a dual purpose: gathering deep insights and performing member-checking. By presenting my observations back to the students (e.g., "I noticed you seemed hesitant"), I allowed participants to verify or correct my interpretations, ensuring the data accurately represented their voices (Mertler, 2020).

The polyangulation of these data types addresses the literature's call for examining creativity within complex social systems (Glaveanu, 2010, cited in Tregenza et al., 2025). By combining measurable performance indicators with personal narratives and observed behaviours, the data captured both the observable demonstrations of creative development and the intrinsic motivational factors that Amabile's (2013) componential theory identified as crucial for creative expression.

Data Analysis

I undertook a systematic analysis of collected data using Mertler's (2020) three-phase framework: organise, describe, and interpret.

- Organise: Quantitative rubric data were organised to generate frequency distributions, allowing for the identification of patterns across the five intervention cycles.

- Describe: Qualitative data (surveys, interview transcripts, OneNote logs) underwent inductive coding. I employed a bottom-up approach, reading the narratives to identify recurring keywords and sentiments (e.g., "judgment," "safe," "messy").
- Interpret: I synthesised the quantitative changes with the qualitative codes. This phase focused on answering whether AI-mediated environments effectively support creative confidence, specifically examining gender-based patterns in risk-taking.
- Identify: I identified themes across data that shaped my discussion of results.

Discussion of Results

My analysis of the data revealed a narrative of transformation. By introducing an anonymised, AI-mediated space for ideation for students to critically engage with, the intervention successfully disrupted the perfectionism-conformity loop that had previously suppressed the creative expression of female students.

Critical Engagement with AI as a Provocateur Amplifies Girls' Agency and Creativity

A common concern amongst educators globally is that AI integration may produce students who are not independent thinkers. My data analysis challenged this assumption, indicating that the purposeful design and use of AI as a provocateur amplified girls' agency and creativity.

The interaction patterns I observed through the prompt logs were not passive; they followed a collaborative pattern where the student provided the initial concept then worked in partnership with the AI to expand it. The amplifier effect was quantifiable in the expansion of elaboration (a key creative metric) in student prompts. Pre-intervention, student concepts averaged between 150–200 characters; these transformed by challenge 4 and 5 into elaborate prompts averaging between 500–700 characters, with a significant expansion in descriptive richness.

The expansion of textual description represents cognitive offloading. By letting the AI handle the syntax of the image generation, the student could focus entirely on the semantics

of the idea. For example, the simple concept of a “shadow magic class” was expanded by Student 13 via the AI interactive process into a creatively rich “cinematic digital painting inside a futuristic holographic classroom transformed into a dense, moonlit forest.” The AI did not generate the idea for her; it acted as a sounding board and prompted for more detail. Crucially throughout this ideation, the student retained the role of director. She did not accept the AI's first suggestion. The logs show her agency as she rejected three iterations, and added lighting, perspective, and imagery considerations before settling on the one she felt captured her idea correctly. This demonstrated a high-level of critical engagement, creativity, and a conscious awareness of the power dynamic between user and tool.

The purposeful use of AI helped the girls overcome choice paralysis, which is characterised by procrastination and fear of getting started and often seen with girls who are motivated by academic outcomes (Gralewski & Karwowski, 2013). Many students reported that it helped them overcome moments of being “stuck” and both Students 2 and 7 appreciated that it supported them as they developed “deeper ideas.” In classroom observations, I noted that students engaged in the brainstorming phases in greater numbers for challenges 3, 4, and 5 than for challenges 1 and 2. Through these data, I substantiated that AI could serve the function of a creative partner and, far from replace human creativity, be a tool that provided the domain-relevant skills identified in Amabile’s (2012) theory; domain-relevant skills, creativity-relevant processes, and intrinsic task motivation. By offloading these technical requirements to the AI, students' intrinsic motivation was protected from the frustration of technical barriers, allowing them to focus creatively on high-level conceptual blending and develop the agency to shift their AI use from a tool of convenience to a thought partner.

AI Supports Girls to Bridge the Gap Between Creative Potential and Creative Expression

My analysis of data confirmed that the action project facilitated a significant expansion in both fluency (the quantity of ideas) and flexibility (the variety and novelty of ideas categories); two primary metrics of divergent thinking across the participants. By

removing the social friction of brainstorming and ideation experienced by girls, my data analysis indicated that the AI tools utilised bridged the gap between creative potential and creative expression.

The quantitative shift in idea generation provided the clearest evidence of reduced risk aversion. Pre- and early project observations recorded a low baseline of enthusiastic participation in the brainstorming and ideation phases of class activities. This finding was even more telling when the challenge the students were given lacked precedent or existing solutions. Student 20, for example, expressed her reluctance to begin the challenge as she was “Not very confident because it is a new problem not one people always complain about.”

Data analysis allowed me to track a reversal of this reluctance and reticence to participate. In the final survey, 19 students reported that the AI tools helped them to generate a greater number of new and novel ideas compared to when they completed the same task without the tools. My longitudinal tracking via the rubrics documented a progression from a baseline of 2–3 ideas per challenge to consistently producing more than 7 ideas per challenge.

Crucially, the increase in fluency was not limited to just the number of ideas, it extended to the depth of the ideas themselves. This was evident in the student prompt analysis referred to earlier, the increased character employment reflected an expansion of descriptive richness in the students’ ideation phase as students progressed through the challenges. Classroom observations noted there was more energy and excitement displayed as students developed their ideas in greater detail. Their willingness to share with their peers was also noticeably more evident. With the AI tools assisting with the heavy lifting of elaboration, the students were able to meet the high fluency benchmarks without cognitive exhaustion.

The highest level of flexibility I observed in the student portfolios was the translation of abstract emotions into concrete visual metaphors. To illustrate, Student 9 utilised Adobe Firefly to capture the state of confusion she experienced in a mathematics class. Through a five-prompt refinement cycle she was able to produce a “transparent red brick wall appearing

inside a math equation" that she felt accurately depicted this emotion. The ability to give physical or visual form to abstract concepts indicated cognitive flexibility, something she had been unable to do in earlier challenges. Student 25 offered another dimension of flexibility. As an English as an Additional Language (EALD) learner, she submitted prompts in her first language (Chinese). The AI bridged the linguistic gap and allowed her to produce outcomes that were visually complex and conceptually rich, proving that the tool could decouple creative expression from language fluency.

Anonymised AI Spaces Provide Psychological Safety for Girls' Educational Risk-Taking

The literature clearly establishes that many girls mask their creativity due to pressures relating to perfectionism and behavioural conformity (Chęć et al. 2025; Gralewski & Karwowski, 2013). The pre-action data from the initial student surveys confirmed this baseline anxiety, with students explicitly reporting fear and a lack of confidence in sharing new ideas. Student 14 provided a good example of this masked potential. While she considered herself creative in traditional arts (painting and drawing), when asked if she was confident in coming up with new and novel solutions, she shared that she was "Never sure if I want to take a risk that intense and if I'm willing to see how it would be looked upon." This admission is a textbook example of Amabile's (2012) assertion that extrinsic constraints, specifically the fear of social evaluation, can actively stifle intrinsic task motivation. Her fear was not of the cognitive task itself, but like many of her peers, of the social evaluation attached to it. Student 11's observed response during the first challenge substantiated this fear, she was afraid to even begin the task stating, "This is so hard–how am I supposed to know if it is right?" The need for a "right "answer was paralysing her divergent thinking. This internal anxiety resulted in a tangible reluctance to participate in the public brainstorming session in Challenge 1, with only 4 of the 25 volunteering to share their ideas with the class.

My post-action data analysis revealed a critical shift in this dynamic. This shift manifested as a stark contrast between the physical and digital environments. In the physical

classroom, the girls were silent, adhering to the “good student” norm of order and quiet. The OneNote logs, however, revealed a chaotic, noisy, and vibrant intellectual risk-taking process occurring on screen. This cognitive noise was only possible because the social volume had been muted. The anonymised space provided by the custom-built chat bot and Adobe Firefly image generation moved the messy and vulnerable process of brainstorming and ideation into a context void of the social risk of teacher and peer evaluation. Evaluation of the survey data from both the second and final student surveys confirmed that most students agreed the AI chatbot was a safer place to share unusual ideas compared to face-to-face sharing with their peers. Student 7 explicitly detailed this psychological release, noting she felt more open to “bounce messy ideas back and forth,” while previously risk-averse Student 14 enjoyed the freedom of “implementing a bunch of silly and futuristic ideas.” This increased level of comfort with “silly” or “messy” thinking is significant, as divergent thinking and creativity require the freedom to explore non-linear, imperfect concepts without premature critique.

My analysis of the interview responses and final critical reflections substantiate that the non-judgemental context of the AI space reduces the social risk of sharing wild ideas. Twenty-One out of 25 students referred in their final reflection to a renewed willingness to try or share an idea that might be wrong. For example, Student 13, in sharing her reflection in class, implored her peers to "Don't be embarrassed to share your creative projects," indicating that this was now a hurdle they had overcome. Student 19 affirmed that both the project and learning to use AI as a creative collaborator had provided “a safe space to try things out.” This articulated the significant role the perception of academic safety plays in girls’ education.

Purposeful Utilisation of AI to Support Divergent Thinking Promotes Creative Self-Efficacy in Girls

One of the most significant patterns I observed was the measurable shift in creative self-efficacy (a student's belief in their own capacity to create). The self-reflection rubrics confirmed longitudinal growth across the entire cohort of participants. Students consistently progressed from a beginning stage, characterised by nervousness to share, to a thriving

stage, where they loved to share and hear others' ideas. This shift was not merely about skill acquisition; it was an identity shift. Student 19 affirmed that the project provided "a safe space to try things out," moving her self-perception from a passive learner to an active experimenter. Similarly, Student 4's critical reflection noted that AI should only be viewed "as your creative partner, not a replacement for your own thinking."

The students' final portfolios, where many successfully blended disparate domains to produce ideas that were distinctly new and novel, evidenced the growth of student agency and creativity and their ability to cross conceptual boundaries with their ideas. For example (Appendix B), an initial future education concept of one student was structured around "smart glasses." Through the AI ideation chatbot loop, the student synthesised this initial concept with a "futuristic holographic classroom" and "veins of captured lightning" that indicated the student's understanding of their learning. Similarly, another student evolved a functional haptic suit idea into a richly detailed solution based on a "botanical biodome on the surface of Mars." This concept shift captured how the student took their idea from a classroom tool through to a complex planetary solution. By challenge 5, many students were able to successfully demonstrate in their ideas a shift from what is probable to what could potentially one day be possible. They were far more willing to share out-of-the-box ideas and verbally celebrate when peers contributed new ideas, and it was evident in their posture and positive attitudes that they loved having agency over their ideas and outcomes.

The Open-Ended Nature of AI is Challenging for Some Girls

In adherence to rigorous analysis, it is important to note my negative findings. While most girls thrived, a small subset (3 out of 25) struggled with the open-ended nature of the AI. For these students, the lack of explicit constraints caused anxiety; they preferred the safety of a correct answer. Student 19 felt that it was stressful not having references or models to work off. This suggested that while AI is a powerful tool for divergent thinking, it requires significant scaffolding for girls who are deeply entrenched in convergent thinking patterns. Future pedagogical designs must therefore include constraint-fading, starting with tight rules and slowly removing them as creative confidence grows. Student 20 also felt

ethically compromised using AI and expressed that in her opinion “ai [sic] kills creativity,” and felt it “actively hindered me.” Social justice and fairness are important factors for girls, making the ethics of AI and individual student values essential considerations when considering its use being mandated or voluntary in class activities.

Ultimately, across the expanse of data I analysed, the AI tools employed supported most students to move from common or straightforward solutions to ideas that were highly original and surprising. By providing a judgement-free sanctuary for ideation, the AI tools helped provide the psychological and educational conditions necessary for high level divergent thinking, and by extension, creativity, to flourish.

Conclusion

This action research project investigated the efficacy of generative AI in mitigating the potential-expression gap in Year 8 girls’ digital design. By addressing the research question, “How does critical engagement with AI encourage divergent thinking?”, the research findings demonstrate that anonymised, AI-mediated environments successfully function as psychological safe spaces. These spaces disrupt the perfectionism and social conformity pressures that can mask girls’ creativity.

The most profound realisation that emerged from the project was that the AI did not act as a substitute for students’ own thinking. Rather, it served to protect and nurture original thought by offering an environment that was both anonymous and free from judgement. This unique space enabled students to explore and express their ideas without fear of criticism or failure. As a result, students felt empowered to experiment, take creative risks, and develop greater confidence in their abilities. By safeguarding the integrity of their creative process, the AI fostered a supportive atmosphere in which students’ individual voices could flourish.

Implications for future practice suggest that educators should leverage AI as a scaffolding mechanism for risk-taking. Implementing anonymised ideation phases and teaching prompt engineering as a form of critical literacy can support students who struggle with a fear of public evaluation. Pedagogical frameworks must, however, incorporate

constraint-fading to support students who struggle with instructional ambiguity. Also, ethical training to address student concerns relating to authorship and integrity needs inclusion.

The limitations of the project sit within the ethical sphere, with buy-in of AI use not being universal due to some students perceiving AI as ethically compromising. Future research should focus on longitudinal studies to determine if AI-scaffolded confidence transfers to non-digital contexts. Ultimately, this study demonstrates that AI can dismantle structural barriers to creativity, empowering girls to reclaim their intellectual agency.

Reflection Statement

Embarking on this action research project, I initially viewed generative AI as another new skill set to be mastered. My journey with the Year 8 digital design cohort fundamentally shifted my understanding of the relationship between technology and adolescent psychology. I learned that, for these students, the primary barrier to creativity was not a lack of imagination, but a surplus of perfectionism.

My feelings throughout the project evolved from apprehension to exhilaration. Early in the semester, observing the hesitancy of students, like the girl who asked, "How am I supposed to know if it is right?", was worrying. A distinct highlight of my professional practice was the lightbulb moment of contrasting the physical silence of the classroom with the chaotic, vibrant noise of the OneNote logs. Watching students transition from hesitant consumers to confident directors of the AI, expanding their prompts from 150 to 700 characters, gave me a deep sense of happiness.

The project was not without its hurdles. The ethical resistance expressed by a minority of students, particularly the sentiment that "ai kills creativity," was a challenging but necessary reminder that technological integration is never neutral. It forced me to grapple with the reality that for some students, the messiness of manual creation is a core part of their identity, and help can feel like intrusion.

I would like to thank the Year 8 students of St Margaret’s, whose willingness to step into the unknown made this research possible. Their honesty, both in their engagement and their resistance, has made me a better educator. I am also grateful to the School Leadership

Team for fostering an environment where innovation is supported, allowing us to truly embody the spirit of *Per Volar Sunata* (Born to Fly Upwards). Finally, I would like to thank the ICGS for this opportunity, the whole GARC team and especially my RA Karen Lewis.

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Appendix A

Creativity Self-Reflection Rubric

Design Thinking Creativity Self-Reflection Rubric		
Beginning *You're building your creative confidence - everyone starts here!*	**Growing** *You're stretching your creative muscles and trying new things!*	**Thriving** *You're showing strong creative thinking and inspiring others!*
How many ideas? (Fluency) • I came up with **2-3 ideas** for the task • I usually stopped after finding one solution that worked	**How many ideas? (Fluency)** • I came up with **4-6 different ideas** before choosing one • I pushed myself to think of more options even after finding a good one	**How many ideas? (Fluency)** • I generated **7+ ideas** and kept going even when it got hard • I used techniques like mind maps or "crazy 8s" to push for more
How different were my ideas? (Flexibility) • My ideas were **mostly similar** to each other • I stuck to one way of thinking about the problem	**How different were my ideas? (Flexibility)** • My ideas showed **different approaches** to solving the problem • I tried looking at the problem from 2-3 different angles	**How different were my ideas? (Flexibility)** • My ideas were **very different from each other** • I deliberately switched between practical, wild, and unexpected approaches
How unique were my ideas? (Originality) • My ideas were ones that many people might think of • I often used examples I'd seen before as my starting point	**How unique were my ideas? (Originality)** • I had **at least one surprising or unusual idea** • I combined different things in ways that felt new to me	**How unique were my ideas? (Originality)** • Many of my ideas were **surprising and made people say "wow!"** • I connected things that don't usually go together • My solutions were different from what anyone else came up with
How detailed were my ideas? (Elaboration) • I kept my ideas **simple with basic details** • I explained what my idea was but not much about how it would work	**How detailed were my ideas? (Elaboration)** • I added **helpful details** like how it would work, who would use it, or what it would look like • I could explain my ideas clearly to others	**How detailed were my ideas? (Elaboration)** • I added **rich details** including sketches, examples, and step-by-step explanations • I thought about the experience from different people's perspectives • I considered potential problems and how to solve them
How did I feel? (Creative Confidence) • I felt more comfortable working alone or with one friend • Sharing ideas with the whole class made me nervous • When stuck, I waited for help rather than trying new approaches	**How did I feel? (Creative Confidence)** • I felt **good about sharing ideas in small groups** • When stuck, I tried things like sketching, asking "what if?", or looking for inspiration • I was open to feedback and used it to improve my ideas	**How did I feel? (Creative Confidence)** • I **loved sharing ideas** and hearing others' ideas too • When stuck, I had strategies like taking a walk, switching tasks, or asking "how might someone from another planet solve this?" • I helped others feel confident about their creative ideas • I saw "wild" ideas as exciting starting points, not mistakes
Remember: There's no "wrong" in brainstorming. Quantity leads to quality - more ideas = better ideas. Wild ideas can spark brilliant solutions. Everyone's creative journey looks different. You can always grow your creativity with practice!		

Appendix B

Student Work Samples

Student Final Prompt and Image

A photorealistic, wide-angle shot of a futuristic 'Impact Studio' classroom. In the foreground, a Year 8 student is stepping out of a minimalist, white, egg-shaped 'Empathy Pod'. The student is wearing a sleek, full-body haptic suit and is lifting a lightweight VR headset from their face, looking thoughtful. The interior of the pod glows with a soft blue light. The classroom is bright and airy, with large windows looking out onto a green campus. In the background, other students collaborate around holographic design tables and work with 3D printers. A large screen on the wall displays a detailed image of a botanical biodome on the surface of Mars. The overall mood is one of intense focus and creativity. Cinematic lighting, high detail.


MARS BIODOME: BOTANICAL RESEARCH