

"I Can Be Anything!" Bridging Today and the Future through Generative AI-driven Self-represented Career Imagination for Children

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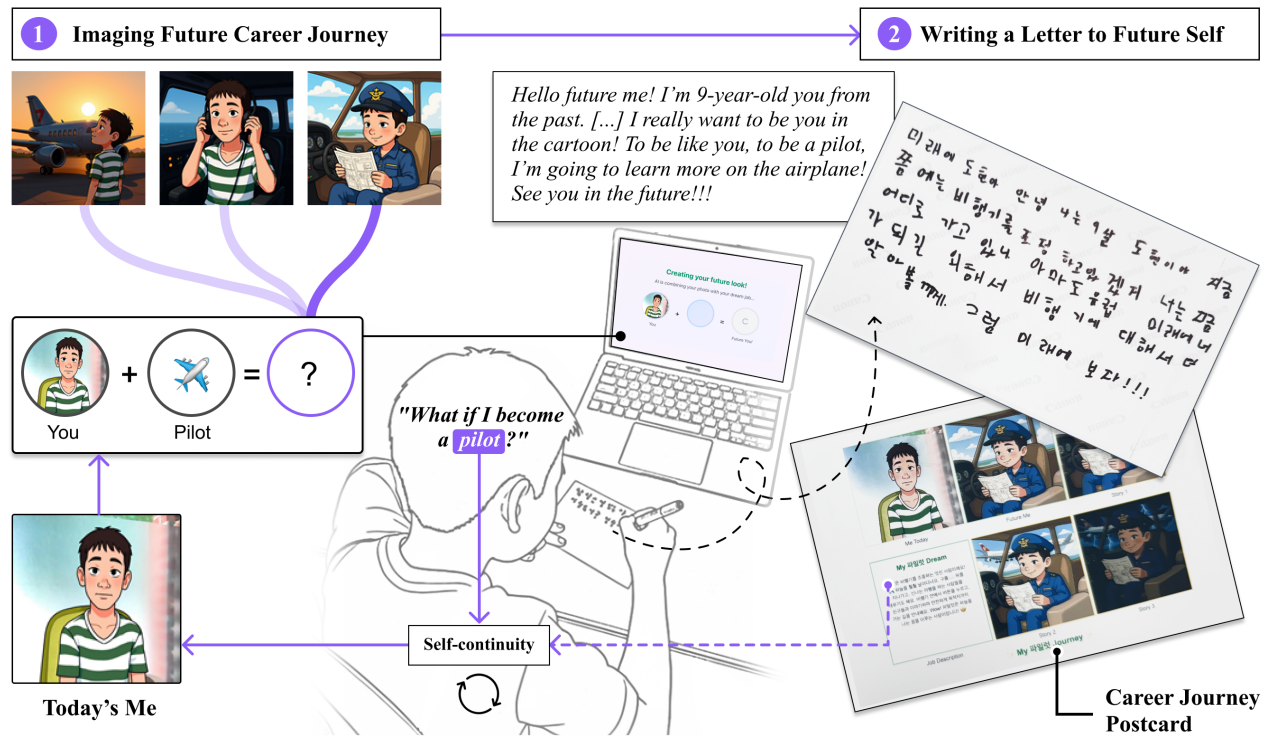


Figure 1: FutureMe is a future career imagination system powered by generative AI, designed to support children's self-continuity. (Left) Children envision their future careers, and *FutureMe* brings these imagined scenarios to life. (Right) Children are guided to write a letter to their future self, fostering a connection between today's self and their envisioned future self. Example of a handwritten postcard produced by P06 as an outcome of the activity.

Abstract

Children's career imagination of their future selves is critical for motivation and identity formation, particularly by fostering continuity between present and future. However, current interventions often lead children—whose developmental stage limits future-oriented

thinking—to view their future not as something connected to themselves, but as a detached job title or label. We present *FutureMe*, a generative AI-driven system that helps children imagine self-represented futures. Through a step-by-step process of taking a photo, exploring career options, imagining actions, and building story strips, children see themselves embedded in AI-generated narratives. The activity concludes with writing letters to their future selves. In a study with 17 children, through *FutureMe*, children revealed hidden aspirations, integrated past and present experiences into imagined futures, and redefined externally prescribed "good careers" as personally meaningful choices. We discuss implications



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for designing AI tools that empower children's agency in imagining futures.

CCS Concepts

• **Human-centered computing** → **Empirical studies in HCI**; Systems and tools for interaction design.

Keywords

text-to-image models, children, self-continuity, generative AI, career imagination, large language models

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1 Introduction

Children's journey of imagining what they want to be in the future is an essential and natural developmental process for elementary school-aged children. In particular, envisioning a career-oriented future provides a concrete anchor for children's self-identity and values, simultaneously motivating present learning and fostering the internalization of future goals and aspirations. This process lays the foundation for self-continuity—the ability to see a meaningful connection between one's present self and envisioned future [18, 30, 54, 82]. Given its importance, encouraging children to imagine their future selves is considered a core component of formal education, with diverse interventions developed to support this process. For example, school programs often ask students to write and discuss narratives about their envisioned future selves, while other curricula guide them to imagine hoped-for, expected, and feared futures and then translate these into concrete goals and actionable plans [71, 86].

Generative AI, including multimodal large language models (MLLMs) and text-to-image (T2I) systems [47, 64, 102, 106, 107], have opened new opportunities to support children's imagination, creativity, and self-expression. Recent studies emphasize balancing AI-generated support with children's agency, enabling personalization, and fostering interpretability to deepen creative involvement [13]. Interactive storytelling systems powered by LLMs help children collaboratively build narratives and expand abstract ideas, leading to richer expressions of their inner worlds [37, 50, 109]. Moreover, systems that feature the child—using their face, name, or voice—foster emotional connection and a stronger sense of self-relevance [79, 110]. Building on these opportunities, researchers have also applied generative AI in the domain of career exploration, mainly targeting adolescents and young adults. Studies have integrated LLM-based "future-self agents" into letter-exchange exercises [59], developed gamified role-play systems that simulate career events and decision-making scenarios [28], and designed workshops where high school students use tools like Midjourney to visualize imagined future identities [1].

However, prior work has largely centered on adolescents and adults rather than younger children in future-self or career exploration contexts [100], even though cultivating a sense of future self-continuity is also critical in middle childhood [18, 30, 54, 82]. Since imagining one's future is inherently abstract and often hard-to-grasp [71], we believe that simply extending these adolescent- or adult-centered interventions to younger children can introduce several frictions. First, existing approaches often assume prior career knowledge and long-term goal reasoning. These interactions may place cognitive demands on younger children. Second, goal-oriented interaction designs may not align with the exploratory, curiosity-driven nature of children's early career imagination, where breadth of exposure is often more important than articulating specific choices. To alleviate these frictions, a generative AI-based imagination system for children should (a) include preparatory stages that enrich children's prior knowledge of diverse careers, (b) provide opportunities for debiased and open-ended exploration of possible futures without requiring a specific pre-defined goal, and (c) stimulate children's curiosity about their future selves through self-relevant elements.

Based on this background, we present *FutureMe*, a generative AI-driven system that combines MLLM and T2I generation to help younger elementary-aged children visualize and narrate their imagined futures (Figure 1 shows the overall process). Through *FutureMe*, children step into imagined careers by seeing themselves in those roles, exploring what the jobs are about, and envisioning the actions they would like to perform. They then co-create four-panel story strips with their own faces embedded in the scenes, and conclude with writing letters to their future selves—bringing reflection into the process and reinforcing self-continuity (see Figure 2 for interface details). A study with 17 children demonstrated how *FutureMe* enabled children to (1) disclose private aspirations they had previously kept secrets, (2) link past and present experiences with envisioned future careers, and (3) shift and reinterpret externally imposed notions of socially prescribed 'good careers' into futures defined on their own value. Building on these findings, we discuss how *FutureMe* can serve as a bridge between children's present and future selves, and how generative AI systems should be designed to support both self-continuity and children's agency in future imagination. The contribution of this work is threefold:

- (1) We introduce *FutureMe*, a generative AI-driven system that combines MLLMs and T2I models to support children's career imagination. The system integrates real-time photo capture, contextual image editing, narrative co-construction, and tangible postcard outputs, operationalizing self-continuity through self-represented visual narratives.
- (2) Through a study with 17 elementary-aged children, we show how *FutureMe* enabled participants to disclose hidden aspirations, expand futures by linking present interests and past experiences, and reinterpret socially prescribed 'good careers' into self-defined, meaningful futures. Our analysis across generated images, narratives, and letters illustrates how generative AI can scaffold self-continuity between today and the future.
- (3) We contribute implications for designing imagination tools that empower children's agency and identity development.

By demonstrating the value of personalization, visual grounding, and reflective engagement, we argue that generative AI can move beyond static outputs toward open-ended, child-directed exploration, fostering self-continuity and adaptive career imagination in a rapidly changing world.

2 Related Work

2.1 Children’s Identity-based Motivation by Imagining a Continuous Future Self

Most children are asked from a young age what they want to be when they grow up, and imagining their future selves is a natural part of early development that supports goal formation, motivation, and emerging identity. According to identity-based motivation theory, imagining an adult future self can become motivational only when that future identity feels accessible and relevant to the child’s present self. When the future feels distant, it may fail to drive present action despite being conceived [82]. Consistent with this perspective, identity-based motivation theory predicts that children who are guided to experience a strong connection between their current and future self perform better academically and show stronger school engagement [82, 85]. For example, Pawlak et al. conducted systematic reviews indicating that vivid and personally relevant future-oriented thinking among children correlates with improved classroom engagement, higher academic performance, and stronger self-regulation—but these benefits depend critically on the future self feeling emotionally and cognitively close to the present self [93].

In this context, it becomes crucial for children to imagine future selves that feel personally relevant and meaningfully connected to who they are now. Self-continuity research shows that individuals who perceive similarity with their future selves are more likely to plan ahead, delay gratification, and persist toward long-term goals [18, 54]. Within identity-based motivation frameworks, the concept of self-continuity—the perceived psychological connectedness between one’s present and future self—plays a central role [54]. Self-continuity has been shown to influence long-term decision-making, as individuals who feel a stronger sense of continuity with their future selves are more likely to plan ahead, invest in long-term goals, and engage in prosocial behavior [5, 55]. In child development, this construct is especially important during middle childhood, when children begin to form a more stable sense of self and consider their roles in the future. Studies show that when children are encouraged to visualize future selves that reflect their current values and personality traits, they experience higher motivation and greater internalization of long-term goals [24]. Thus, fostering self-continuity through accessible and emotionally resonant imagery may be key to supporting children’s ability to envision and strive toward meaningful futures.

In particular, for many children, imagining their future self often centers on a career aspiration—linking self-continuity to career exploration can make the future feel concrete, purposeful, and tied to present learning. Career-oriented future thinking not only helps children anchor aspirations in identity but also supports goal-directed behaviors such as persistence in relevant subjects (e.g., a child wanting to be a veterinarian may find renewed purpose in studying science) [30, 101]. In particular, Super’s theory positions

the elementary years as a “growth stage,” where children develop both self-concept and initial awareness of the world of work, laying the foundation for realistic career exploration. Similarly, Eccles’ expectancy-value theory also explains how seeing a clear connection between present learning and valued future roles strengthens motivation and sustained engagement [30].

2.2 Interventions for Children’s Future Self Imagination

Prior research has explored diverse interventions to support children’s career-centered imagination of their possible selves, often using creative and expressive methods. In formal education, career education programs in elementary schools frequently incorporate drawing, storytelling, and role-play activities to help children envision future roles. For example, Chambers et al. conducted a large-scale international study involving over 20,000 primary school children who drew the job they wished to have as adults, revealing a broad range of aspirations alongside evidence of gender stereotypes and the influence of familiar role models [16]. Ferrari et al. found that upper elementary students could articulate specific career dreams linked to personal interests, while younger children’s aspirations tended to be more fantastical [40]. Such arts-based, open-ended tasks can surface meaningful personal goals even in early childhood. Furthermore, informal learning environments offer rich opportunities for future-self exploration. The global edutainment park KidZania enables children to role-play over 50 adult occupations in a realistic miniature city [43]. Similarly, the Kidtropolis exhibit at the Children’s Museum Houston engages children in running a functioning play economy [42], and traveling career-exploration exhibits like the Future Me Lab bring immersive job experiences to community centers and libraries [63].

Technology-based approaches have also emerged in this space. Human-computer interaction (HCI) and education researchers have developed interactive systems to broaden children’s future exploration. For example, intervention using virtual reality (VR) allowed teenagers to step into a career in a simulated environment, which led to improved understanding of that job’s challenges and required skills [57]. Researchers have examined mobile self-reflection tools for adolescents’ career exploration. For example, mobile self-reflection tools FindMyself was designed and evaluated with high school students ($N = 46$) in a twelve-day field study, showing that recurring reflection tasks and personal profiling effectively supported self-reflection, while also revealing users’ desire for concrete job recommendations—an insight that highlights the delicate balance between guidance and autonomy in career decision support [3]. Also, Shipepe and Peters designed an interactive career guidance learning system that incorporated gamification elements to engage learners in exploring future career options. Their system highlighted how playful mechanics and interactive tasks can motivate students to reflect on interests and career choices, pointing to the value of game-based approaches in career education [96]. Similarly, Brandenburger et al. designed a gamified career guidance platform for adolescents (12+), incorporating elements like badges, vision boards, and storytelling to foster intrinsic motivation. A field study with grade-8 students showed that intrinsic motivation strongly



Figure 2: Main screens and usage flow of *FutureMe*: ① Self-image generation screen, where a child takes a photo and the system cartoonizes and integrates the child's face into a visualized future self. ② Career exploration screen, which supports interactive hovering for intuitive career exploration, ③ Deciding future career screen, where a child types or selects a dream career (e.g., "Astronaut") ④ Future self visualization, showing multiple candidate images for the child's imagined role. ⑤ Learning about dream job screen, which provides short explanations of the chosen career. ⑥ Action-oriented imagination screen, where the child describes actions (e.g., "I want to explore the moon!") ⑦ Story generation screen, where actions are expanded into narrative content, ⑧ Future journey postcard, allowing children to have self-represented visual narrative. ⑨ Writing letter to future me screen, which guide child to write a letter to future self.

correlated with perceived usefulness, underscoring the value of motivational design features in career support tools [8].

These attempts highlight that a range of intervention formats – from arts-based class activities to digital intervention – have been used to help students imagine who they might become in the future. However, much of the research to date on youth future orientation

has concentrated on adolescents, often relying on surveys or questionnaires to assess teens' thoughts and attitudes about the future [2, 77, 99]. Because prior work has focused on older age groups and fixed measurements, there is limited understanding of how younger children vividly imagine their future selves, particularly through creative and personal expression [100].

As careers continue to change and new roles emerge, children need opportunities to explore possible futures in personal and creative ways. Rather than simply naming jobs on a questionnaire, interventions should help them build meaningful connections with their future selves. Our work addresses this need by introducing a system that enables children to imagine futures that feel relevant and motivating.

2.3 Generative AI as a Catalyst for Children’s Future Self Imagination

Recent advances in generative AI present new opportunities to address the limitations of prior approaches by enabling not only high-quality generation but also multimodal understanding. These developments span MLLMs [20, 23, 83, 84, 102, 107] and T2I models [35, 64, 106]. Among these, the integration of cross-modality understanding with generative outputs (e.g., images or text) is especially promising for supporting children in envisioning and constructing their imagined future selves. These models enable users to translate verbal ideas into rich, high-fidelity visual depictions, lowering the barrier for children to externalize abstract aspirations. In educational contexts, researchers have shown that T2I models can scaffold creative ideation by rendering intangible concepts concrete, thereby allowing younger learners to engage with scenarios beyond their immediate lived experience [38, 79]. For instance, frameworks for child-centered AI design emphasize co-creative interaction, where AI serves to expand the child’s expressive range rather than replace it, thus preserving agency and ownership over imagined content [25, 27, 51]. Emerging natural language–driven image editing frameworks [20, 65, 106] further streamline this process, enabling intuitive materialization of imagined futures.

Studies in HCI have demonstrated that AI-mediated visualizations can foster both engagement and narrative depth when children are encouraged to iteratively refine outputs, linking each iteration to evolving storylines or personal contexts [50, 109]. This iterative, reflective cycle mirrors principles from possible selves theory, where repeated elaboration of a future self enhances clarity, emotional salience, and perceived attainability. Moreover, recent work has identified the affective dimension of AI-assisted creation that children often experience heightened excitement and personal connection when AI outputs reflect their individual traits, interests, or cultural background [21, 68]. For example, Han and Cai examined how tools like ChatGPT (for text) and Stable Diffusion/Midjourney (for images) might be harnessed for young learners’ literacy and creative expression. Based on these insights, the authors proposed “AIStory,” a prototype visual storytelling application. AIStory allows children to co-create storybooks by typing or dictating text (with a chatbot’s assistance to develop the plot) and then generating illustrations for each scene using a T2I model [50]. Newman et al. underscore the potential of combining LLM and text-to-image generation to support children in internalizing creative styles when they customize generative outputs, helping build creative self-efficacy [79].

Building on these opportunities of generative AI, prior work has explored a broad range of future-oriented interventions—from open-ended future imagination to career exploration—primarily targeting adolescents and adults. These studies demonstrate how generative AI can scaffold reflection about one’s future identity,

support prospection, and provide new forms of guidance across educational, personal, and emotional domains.

In the domain of broad AI-mediated future-self imagination, Pataranutaporn et al. introduced AI-driven future-self interventions, showing that conversational agents using AI-generated future selves can enhance future self-continuity and reduce anxiety by allowing users to explore temporally distant identities through dialogue rather than embodied simulation. These systems demonstrate that AI-generated characters and LLM-based conversational interaction can serve as accessible, scalable alternatives [88]. Dechant et al. developed LLM-powered mental health interventions to support mental well-being, a chatbot that supports prospection by guiding users through future-oriented thinking strategies. Across user studies, these AI-driven systems have been shown to foster self-reflection and goal clarity [22]. Similarly, Torres investigated AI-prompted future-self journaling tools that use guided selfie-video recording to support emotional self-regulation and increase self-efficacy. This study demonstrated the potential of future-self–based, LLM-supported interventions for enhancing reflection and positive affect, while highlighting the need for more personalized, adaptive models that can account for individual emotional patterns and mental-health contexts [104].

In the context of generative AI-driven intervention to career exploration, Jeon et al. integrated LLM-based “future-self agents” into the classic letter-exchange exercise to support young adults’ career exploration. Their study with 36 participants showed that AI-augmented conditions increased engagement but produced comparable effects on future orientation and career self-concept compared to traditional methods [59]. Du et al. introduced CareerSim, a gamified role-play system leveraging LLMs to support career development reflection. In a study with participants aged 18–24, they showed how simulated career events and decision-making scenarios encouraged exploration of career pathways and values, offering insights into the design of AI-assisted career interventions [28]. Ali et al. designed Dreaming with AI, a workshop where 34 high school students used text-to-image generation to visualize their imagined future identities while critically reflecting on the potentials and risks of generative AI. The study showed that students not only learned technical aspects such as prompt engineering and model limitations but also articulated societal concerns around ethics, privacy, and classroom policies [1].

While cultivating a sense of future self-continuity is critical in middle childhood [18, 82, 100], prior work has primarily focused on adolescents and adults. We argue that adapting adult-centric models imposes cognitive barriers for children [30, 46], as these tools rely on abstract, text-heavy interactions that assume extensive background knowledge. Furthermore, existing interactions that emphasize depth within a single selected career do not align well with the exploratory, curiosity-driven nature of children’s imagination, where broad exposure is often more valuable for fostering a sense of agency and openness toward multiple possible futures. To address these gaps, we devised *FutureMe*, a system that supports open-ended exploration of future careers without requiring extensive prior knowledge, while embedding conscious interaction patterns tailored to children.

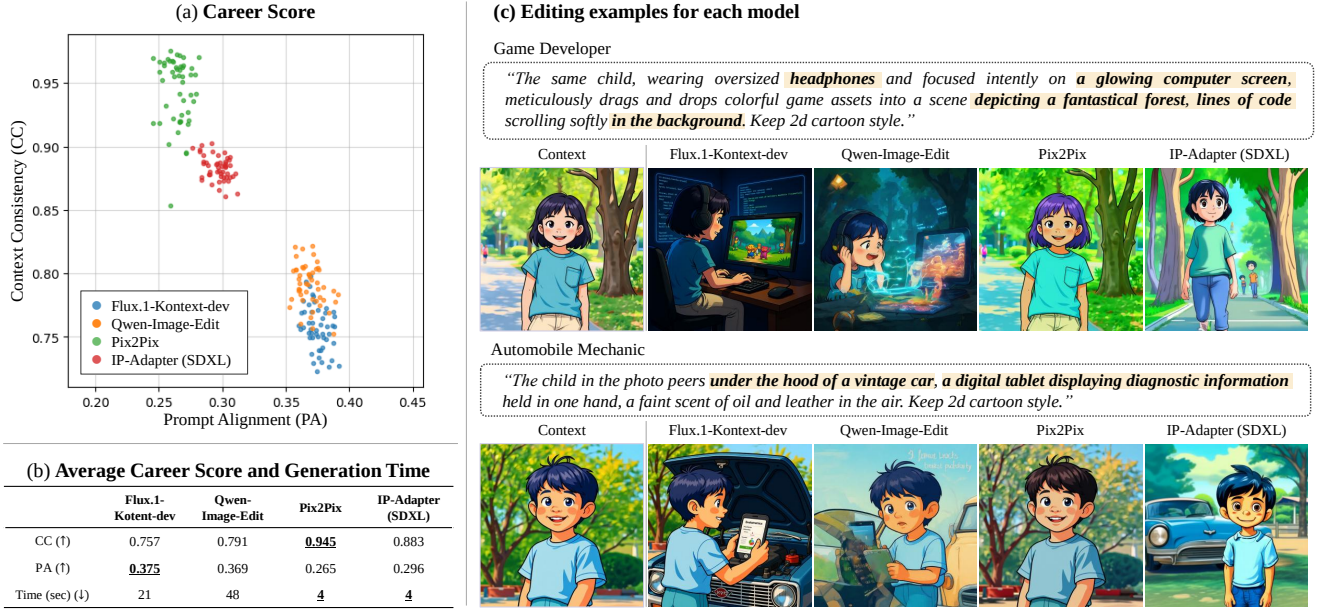


Figure 3: Synthetic editing benchmark results for various T2I models. (a) Averaged context consistency (CC) and prompt alignment (PA) for each career, computed from 12 edited images (six prompts applied to cartoonized boy and girl images). Each dot represents the averaged score for one career, with color coding denoting the T2I model. (b) Overall averages of CC and PA across all dots in (a), along with the average editing time per image. (c) Example editing prompts and corresponding results for each model, enabling qualitative comparison. Additional editing examples are provided in Figure 14 in the Appendix. Considering both editing quality and computation time, we select Flux.1-Kontext-dev as the T2I backbone for *FutureMe*.

3 FutureMe: An Interactive System for Child-Centered Future-Self Exploration

In this section, we introduce *FutureMe*, a generative AI-driven system that guides children aged 7–11 through future-self imagination and career exploration. Our system design was informed by developmental theory of children. According to Piaget’s theory of cognitive development, children aged 7–11 are in the concrete operational stage, where they reason most effectively through tangible, visual, and narrative forms rather than through abstract or hypothetical ideas [90]. In parallel, Erikson’s psychosocial theory describes this period (ages 6–12) develop a growing interest in demonstrating competence and exploring socially meaningful roles [33]. Motivated by these perspectives, our system guided activities move from broad career exploration to personalized narrative construction, resulting in a tangible career journey postcard and a reflective letter written to one’s future self. We next present the formative research that shaped the design, followed by details of the implementation.

3.1 Formative Research

To inform the design of our intervention *FutureMe*, we conducted formative research combined a literature review and technical evaluation. From 83 works in education and developmental psychology, we derived four design goals for future-self imagination interventions. Building on these goals, we then examined technical requirements for implementing personalization and contextualization in

FutureMe. To realize this potential of generative AI for supporting children’s future imagination, we evaluated state-of-the-art text-to-image (T2I) models through a synthetic editing benchmark that examined their ability to preserve contextual self-continuity across diverse career scenarios.

3.1.1 Design Goals. We reviewed 83 peer-reviewed studies and reports from education and developmental psychology domains. From this extensive body of work, we selected 21 core works for in-depth analysis due to their direct relevance to child-centered approaches to future-self imagination, career exploration, and identity-based motivation. Our review focused on interventions and studies targeting middle childhood (ages 7–12), a critical period for the development of self-concept and future orientation. Our synthesis of the literature produced four design goals that articulate the functional priorities of a future-imagination intervention for children, each addressing a specific motivation.

(1) *Enhance Self-Continuity Through Personalization.* Research demonstrates that helping children vividly envision their future selves can strengthen present-to-future self-continuity [44, 56, 58, 98]. This connection is particularly powerful when the future self feels personally relevant. We found that interventions using personalized, age-progressed versions of a child’s own facial features are effective at bridging their current and imagined identities. This personalization increases emotional engagement and reduces the psychological distance to the future self, mitigating appearance-based concerns that can arise [53, 61, 91].

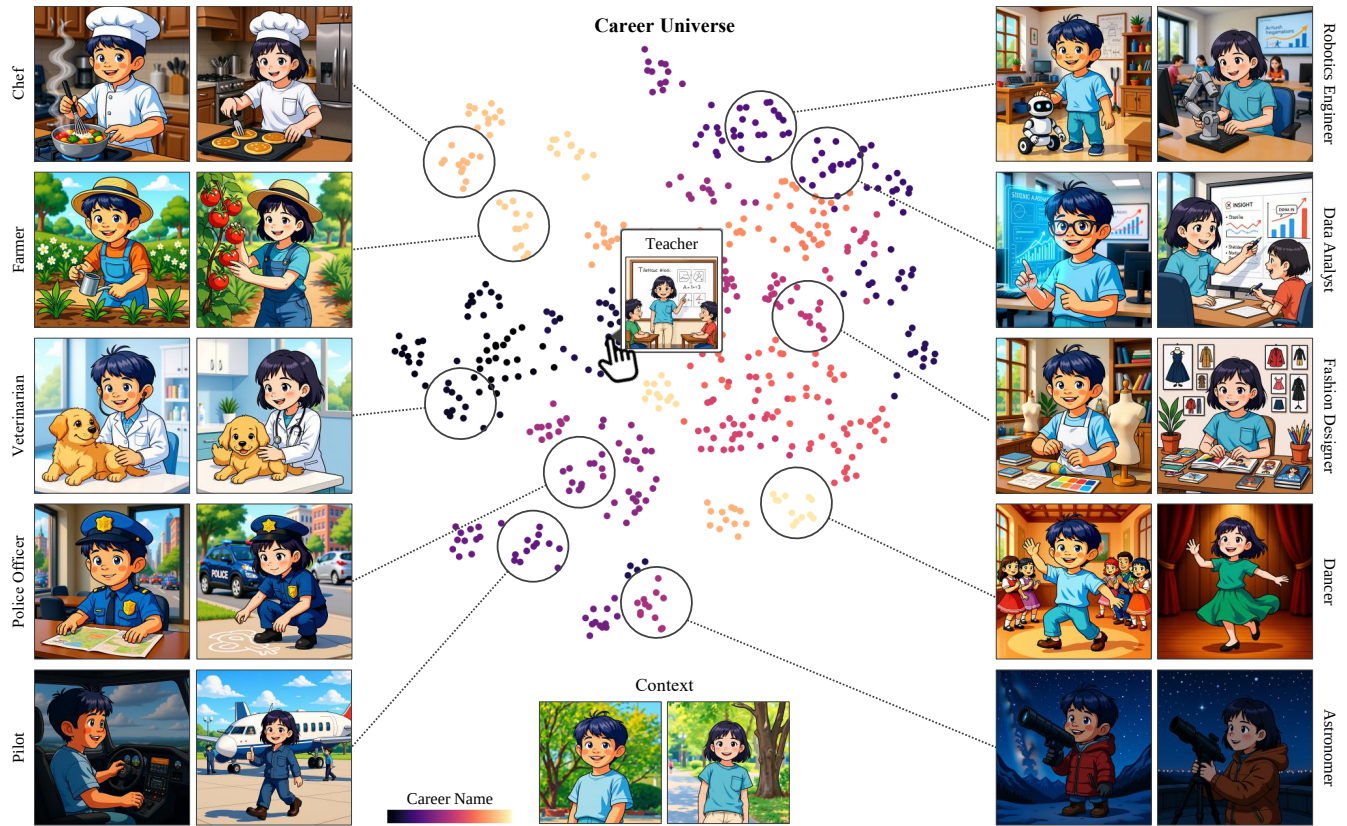


Figure 4: Illustration of the career universe. Career scenes are embedded with the CLIP model and reduced in dimensionality for visualization. Color coding indicating the associated career. By hovering over a point, the child can view the corresponding career name and scene (see center illustration). Example generations from selected area of the embedding space are displayed around the plot. This interactive system enables children to explore a wide range of career possibilities.

(2) *Moving Beyond Job Titles Toward Narrative Futures.* Merely stating a static aspiration such as “I want to be a scientist” is often insufficient to sustain motivation [72, 89]. For example, a child might instead imagine, “If I become a scientist, I want to build robots that can help people.” Future identity becomes meaningful only when it is tied to concrete actions and embedded in a coherent personal story [34, 74]. Our review suggests that interventions should encourage children to envision and articulate these richer narratives, positioning them as protagonists in their own future journeys. This narrative framing strengthens both their sense of agency and ownership over the paths they imagine.

(3) *Provide Child-Friendly Career Information* Children’s career horizons can be broadened by information that is tailored to their developmental stage and presented in ways they can easily relate to [48, 62, 94, 101]. Using age-appropriate language, concrete examples, and familiar contexts makes career information more engaging and understandable, while also challenging stereotypes. This child-centered approach helps counteract early occupational narrowing and supports children in seeing how their own interests and everyday experiences can connect to diverse and meaningful future possibilities.

(4) *Strengthen Motivation Through Reflective Engagement.* An enduring psychological link between the present and future self is crucial for increasing motivation for long-term goals [31, 45, 73, 85, 97]. Our synthesis highlights that effective interventions design activities that foster this connection, making long-term goals feel personally relevant and attainable. This can be achieved through reflective exercises, such as writing messages to one’s future self, or creating meaningful outputs that act as persistent cues for self reflection [36, 81].

3.1.2 Self-represented Career Imagination. Formative research underscores that self-continuity is fostered by bridging present identity with imagined futures. Motivated by this principle, we formalize the task of self-represented career imagination as a context-aware text-to-image generation problem within the computer vision domain. To this end, we design *FutureMe* as a system that operationalizes self-continuity through contextual image editing, treating a child’s temporal state as a context image and leveraging T2I models accordingly. In this setting, the quality of self-representation is a crucial factor for sustaining a meaningful and engaging experience. To systematically evaluate this approach, we introduce a synthetic editing benchmark specifically tailored to assess the naturalness of self-representation. We begin by generating 50 diverse

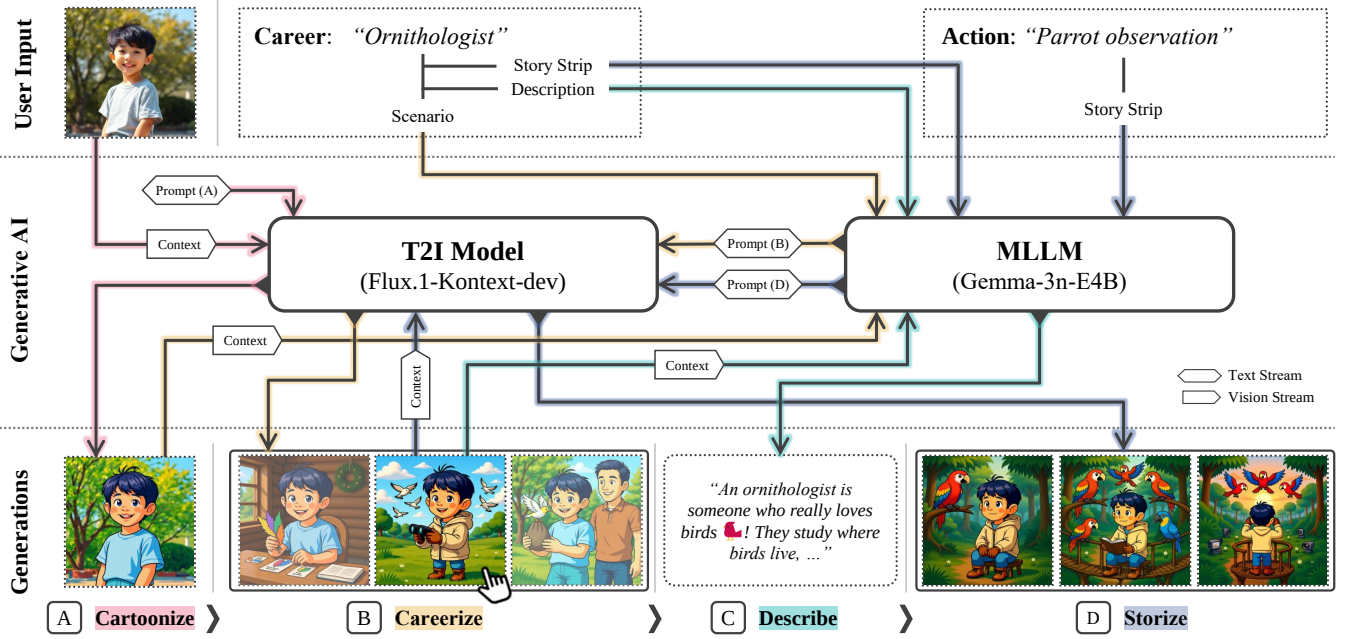


Figure 5: *FutureMe* pipeline. (A) **Cartoonize**: a child’s photo is transformed into a cartoon-style image using pre-defined editing prompt. (B) **Careerize**: conditioned on the cartoonized image and a selected career, the MLLM generates three job scenario prompts, and the T2I model produces corresponding career-oriented images; the child selects one preferred result. (C) **Describe**: the MLLM generates a child-friendly description of the selected career. (D) **Storize**: the child writes an imaginative action based on the generated future self-image and job description; the MLLM translates this into a story strip script, and the T2I model generates images to complete the strip. This workflow integrates MLLM and T2I models for self-represented career imagination, and through these four stages, children are supported in sustaining self-continuity between their present and envisioned future selves.

career categories¹ with GPT-5 [84]. Artificial children’s selfies (boy and girl) are then synthesized with Flux.1-dev [64] and stylized into cartoon representations using Flux.1-Kontext-dev [65]. For each career (e.g., game developer), pre-defined editing prompts² are applied to cartoonized child images, which serve as the *context*. Then we compute similarities between generated images and editing prompts in the CLIP³ embedding space [92]. We evaluate two criteria: (1) context consistency (CC), measuring cosine similarity between the original context and the edited images, and (2) prompt alignment (PA), measuring cosine similarity between the edited image and the corresponding career scenario (i.e., editing prompt). Four T2I models are compared: Flux.1-Kontext-dev [65], Qwen-Image-Edit [106], Pix2Pix [10], and IP-Adapter [108], with quantized versions employed for Flux [69] and Qwen⁴ to improve efficiency. Detailed measurement procedures are provided in Appendix C. Figure 3 presents benchmark results across 50 careers. While Flux.1-Kontext-dev and Qwen-Image-Edit achieve comparable CC and PA scores, Flux.1-Kontext-dev demonstrates higher qualitative fidelity (see right-hand examples in Figure 3) and lower

computational cost. Consequently, we select Flux.1-Kontext-dev as the T2I backbone for *FutureMe*.

3.2 User Interface and System Implementation

The *FutureMe* framework consists of four core stages supplemented by two additional steps: [Pre-step] career exploration; (A) **Cartoonize**, transforming a child’s selfie into a cartoon-style image; (B) **Careerize**, generating a self-represented career image from the cartoonized input; (C) **Describe**, producing an MLLM-driven introduction to the chosen career; (D) **Storize**, constructing visual story strips based on user-defined actions; and [Post-step] printing a postcard as a tangible artifact that also includes a reflective letter to the future self. Collectively, these stages enable children to envision possible futures, fostering self-reflection and strengthening self-continuity. The complete workflow for the core stages is illustrated in Figure 5⁵.

3.2.1 [Pre-step] Career Exploration. Exposure to limited or stereotyped images of careers can restrict children’s sense of self-continuity, particularly when their futures are framed narrowly through career pathways. To address this, we implement a career exploration stage that presents a broad, non-prescriptive set of career categories.

¹The utilized career names are available in Table 2 in Appendix.

²Prompts are generated using the MLLM integrated in our system. See Figure 5.

³<https://huggingface.co/openai/clip-vit-base-patch32>

⁴<https://huggingface.co/ovedrive/qwen-image-edit-4bit>

⁵All experiments and system implementation were conducted on a single NVIDIA RTX A6000 GPU (50 GB).

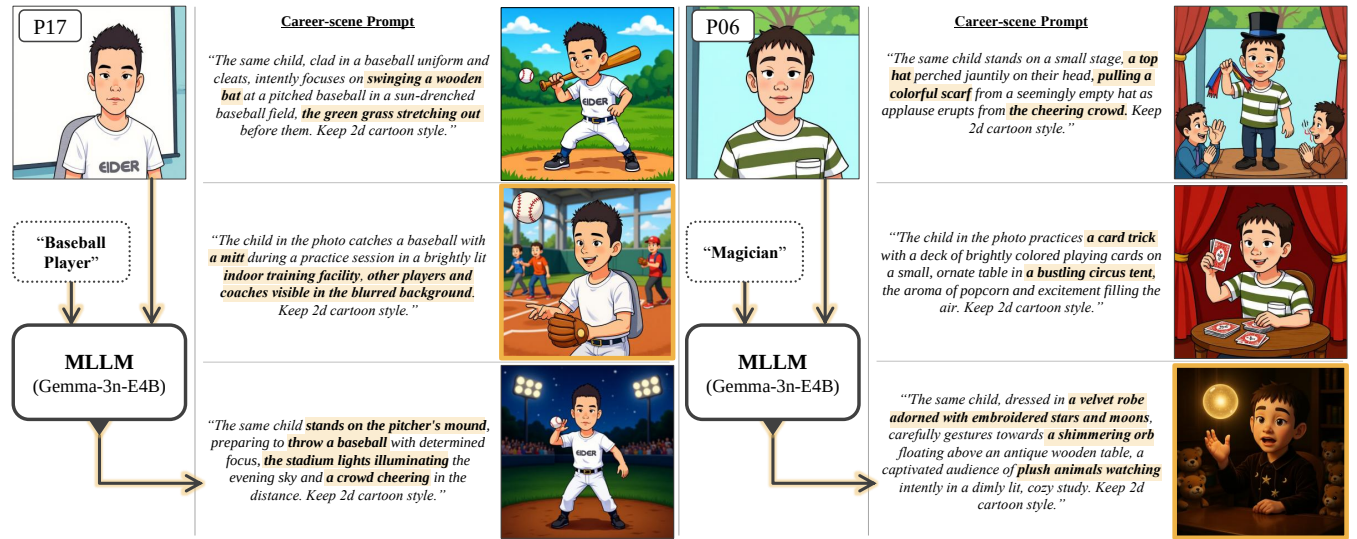


Figure 6: Experimental results from participants P17 and P06 during the Careerize stage. After completing the Cartoonize stage, children either typed or selected their desired future career (e.g., Magician). The connected MLLM generated three alternative career scene prompts. The T2I model then combined these prompts with the child’s cartoonized illustration to produce self-represented career images. The yellow box highlights each child’s preferred future self.

Technically, we reuse the pre-computed image embedding vector (50 careers) from Flux.1-Kontext-dev obtained in the formative research, compute a corresponding career name embedding vector with CLIP text encoder, and define the representational vector as their summation. Instead of relying on a single, fixed image per job, each career is represented by a set of 1 male- and 1 female-gendered images, totaling 100 images. We then apply UMAP [75] for dimensionality reduction, enabling visualization of the resulting *career universe*. Figure 4 illustrates this space, which supports interactive hovering for intuitive career exploration. Careers were visually grouped into related clusters (e.g., art, science, care, public service), helping children navigate intuitively among similar professions and discover relationships between them. By giving children agency to move, select, and reorganize within the universe, the design fostered self-direction, allowing them to situate themselves. This stage is grounded in career development theories that emphasize the importance of expansive exploration to disrupt premature occupational narrowing and challenge stereotypes tied to gender and social status [48, 94, 101]. We believe that this interactive exploration stage can resolve the limitation of experience or knowledge for appearance of various careers and stimulate to imagine various future reflection.

3.2.2 Cartoonize: Photo to Stylized Illustrations. After the exploration phase, children are invited to construct a personalized future self by uploading or capturing a photo. We transform the photo into a stylized 2D cartoon illustration rather than a photorealistic depiction. This transformation is implemented through the T2I model (pink lines in Figure 5) using prompt (A): “change to cartoon style.” This design choice serves two main purposes. First, by abstracting children’s faces into cartoon form, it reduces potential self-consciousness about appearance, encouraging them to

participate more playfully and imaginatively in future-self tasks. Second, it provides an additional layer of privacy protection by avoiding the direct use of children’s real photos in generative processes, thereby lowering risks associated with storing or displaying identifiable facial data. By shifting emphasis from literal likeness to symbolic representation, the cartoon style enables children to focus on the imaginative aspects of their envisioned futures while also safeguarding personal privacy.

3.2.3 Careerize: Self-represented Career Journey. In this stage, children first select a career they wish to imagine for their future. Based on this choice, the system generates three alternative visualizations of the child in that role, from which the child selects a preferred image. To create these variations, we leverage Gemma-3n-E4B [103], an MLLM that produces career-specific scene descriptions tailored to the selected role. Both the cartoonized illustration (context) and the generated descriptions (editing prompts) are then provided to the T2I model to create context-aware, self-represented images (see yellow line in Figure 5). For example, if a child chooses “scientist,” the system may generate three images depicting the child (1) mixing colorful liquids in a laboratory, (2) building and testing a robot, and (3) observing stars with a telescope. By offering multiple personalized options, the system encourages children to explore diverse possibilities and stimulates divergent thinking about their future selves. Figure 6 illustrates example scene descriptions and corresponding career visualizations generated for participants P17 and P06. This visual personalization supported identification and self-relevance, bridging the gap between the real self and the imagined future self.

3.2.4 Describe and Storize: From Child-Friendly Explanations to Personal Visual Narratives. In this stage, the chosen career is first explained through a simple, child-friendly description that helps

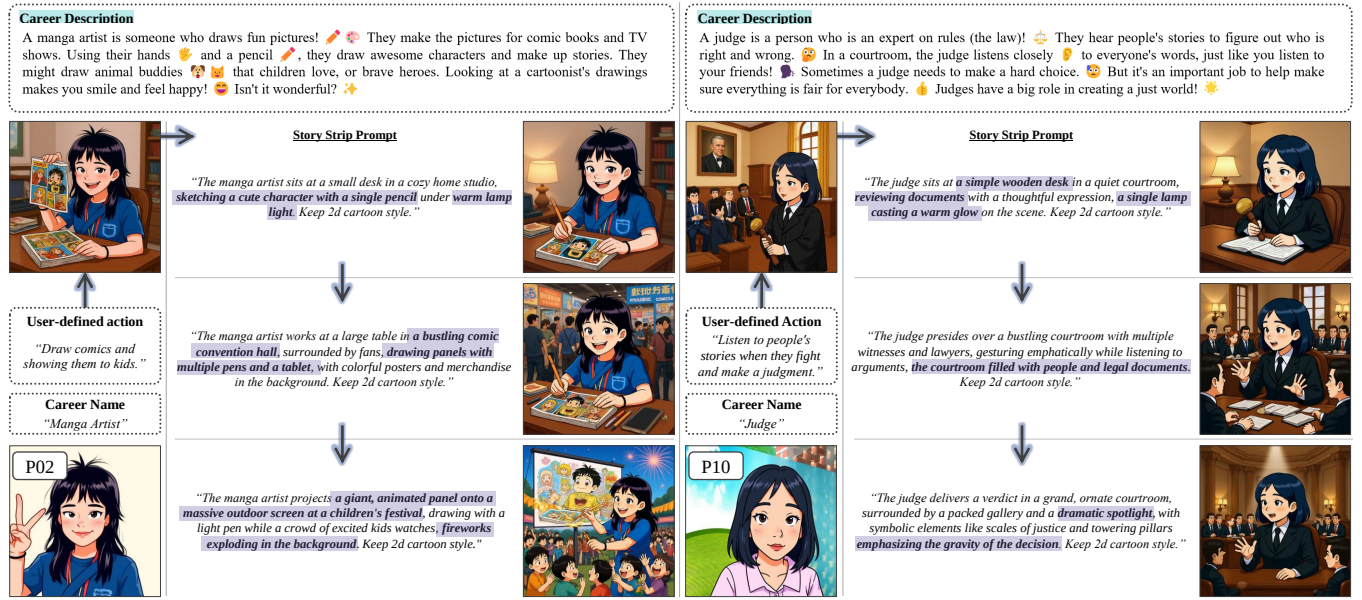


Figure 7: Experimental results from P02 and P10 during the Describe and Storize stages. FutureMe provides children with intuitive career descriptions generated by the MLLM for an arbitrary career. After reading the generated description, children defined their envisioned future actions for the visual narratives.

children understand the role. To generate these explanations in alignment with each child's imagined career, we use the MLLM with the selected image and career name as input (see the green line in Figure 5). Children are then invited to write what they would personally do in that role—for example, "If I became a scientist, I would invent a new machine to help people." These child-authored actions are transformed into visual narratives: a three-panel story strip in which the child becomes the main character. The MLLM generates short stories for each panel, and these are used to guide the T2I model in manipulating the selected career image into a coherent story strip (see the blue line in Figure 5). The comic strip format was chosen to externalize children's thoughts in a story-based and accessible form. Research in child-centered design and developmental psychology shows that visual narrative tools can bridge the gap between imagination and self-expression [14, 80]. By sequencing their imagined scenes, children could construct continuity—seeing themselves performing specific actions connected to their envisioned future career. This format also reduced linguistic pressure and enabled children with different literacy levels to communicate through imagery and dialogue. Figure 7 presents examples of generated career descriptions and visual narratives from participants P01 and P10. This step moves children beyond seeing careers as static labels, instead encouraging them to imagine dynamic stories of what they could do, thereby fostering more fluid and personal ways of thinking about their futures.

3.2.5 [Post-step] Tangible Career Journey Postcards for Reflection.

The final output of the system is a tangible postcard designed to support engagement, reflection, and long-term motivation. Each postcard contains four elements: (1) the child's present self, (2) their imagined future self in the chosen career, (3) a three-panel story

strip based on the child's described actions, and (4) a simple career description. Figure 8 shows an example of a career journey postcard. This design provides children with a personal visual narrative of their future path and a physical artifact they can keep and revisit. At the end of the session, children review the different postcards they created and select their favorite, which is then printed in real time. On the printed postcard, children are also invited to write a letter to their future self, encouraging them to connect who they are now with who they hope to become. This activity reinforces reflection and strengthens their sense of self-continuity.

3.3 Ethical Considerations

As our participants were children, we placed particular emphasis on ethical considerations in the design and implementation of the system. Because generative AI systems cannot guarantee the reliability of their outputs, *FutureMe* was deliberately designed with multiple safeguards to ensure that all content remained appropriate for young participants. The study protocol was approved by the Institutional Review Board (IRB) of the university.

Controllability. To ensure full controllability of both the T2I model and the MLLM, the entire system was implemented on local infrastructure. Since the generative AI models used were open source, all hyperparameters affecting the fidelity of generations (e.g., the number of inference steps for T2I) were explicitly controlled; details are provided in Appendix B. System prompts for the MLLM were also carefully designed to minimize the risk of harmful or biased generations, such as negative or inappropriate imagery. The complete prompts are available in Tables 3–5. For additional verification, we examined the outputs generated during the career exploration stage and found no problematic cases.

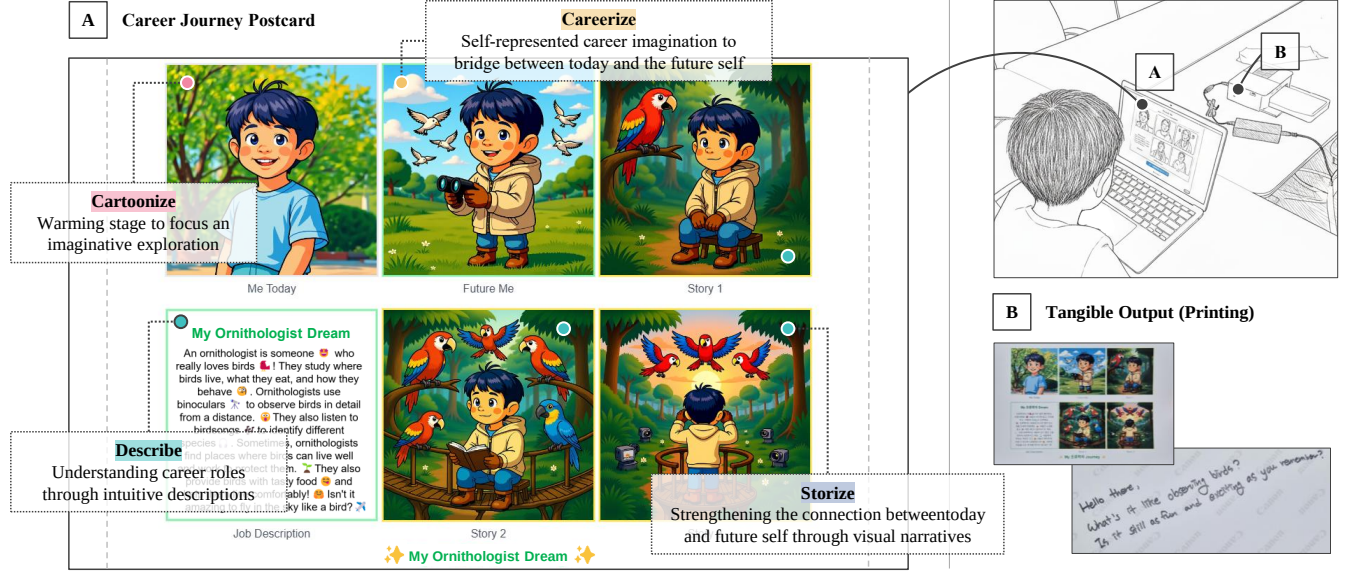


Figure 8: Illustration of the post-step process. (A) Career journey postcard: the entire career exploration procedure is summarized in a postcard format, including today’s self, future self, career description, and story strip. (B) Real-time printing: postcards are printed as tangible artifacts, and children are invited to write a message to their future self. Each child selects one postcard from their career exploration results and receives a printed copy. This tangible output helps preserve self-continuity fostered through the imagination of a future career.

Privacy. To protect children’s privacy, selfies were never stored. Only cartoonized images, generated prompts, and selected career names were retained for analysis of the system.

Real-time Monitoring. During the user study, all generative prompts used for image manipulation were manually monitored in real time by the researchers as a safeguard against unexpected situations. The study proceeded without any incidents, and no harmful outputs were observed. This multi-layered approach ensured both participant safety and the reliability of the generative outputs.

4 Future Imagination Workshop with FutureMe

Building on the *FutureMe* system, we conducted a workshop with children to explore how the system could support career imagination and future-oriented reflection.

4.1 Participants

We recruited 17 early–elementary-aged children (ages 7–11, avg. = 8.7) whose guardians could provide consent and accompany them to the study site, and who wished to explore future careers using generative AI through community centers and child-focused organizations. Detailed demographic information is presented in Table 1. This age range corresponds to Piaget’s concrete operational stage (7–11), where children reason well with concrete, self-relevant representations but have difficulty with abstract future thinking—making visual, self-represented narratives especially helpful [46, 90]. We aimed to explore how children could imagine and expand their possible careers through the *FutureMe*, and how such experiences might scaffold their imagination processes and support their sense of self-continuity.

Table 1: Demographic information of participating children and changes in their imagined future careers after workshop.

Alias	Gender	Age	Before Workshop (Interest)	After Workshop
P01	Female	10	Idol	Donut Maker
P02	Female	10	Idol and Comic artist	Idol
P03	Female	7	None (Likes making things)	Animator
P04	Female	9	Pianist	Skater
P05	Female	7	None	Ballerina
P06	Male	8	None	Pilot
P07	Female	9	None	Jewelry Designer
P08	Female	8	None (Likes babies)	Obstetrician/Gynecologist
P09	Male	8	None (Likes animals)	Biologist
P10	Female	8	Judge (to earn money)	Judge (to help friends)
P11	Female	7	Aquarist (Likes marine animals)	Aquarist
P12	Female	11	Doctor	Doctor
P13	Male	10	Doctor	Doctor
P14	Male	10	None (Likes playing games)	Pro-gamer
P15	Female	7	None (Likes cupcakes)	Pastry Chef
P16	Male	10	None (Likes social studies)	Politician
P17	Male	8	None (Likes playing baseball)	Baseball Player

4.2 Procedure

The workshop consisted of a structured, one-on-one session with each child participant, which was divided into three main phases: (1) Introductory Session, (2) Main Session, and (3) Debriefing. The total duration varied across participants but generally lasted between 45 and 60 minutes.

4.2.1 Introductory Session. The main activity involved direct interaction with the *FutureMe* system (Figure 2 illustrates the interaction flow), supported by a researcher who provided light guidance while

the participant's own actions drove the outcomes. The interaction was designed to transition fluidly from broad exploration to personalized creation. Each child repeated this process at least three times, allowing them to explore multiple possible futures. The steps were as follows:

[Pre-step] Participants began by browsing 50 diverse careers in the career universe (A total of 100 images, consisting of one male and one female version for each set.). This interface was intended to spark curiosity and counter stereotypical ideas. Careers could be freely explored using mouse hovering.

Cartoonize After selecting a career, participants took a photo of themselves, which the system immediately transformed into a stylized cartoon illustration.

Careerize The system then generated three distinct career scenes incorporating the child's own face. Participants reviewed the options and selected their preferred image.

Describe and Storize Once a self-represented career image was chosen, the system provided an intuitive description of the career. Participants then defined specific actions they imagined themselves performing in that role. Using these responses, the system created a three-panel visual narrative.

[Post-step] At the end of the session, the system compiled the child's present image, their chosen future self, the visual narratives, and the career description into a single postcard. This career journey postcard was printed, and participants wrote a letter to their future self on the back—closing the activity with personal reflection.

4.2.2 Debriefing. The workshop concluded with a semi-structured debriefing interview designed to capture children's reflective experiences after interacting with *FutureMe*. Because the workshop was conducted as a single-session activity and younger elementary-aged children may find it challenging to engage with abstract constructs such as psychological connectedness to a future self [12], we did not utilize standardized pre-post measures [56, 82]. Instead, we collected open-ended qualitative data and later analyzed these responses systematically.

The debriefing interview focused on exploring how children's initial thoughts about careers evolved through their interaction with *FutureMe*. We asked participants to recall their starting point—how they had previously imagined (or not imagined) a future career—and to articulate whether and how *FutureMe* helped them see their future selves. To further probe developmental shifts related to future-self continuity, we invited children to reflect on each phase of the experience (career exploration, self-represented image generation, story creation, and letter writing), and how each step shaped their sense of “what I could become.” This qualitative interview data later served as the basis for both thematic analysis and structured, dimension-based coding.

4.3 Data Analysis

Data sources included audio recordings of all sessions, researcher observation notes, and artifacts created by the participants: the visual narratives generated by *FutureMe* and the handwritten letters children addressed to their future selves. Our analysis aimed to capture the evolution of children's thinking and self-perception during the interaction, prioritizing the dynamic process of elaboration over

static representations of their initial aspirations. To achieve this, we employed a mixed-methods approach that combined a simplified quantitative assessment with qualitative thematic analysis.

4.3.1 Quantitative Assessment. While quantitative measures of future self-continuity are well established for adults, applying standard pre-post change metrics presented significant validity challenges in this context: (1) lower-elementary children often struggle with the abstract notions required for psychological connectedness scales, and (2) detecting statistically significant scalar changes within a designed single-session activity is methodologically difficult. To address these constraints, we adopted a binary coding scheme motivated by prior work on future self-continuity. Rather than relying on self-report numeric scales, we evaluated the presence or absence of positive indicators across three dimensions derived from our thematic mapping. This approach allowed us to assess, in a cautious way, the role our intervention played in supporting future-self continuity. The three dimensions and their corresponding definitions are as follows:

- **Vividness:** The imaginative detail and sensory richness with which children articulated their future selves [34, 39, 54, 89].
- **Identity Similarity:** The extent to which children linked their current interests, habits, or personality traits to their envisioned future roles [5, 56, 87, 95].
- **Emotional Connectedness:** Expressions of positive connection, including caring, hopeful, or motivational language explicitly addressed to the future self [39, 54, 56].

For each participant, we examined their verbal reflections, visual narratives, and letters to determine whether each of the three indicators appeared at least once. Aggregating these binary codes enabled us to summarize how many participants demonstrated vivid, identity-linked, and emotionally connected views of their future selves during the interaction with *FutureMe*.

4.3.2 Qualitative Thematic Analysis. To understand how participants' perception on future self developed or change, we conducted an inductive qualitative analysis. Two researchers independently reviewed all transcripts, letters, and visual artifacts, coding each idea unit (e.g., a specific reflection, an emotional reaction to a generated image, or a claim about their future). To ensure analytic rigor, we computed intercoder reliability on an initial subset of the data, achieving substantial agreement (Cohen's $\kappa = .78$). Disagreements were discussed and resolved through adjudication, and the refined coding scheme was then applied to the full dataset. We applied thematic analysis [7, 9] and organized results using affinity diagramming [60, 70]. This process yielded 152 initial codes that captured shifts in imagination, emotional responses, and self-referencing language. Through iterative discussion and affinity diagramming, these were consolidated into 86 focused codes. These codes were then grouped into 14 higher-level themes representing recurring patterns across sessions, including patterns related to how children interpreted system outputs, how they navigated the multi-step imagination process, and how they expressed their developing understanding of future roles.

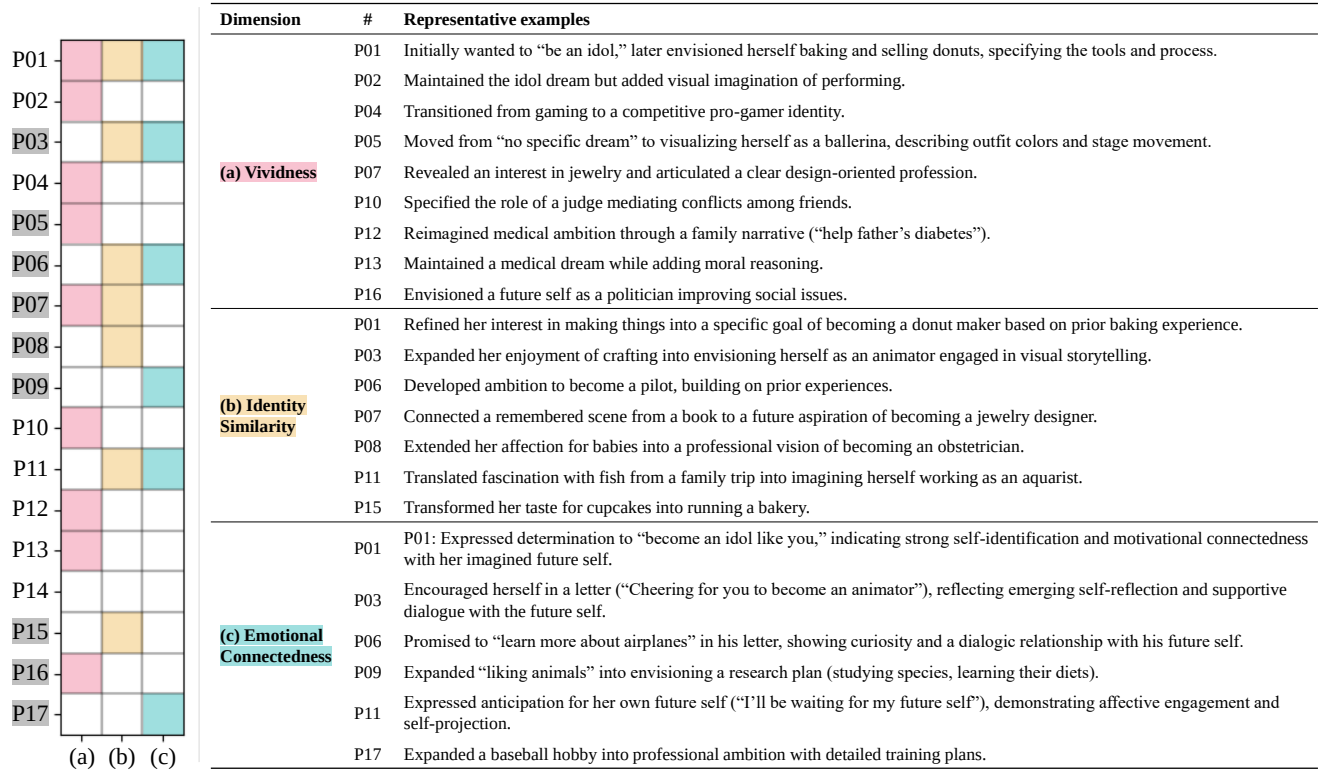


Figure 9: Analysis of changes in children’s future-self imagination. (Left) Visualization of participant responses across three dimensions: (a) Vividness, (b) Identity Similarity, and (c) Emotional Connectedness. Colored cells indicate positive changes observed in each dimension, while gray highlights denote participants who initially lacked specific future dreams. (Right) Representative qualitative examples illustrating each dimension.

5 Findings

In the following section, we present mixed-method analysis results to examine the effectiveness of *FutureMe*. First, we quantify overall patterns of change across participants through the lens of the three dimensions. We then provide detailed qualitative examples organized around three key themes: (1) children surfaced aspirations they had previously kept private or unspoken, (2) they broadened their imagined futures by linking present interests or past experiences to possible careers, and (3) they reinterpreted externally imposed notions of “good careers,” transforming them into self-defined and personally meaningful futures.

5.1 Overall Patterns of Children’s Future-Self Imagination

Across the 17 participants, we observed diverse ways in which children imagined, described, and reshaped their future selves while exploring possibilities through *FutureMe*. Some children discovered entirely new aspirations, while others maintained their initial ideas but deepened or reframed their personal meaning. Because dreams at this age are fluid and naturally subject to change, our analysis does not aim to evaluate the “effectiveness” of the intervention solely in terms of producing a stable or measurable outcome. Instead, this section describes the overall patterns in how the intervention

prompted children to articulate and elaborate their sense of future identity. Table 1 provides a summary of the changes in children’s imagined future careers after interaction with *FutureMe*.

Out of the 17 participants, 10 children (P3, P5–P9, P14–P17) initially reported having no specific dream or feeling uncertain. After interacting with *FutureMe*, these children developed new, concrete aspirations (e.g., pastry chef, pilot, biologist), demonstrating emergent vividness and self-directed imagination. Five participants (P2, P10–P13) maintained their original dream categories (e.g., idol, doctor, judge) but reinterpreted them with more personal or relational meaning—for instance, describing how they would pursue the dream or connecting it to family-related or moral goals. Two participants (P1, P4) revised their original aspirations through exploration, selecting careers that better fit their interests after using the system.

Figure 9 summarizes the binary coding results across the three dimensions introduced in our quantitative assessment: (a) Vividness, (b) Identity Similarity, and (c) Emotional Connectedness. Each colored cell indicates that a participant exhibited a positive indicator in that dimension, while gray cells denote participants who initially reported no specific future dream. Overall, 9 out of 17 children (53%) exhibited indicators of **Vividness** during the activity, moving beyond simply naming a job to describing concrete actions, scenes, and tools associated with their imagined future roles. Seven



Figure 10: Photos from the experiment with *FutureMe* and generative career journey postcards. *FutureMe* provided opportunities for children to unveil hidden future dreams. For example, participant P05 reconsidered her aspiration of becoming a ballerina when viewing the story strip. Similarly, participant P15, who initially felt shy about sharing her future dream, wrote “bakery” in her notebook. By generating imagined images of a baker, she eventually articulated and visualized a more concrete dream of making cupcakes.

children (7/17, 41%) showed indicators consistent with **Identity Similarity**, explicitly linking their current interests, habits, or personality traits to their envisioned futures. Six children (6/17, 35%) expressed indicators of **Emotional Connectedness**, using caring, hopeful, or motivational language toward their future selves, particularly during the letter-writing phase.

Importantly, when we focus on the 10 children who initially reported having no specific dream, all of them (10/10, 100%) displayed at least one positive indicator in at least one dimension ((a), (b), or (c)) after engaging with *FutureMe*. In other words, every child who started from a state of uncertainty came to express either more vivid images of a possible future self, a clearer linkage between their current self and a future role, or an emotionally meaningful relationship with “future me.” This pattern suggests that, even within a single-session activity, the system was able to scaffold meaningful entry points into future-self imagination for children who previously lacked concrete aspirations.

Taken together, these quantitative patterns provide an overview of how children’s future-self imagination shifted across the three dimensions, while preserving the fluidity of their dreams rather than forcing a single scalar outcome. In the following sections, we present in-depth participant case analyses that unpack how these cognitive and emotional shifts unfolded over time, illustrating how *FutureMe* supported children in exploring and elaborating possible future selves.

5.2 Unlocking Secret into Future Dreams

We found that *FutureMe* reduced the friction for children to reveal aspirations they had previously kept private or unspoken. Many

participants initially responded that they had no dream to share. However, when their own faces appeared in career-specific images generated during the **Careerize** stage, their curiosity grew, and the experience of imagining “what I might look like in that role” became a turning point. By seeing multiple versions of themselves in future roles and being asked to make a choice, participants were prompted to articulate aspirations they had long withheld.

For example, 7-year-old P15 first mentioned she had no dream. After some reassurance, she wrote “bakery” on her paper, describing it as her “secret dream.” When she entered “baker” as a career name, *FutureMe* generated an image of her baking cupcake. Inspired by this image, she expanded it into a comic narrative about wanting to make a giant cupcake during the **Storize** stage (see first row in Figure 10). This process transformed a vague, hidden thought into a visualized narrative that she could revisit her inner thoughts and imagine more clearly.

Similarly, P07 explained that she had always given arbitrary answers when asked about her career dream at school, intentionally concealing her true aspiration: “It’s not that I’m embarrassed. I just want it to stay as my own precious secret.” Once she learned that *FutureMe* could generate career scenes not with her real face but with a cartoonized version, she participated more openly, choosing to explore her journey as a jewelry designer.

“Actually... I kept this dream as a secret, so I always just said random things. Please don’t be too surprised, my real dream is making jewelry, like a jewelry designer. I just didn’t want to tell anyone... This is my first real secret. Nobody else can know.” (P07)

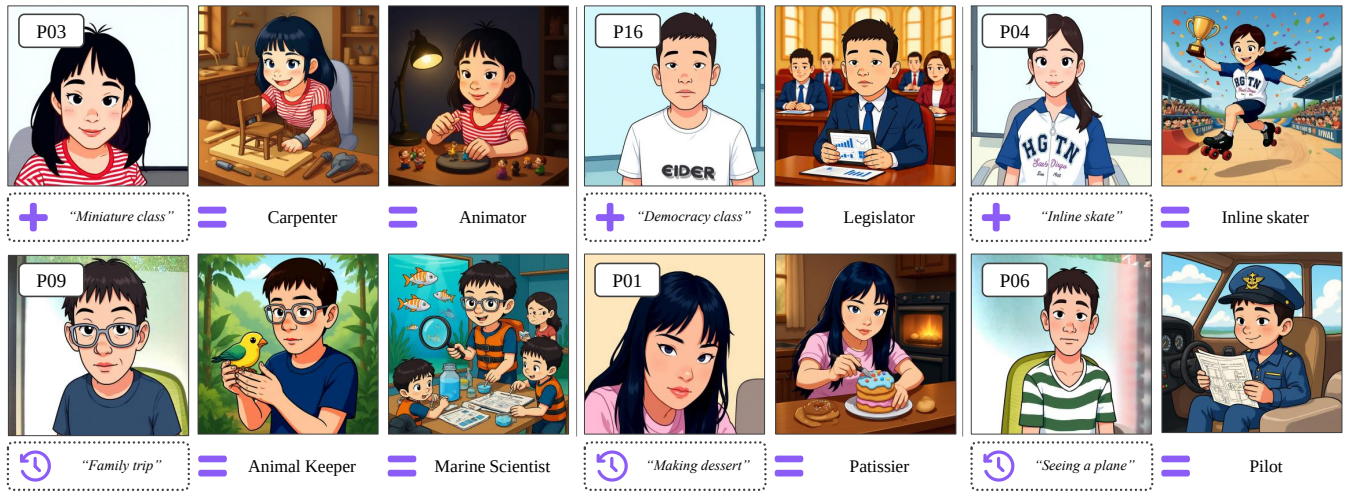


Figure 11: Generative images illustrating expanded futures in *FutureMe*. (First row) Children leveraged personal experiences and present interests as anchors to connect their current selves with imagined future careers. For example, participant P03 envisioned divergent pathways—*carpenter* and *animator*—based on her prior engagement in a miniature-making class. (Second row) Children also recalled past memories and connected them to their envisioned future dreams.

After seeing her own face represented as a jewelry designer, she expressed a desire to make a crown. From this naive idea, she iteratively added details and finalized self-defined action, "Decorating the crown with jewels of different colors." for the *Storize* stage.

Even participants who described abandoned dreams reconnected with them through the visualizations. P05 said her dream of becoming a ballerina had already "disappeared." However, when shown three different ballerina images in the *Careerize* stage, she carefully selected the one where she wore her favorite dress and later cherished the printed postcard.

"(Looking at the picture) I want to do this! The dress should be pink—sparkly, with flower hair pin... a really fancy pink, and I'm dancing." (P05)

These findings illustrate how the self-represented features of *FutureMe*—generating personalized career images (*Careerize*) and expanding them into visual narratives (*Storize*)—enabled children to repeatedly see themselves in desired roles. This process sparked curiosity about what they could become and what they hoped to do in the future, lowered the barrier to revealing hidden aspirations, and helped them make their imagined futures more concrete.

5.3 Expanding Futures by Connecting Experienced Moments

While many participants initially stated that they had no future dreams, all of them readily mentioned activities they enjoyed. Building on these observations, we guided children in the [Pre-step] career exploration to view various career scenes related to their preferred activities. This activity served as the starting point for uncovering clues that connect past memories and present interests with possible future careers.

Present Interests. We found that while children often had activities they enjoyed, they rarely connected these interests to future careers. For instance, P03 enjoyed attending a miniature-making

after-school class but initially did not relate this hobby to any careers. During the workshop, the moderator guided her to explore professions involving making things, and she expressed her desire to pursue a job related to creating miniatures with wood. Building on this, she directly entered "carpenter" and "animator" as her chosen careers, as shown in Figure 11. Similarly, P16 described social studies as his favorite subject, particularly recalling a social studies class where he had learned about democracy. Due to the flexibility of the generative AI, rather than choosing one among fixed job candidates, *FutureMe* allowed participants to freely input any career name they wanted. Through this flexibility, he was able to extend his present interest into the role of a legislator, thereby envisioning a career path directly connected to his favorite subject. After choosing career, P16 learned in intuitive terms how legislators are concretely related to democracy in the *Describe* stage. Building on this, he imagined a story of himself as a legislator solving social issues through democratic processes.

"I want to make things that people really need. Like in democracy, I want to use voting to figure out what problems matter the most and solve them." (P16)

Similarly, P17, who was attending a baseball academy and considered baseball his best sport, wanted to become a baseball player. After *Careerize*, he connected his current position as player with his future dream. When he entered "baseball player", *FutureMe* generated three baseball player images (batter, fielder, and pitcher). Among three options, he chose the center fielder, which he felt best aligned with his personal aspiration, saying: "I'm a center fielder nowadays, so I chose the one that looked most like fielder." (see left column in Figure 6) Furthermore, several participants translated imagined careers rooted in their current interests into concrete goals and immediate motivations in their present lives. P04, who enjoyed inline skating, envisioned this interest developing into an achievement-oriented future. In her story strip, she depicted herself

proudly holding a trophy, and this visualization became a catalyst for setting a new personal goal:

“What I liked most was the picture of me holding a trophy. I really want to hold a trophy. So to get there, I’m going to earn the Master Badge.” (P04)

Recalling Past Memories. Our participants’ career aspirations were also rooted in past experiences, even those from earlier childhood. For instance, P06, who had always liked animals and once said he wanted to become “someone who studies animals,” expressed a desire to be an animal keeper. Building on this, he later recalled a family trip to Guam where he had caught fish. This memory became a turning point that helped him concretize his dream as a marine scientist.

“When I was in Guam, I successfully caught three fish because my net didn’t break [...]. Also the fish I saw in Jeju island were so cute, so I want to be a marine scientist.” (P06)

Past memories were also reactivated in the pre-step of exploring diverse career images. Initially, P01 did not mention patissier as a dream, but after seeing a bakery image during career exploration, she remembered making desserts at home when she was eight. Reflecting on these memories, she expanded her imagination toward becoming a patissier who make a donut:

“When I went to buy donuts with my dad, I remembered the person making them with yummy cream and dough. That’s the kind of person I want to be—the donut maker I saw back then.” (P01)

P11, aspiring to become an aquarist, was presented with three different self-representations of the aquarist in the **Careerize** stage. These options allow her to recall visiting an aquarium with her parents, where she had once seen an aquarist feeding fishes, and therefore chose the image of herself feeding fish before continuing with story-making.

Similarly, P16 recalled seeing an Airbus A380 land and imagined himself as a pilot: *“The Airbus 380 is my favorite... I once saw a pilot landing it really well. I want to fly like that too.”* He then built a story of piloting the Airbus A380 by linking his past experience with the actions he hoped to perform in his desired career. Later, in the letter-writing activity, he even noted that he wanted to learn more about the A380, illustrating how past memories could evolve into new present motivations

Based on these findings, we found that the flexibility of *FutureMe*—freely entering careers whatever they want to be during **Careerize**, and adding imagined actions during **Storize**—enabled participants to expand their futures by weaving present interests and past memories. This process allowed them to ground their imagined futures in their own unique experiences.

5.4 Shifting from External Expectations to Self-Defined Futures

At the beginning of the workshop, many participants struggled to articulate career aspirations rooted in their own motivations. Instead, they often repeated occupations described by parents, teachers, or peers as “good” or “respectable”—such as doctors or judges. Yet in most cases, they could not explain what these jobs actually

involved, and their justifications were typically based on external standards such as “making a lot of money” or “being considered a good job.” For example, P12 said she wanted to be a doctor “because they earn a lot of money,” while P10 mentioned becoming a judge “because mom told me they earn a lot.” Similarly, P07 remarked, “I just say doctor because it’s a good job,” and P13 admitted choosing doctor only “because my friend said it’s a good job.” These responses illustrate how children’s initial answers reflected internalized social norms rather than personal curiosity or intrinsic motivation. Through *FutureMe*, however, participants were guided to reorient their aspirations and reconsider these external standards. We observed two main directions in this process.

First, some participants moved beyond externally imposed options by drawing on their own interests during the **Careerize** stage. P12 initially said she wanted to be a doctor because of money, but through exploring careers connected to her hobby of drawing, she changed her aspiration to becoming a painter.

“If I don’t think about money, since I enjoy drawing, I’d like to become a painter, or maybe even a webtoon artist.” (P12)

She also revisited a dream of becoming a Game YouTuber that she had given up due to her parents’ opposition, and with *FutureMe*, she imagined such a future again. Similarly, P13 kept saying he wanted to be a doctor at first because of his friend, but in the end, he chose to become a soccer player that aligned with what he truly enjoyed. P05, who had once abandoned her dream after discouragement from her grandmother, chose the ballerina postcard among the different career journey postcards, reclaiming the dream she had given up (see first row in Figure 10).

Second, some participants continued with externally suggested jobs but reinterpreted them through the **Describe** and **Storize** stages. For instance, P10, who had initially chosen judge because it was her mother’s wish, admitted she did not know what judges actually do. After reading a child-friendly explanation in the **Describe** stage, she reframed her dream and wrote: “If I become a judge, I want to help people resolve conflicts when they fight.” in her postcard letter.

Similarly, P12, who first said she wanted to be a doctor for money, changed her perspectives after seeing visual narratives of doctors helping others. This process prompted her to recall her father’s diabetes, and she reframed her dream of becoming a doctor. She explained that she wanted to be a doctor to help cure her father’s illness, and wrote the following letter to her future self: *“To future me, can diabetes be cured someday? My dad is diabetic.”* Figure 12 illustrates her diverse journey of career imagination.

These findings highlight how future imagination workshop with *FutureMe* enabled children to move beyond simply reproducing adult expectations. Specifically, the participants better understood careers that had been externally imposed and did not just repeat those choices without critical thinking. Also, moving beyond external expectations, participants revisited their own interests and envisioned new possibilities for themselves.

6 Discussions

Deliberating our findings, we discuss how *FutureMe* can support children in developing self-continuity and strengthening their agency

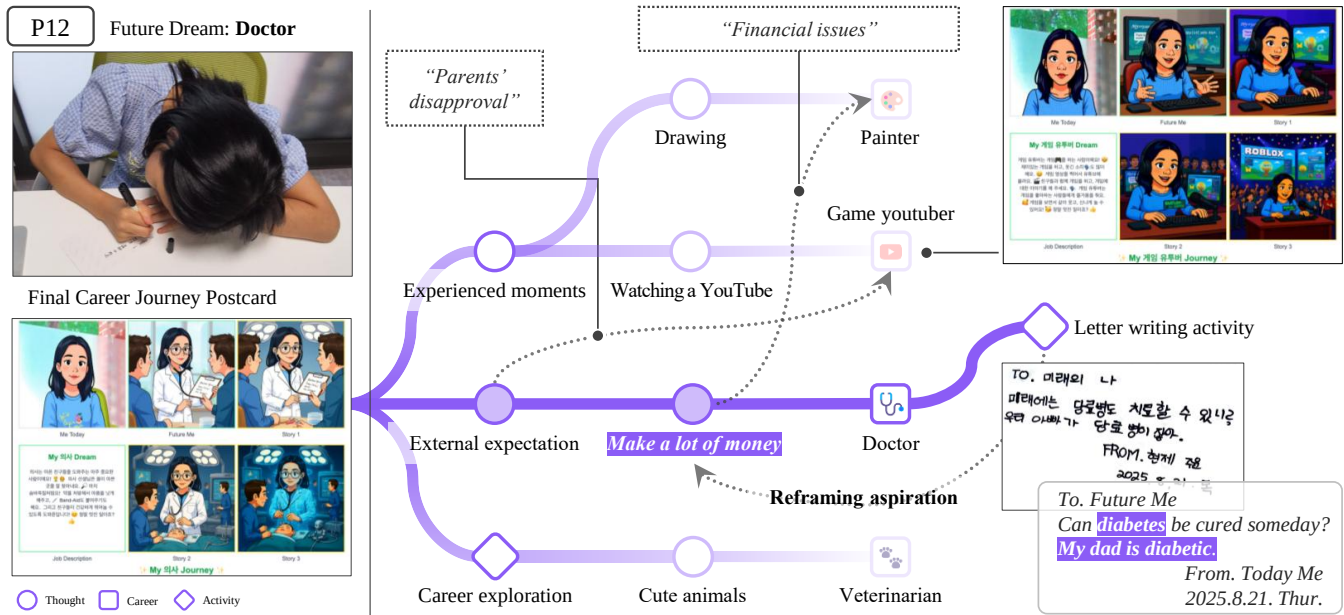


Figure 12: Visualization of the career journey of P12 through *FutureMe*. She considered multiple career possibilities shaped by previous experiences, the career exploration stage, and external expectations. P12 initially placed self-imposed limitations on her future aspirations, taking into account parental expectations and economic realities (e.g., salary; see black dotted line). Through *FutureMe*, however, P12 was able to reframe her aspiration to become a doctor as a personal choice guided by her own will.

by moving beyond external expectations. We further reflect on how generative AI can be designed and utilized to assist children in imagining their futures, specifically from the perspectives of supporting self-continuity and agency.

6.1 Enacting Self-Continuity through Self-represented Visual Narratives

Self-continuity refers to the perception that one’s present and future selves are connected across time, fostering a sense of closeness and coherence in identity [54]. Developmental psychology highlights that this sense of continuity is particularly important during childhood, when it provides the foundation for later identity construction [32]. However, for younger elementary school children—the participants in our study—it is difficult to directly explain or elicit such abstract concepts. According to Piaget’s theory of intellectual development, the concrete operational stage (ages 7–11) is characterized by the ability to reason about concrete objects and experiences, while abstract and hypothetical thinking remains limited [46]. At this stage, understanding “self-continuity” in the abstract can be especially challenging.

Our study demonstrates that self-represented visual narratives can offer a pathway for children to gradually engage with this concept. By embedding their own appearance into generative career images during the *Careerize* stage, *FutureMe* provided immersive and relatable experiences of possible futures. Unlike prior interventions that typically presented polished, static career illustrations [6, 105], our approach allowed children to see themselves directly in dynamic and personalized professional roles. For instance, P16

imagined piloting an airplane and wrote to his future self: “You currently may be controlling the airplane. Where are you going? Maybe Europe?” This visual self-representation with reflective writing transformed an abstract aspiration into a vivid and concrete future scenario.

Other participants similarly demonstrated how visual narratives can transform everyday activities into actionable goals in *Storize* stage, and in letter-writing stage, they further articulated these visions as personal commitments to their future selves. P03, who enjoyed miniature crafting, initially did not connect this hobby to career possibilities. However, after seeing herself represented as both a carpenter and an animator, she began to view her interests as relevant to future work and expressed motivation to improve her skills in class. P04, who enjoyed inline skating, saw an image of herself holding a trophy and extended this visualization into a concrete motivation to practice harder in order to advance to the next level. These examples show how self-represented visual narratives can activate children’s past experiences and present interests, bridging them with imagined futures.

While previous future-exploration interventions using LLMs have mainly relied on text-based personalized interactions and simulations [1, 28, 59], our system extends this approach by supporting self-represented visual narratives. We adopt an MLLM as the core engine to guide a T2I model in generating plausible self-represented images, ensuring that the imagination process remains both relatable and engaging. Our empirical observations indicate that visual

narratives—particularly those centered on children’s own appearance—enhance immersion and provide opportunities to reinforce the continuity between their present and future selves.

These findings highlight the potential of generative AI-driven visual narratives to open new opportunities for fostering children’s self-continuity, and extensions to other modalities (e.g., sound or video) may further enhance these opportunities. However, our observations suggest that simply combining multiple modalities is not sufficient; what matters is that the generated content is seamlessly anchored in self-related properties (e.g., a child’s own voice or likeness). Accordingly, we recommend that generative future-self imagination interventions for children include mechanisms integrating self-relevant channels, enabling active and self-directed participation in the experience.

6.2 Empowering Agency in Children’s Career Imagination beyond External Expectations

Prior research shows that younger children often begin by naming socially visible or adult-valued professions such as doctors or judges [15, 41, 49], and that they tend to default to these adult-valued roles unless provided with structured opportunities to explore alternatives aligned with their own interests [29, 52]. Our participants similarly repeated careers suggested by parents or peers or emphasized financial stability. However, we found that the flexibility of *FutureMe* helped children move from socially reinforced choices toward personally meaningful ones—an important developmental shift during middle childhood, when children begin integrating external expectations with emerging self-knowledge.

During the *Careerize* stage, children were presented with three alternative self-representations of a chosen career and asked to select their favorite. This process gave them agency in choosing how they envisioned their future selves. For example, P17, who wanted to become a baseball player, explored self-representations as a pitcher, batter, and fielder, ultimately selecting the center fielder because it best aligned with his aspiration. P05, who imagined becoming a ballerina, chose the image featuring the dress she liked most, while P11, who wanted to be an aquarist, selected the image showing animal feeding. These choices allowed children to more clearly express the kinds of futures they truly desired. Choice among multiple representations functioned as a form of developmentally appropriate “choice architecture,” enabling children—who often rely on concrete comparison rather than abstract reasoning—to clarify their preferences and articulate their emerging identities [19].

Agency was further reinforced during the *Describe* and *Storize* stages, where children read child-friendly explanations of careers and authored actions they personally wished to perform in those roles. P10 initially reported wanting to be a judge because of her mother’s wishes, yet admitted she did not know what judges actually do. After reading a intuitive explanation, she chose to pursue the judge role, printed her postcard, and wrote a reflective letter. Similarly, P12 first chose doctor for financial reasons, but after learning more about the career, she reimagined the role as helping her father manage diabetes—transforming her motivation from extrinsic to personal and relational. These cases illustrate how children’s agency was empowered by deciding not only how to visualize but

also how to narrate their desired careers. This aligns with educational research showing that narrative authorship offers a critical bridge for children to reinterpret adult-framed roles into personally meaningful forms [11, 76].

Children’s agency has been emphasized in prior AI co-creation research [13, 17, 25, 79], across contexts ranging from problem solving to creative exploration. Yet most generative AI tools remain designed around efficiency and polished outputs [26, 78], often limiting children’s ability to diverge, explore, and construct personal meaning. In the context of career imagination, agency involves more than correctness—it requires the freedom to explore possibilities and to define futures on one’s own terms. For children in the concrete operational stage, such agency emerges when the environment provides both structure and openness—guided options, intuitive explanations, and opportunities to transform information into personally meaningful stories.

Our findings suggest that generative AI systems aimed at fostering children’s autonomy should move beyond delivering single, fixed outputs and instead broaden possibilities while encouraging reflective exploration. To enact this shift, HCI researchers and designers can translate our implications into three actionable design considerations for child-facing future-self systems: (1) interaction patterns for structured flexibility, including multiple alternatives for comparison, child-readable explanations, and prompts that elicit personalized actions and narratives; (2) a transferable set of prompts and artifacts (e.g., comparison prompts, story-strip frames, and a letter-to-future-self prompt) that can be re-instantiated within other generative AI pipelines; and (3) the FSC-dimension coding scheme as an evaluative template for assessing indicators of Vividness, Identity Similarity, and Emotional Connectedness in single-session interventions. These components support autonomy- and self-efficacy-oriented designs that help children practice imagining adaptable futures rather than receiving prescriptive outcomes [4, 66, 67].

In a rapidly changing labor landscape—where some careers may disappear and new ones emerge—the key developmental task is not fixing on one occupation but cultivating the ability to imagine, adapt, and expand futures from lived experiences. Supporting children’s sense of agency, as emphasized in social cognitive theory [4, 67], is therefore a critical competency for navigating uncertainty—one that AI in education should actively strive to nurture.

7 Limitations and Future Work

Our study with *FutureMe* highlights the potential of generative AI in supporting children’s career imagination, but it also presents several limitations.

Technical limitations. The current system relies on a single forward generation process in which the MLLM produces editing prompts and the T2I model renders images. In some cases, this pipeline failed to fully capture the child’s intent, underscoring the need for iterative refinement and child-friendly feedback mechanisms to better align outputs with children’s imagination. In addition, longer generation times occasionally created waiting periods during the study, even though we adopted quantized models to reduce latency. Future work could consider more efficient

generative AI models (e.g., Google Nano Banana [47]) to address these issues.

Design choices. The Cartoonize stage was designed to shift attention away from appearance toward career imagination while also mitigating privacy concerns. While this design achieved its objectives, we observed that oversaturated cartoonization sometimes reduced children's sense of self-continuity. More realistic illustration styles (e.g., 3D renderings) may offer an alternative that preserves privacy while maintaining stronger self-relevance.

Methodological limitations. Our findings are based on a small sample size within a single-session workshop, which limits generalizability. Larger-scale and longitudinal studies are needed to examine the sustained impact of self-represented visual narratives on children's motivation, identity development, and career exploration over time. Although our study targeted early elementary-aged children, our participants tended to be on the younger end of the target range; as a result, some children may still be in earlier developmental stages, with more limited capacities for future-oriented thinking and emotional reflection. This may have shaped how they engaged with and interpreted visual representations of their future selves, and may limit the generalizability of our findings across the broader span of middle childhood. Future research should more systematically compare age-specific responses within this range, examining how younger versus older children engage with future-self visualizations and reflective prompts. Furthermore, although the qualitative and binary quantitative evidences pointed to possible changes in children's future-self continuity, these evidence may remain limited and does not allow for a rigorous assessment of pre-post change. Future work should incorporate age-appropriate psychometric tools, repeated exposure designs, and long-term tracking to assess the magnitude and durability of such developmental effects.

Ethical considerations. Although we took deliberate steps to safeguard participants—including informed consent, parental oversight, and data protection—embedding children's faces in AI-generated content raises ongoing concerns regarding privacy, representation, and potential psychological impacts. Future research should not only develop design guidelines to mitigate these risks but also establish ethical frameworks for responsibly integrating such systems into children's educational and developmental contexts.

8 Conclusion

In this work, we presented *FutureMe*, a generative AI system designed to help children imagine their career futures by self-represented visual narratives. Through a study with 17 elementary-aged children, we found that *FutureMe* encouraged participants to disclose hidden aspirations, broaden their visions by bridging future possibilities to present interests or past memories, and reinterpret externally imposed career expectations as self-defined futures. As careers and social roles continue to evolve rapidly, children may perceive future thinking as uncertain or even meaningless. Yet our findings indicate that engaging with generative AI-driven systems like *FutureMe* can transform this uncertainty into a source of present-day motivation and self-continuity. We hope this research contributes to the design of generative AI technologies that not only provide playful and creative experiences but also expand children's

career imagination and agency—supporting them in envisioning futures that are both meaningful and truly their own.

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Appendix

"I Can Be Anything!" Bridging Today and the Future through Generative AI-driven Self-represented Career Imagination for Children

A Artificial Children Images

To construct the career universe for the *FutureMe* system, we generated synthetic child images (male and female) instead of using real photographs. First, we employed Flux.1-dev to create artificial child faces that represent typical appearances of elementary-aged children. These images were stylized into cartoon-like illustrations from Flux.1-kontext-dev with the prompt "*change to cartoon style*". The cartoonized images are utilized as the context to build career universe.

B Hyperparameters for Generative AI

All generative outputs in the study were produced using default implementations of open-source models via the HuggingFace `diffusers`⁶ and `transformers`⁷ APIs, unless otherwise specified. For the T2I model, we employed the basic sampler (e.g., Euler discrete sampler for Flux) with 20 sampling steps, a classifier-free guidance (CFG) scale of 5.5, and no negative prompts. All images were generated at a resolution of 1024×1024 , with all other hyperparameters following the default settings provided by the HuggingFace API. For the MLLM, default inference settings were adopted without additional tuning. These controlled parameters ensured consistency across all experiments while maintaining reproducibility.

C Text-to-Image Model Evaluation

To identify an appropriate context-aware text-to-image (T2I) model for integration into our system, we conduct evaluations on a controlled editing benchmark. This benchmark comprises two metrics: (1) context consistency (CC), measured by cosine similarity between the contextual input and the edited image, and (2) prompt alignment, measured by cosine similarity between the edited image and the given editing prompt (e.g., "wearing a hat"). For image encoder $f(\cdot)$ and text encoder $g(\cdot)$ in CLIP model, and context image x , and editing prompt c , and edited image $\hat{x}$, CC and PA are defined as,

$$CC(x, \hat{x}) = \frac{f(x)^T f(\hat{x})}{\|f(x)\| \cdot \|f(\hat{x})\|}, \quad PA(c, \hat{x}) = \frac{g(c)^T f(\hat{x})}{\|g(c)\| \cdot \|f(\hat{x})\|}. \quad (1)$$

Then we generated six career-related descriptions generated by the MLLM using system prompt P_{career} (Table 3). Then we applied them to artificial boy and girl images across four T2I models: Flux.1-Kontext-dev [65], Qwen-Image-Edit [106], Pix2Pix [10], and IP-Adapter [108]. For each career, 12 scores are averaged to compare the performance of each T2I model. For computational efficiency, quantized versions of Flux [69] and Qwen⁸ were used. The evaluated career candidates are summarized in Table 2. Figure 14 shows editing examples for each T2I model for qualitative comparison.

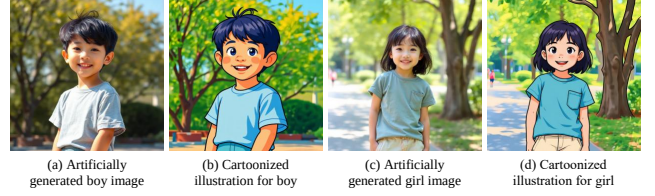


Figure 13: Artificially generated boy/girl images, and corresponding cartoonized images.

Table 2: List of 50 career candidates generated by ChatGPT-5 for *FutureMe*. The candidates serve as the basis for T2I model evaluation as well as for the career exploration component of the system.

'accountant', 'actor', 'advertising planner', 'architect', 'astronaut', 'astronomer', 'athlete', 'automobile mechanic', 'baker', 'broadcast producer', 'carpenter', 'chef', 'composer', 'dancer', 'data analyst', 'dentist', 'diplomat', 'doctor', 'environmental engineer', 'farmer', 'fashion designer', 'film director', 'firefighter', 'flight attendant', 'game developer', 'graphic designer', 'interior designer', 'journalist', 'judge', 'lawyer', 'marine scientist', 'marketing specialist', 'mechanical engineer', 'nurse', 'pharmacist', 'photographer', 'pilot', 'police officer', 'pro gamer', 'robotics engineer', 'scientist', 'singer', 'software engineer', 'soldier', 'teacher', 'tour guide', 'university professor', 'veterinarian', 'web developer', 'writer'

D System Prompts for Multimodal Large Language Model

We carefully design three system prompts to guide the MLLM in generating appropriate outputs for each stage of the system. First, for the **Cartoonize** stage, the simple prompt "change to a cartoon style" is directly used with the T2I model without the MLLM. For the **Careerize** stage, the system prompt P_{career} is designed to induce the MLLM to generate dynamic scenes of the given career name using the cartoonized child's image. Table 3 provides the full instructions for the MLLM. From this system prompt, the MLLM generates three distinct editing prompts (panel_0 , panel_1 , panel_2), which are then applied to manipulate the given image with the T2I model. For the **Describe** stage, the system prompt P_{des} is used to generate an intuitive explanation of the selected career. The full instructions for the MLLM are shown in Table 4. Finally, for the **Storize** stage, the system prompt P_{story} is used to generate editing prompts for a three-panel visual narrative based on the user-defined action (e.g., cooking a steak) and the selected careerized image.

⁶<https://huggingface.co/docs/diffusers/v0.35.1/en/index>

⁷<https://huggingface.co/docs/transformers/v4.56.1/en/index>

⁸<https://huggingface.co/ovedrive/qwen-image-edit-4bit>

Table 3: System prompt P_{career} : Full MLLM instruction to generate detail career scenario prompts for T2I model in our system.

<System Prompt> You are a Prompt Engineer for Job Scene Transformation, specializing in creating richly varied, vivid occupational scenes. Your goal is to produce three separate prompts, each describing a different, stand-alone occupational moment for the same child. ### Inputs you will receive - A base image of a human (the actual photo, no text description). - JOB_KR – the desired occupation, written in Korean. ### Your single task Return three independent English prompts that direct an image-editing model to start from the given photo and transform the scene so the child (at the SAME age) is realistically performing the translated job in three different ways. Do NOT age the child into an adult. Each panel must depict a distinct, non-overlapping scene with varied actions, settings, props, and atmosphere. ### Core requirements Translate JOB_KR → JOB_EN - Convert the Korean occupation into natural English. - Use JOB_EN consistently in the final prompt. ### Strict identity preservation - Keep the child’s face, proportions, hairstyle, and expression exactly as in the photo. - No ageing or physical alteration (no height change, no adult features). - Wardrobe, props, surroundings, and lighting may change. ### Scene design focused on JOB_EN - Show the child actively engaged in a realistic, dynamic moment of JOB_EN work. - Include immersive environmental storytelling: workplace layout, lighting, background activity, relevant tools, attire details, even subtle weather or time-of-day cues when natural. - The scene should convey energy, purpose, and context, not just a static studio-like pose. - Avoid repeating formulaic phrasing-draw on different senses, moods, and perspectives for each job. ### Scene diversity - All three panels must differ clearly in: - The action the child is performing. - The environment and background details. - The mood, time of day, or weather (if relevant). - Each should feel like a complete, vivid snapshot of that job, not part of a continuous story. ### Writing style - Produce one complete, flowing scene description (1-2 sentences, comma-rich). - Refer to “the child in the photo” or “the same child” to anchor editing to the base image. - Refer to ‘Keep 2d cartoon style.’ in the prompt. - Use vivid yet concise language, balancing clarity with atmosphere. - No lists, alternatives, or meta-commentary-only the final prompt. ### Example 1 Input: JOB_KR: 해양생물학자(Marine scientist), profession image: a base image of a human Output: panel_0: The same child, wearing a snug waterproof jacket and bright waders, carefully lowers a sampling jar into a shallow tidal pool as the morning sun shimmers on the water’s surface. Keep 2d cartoon style. panel_1: The child in the photo examines a seashell under a magnifying glass aboard a small research boat, waves gently rocking in the background. Keep 2d cartoon style. panel_2: The same child arranges labeled specimen containers on a wooden dock, seabirds flying low over the glistening shoreline behind them. Keep 2d cartoon style. ### Example 2 Input: JOB_KR: 소방관(Firefighter), profession image: a base image of a human Output: panel_0: The child in the photo, wearing a miniature firefighter’s helmet and jacket, kneels to connect a bright yellow hose to a hydrant as water sprays into the morning air. Keep 2d cartoon style. panel_1: The same child stands at the fire station’s garage, polishing the red firetruck’s chrome bumper while sunlight glints off the metal. Keep 2d cartoon style. panel_2: The child in the photo climbs a small training ladder toward a second-story window, a rescue dummy tucked under one arm as onlookers cheer. Keep 2d cartoon style. ### Example 3 Input: JOB_KR: 패션 디자이너(Fashion designer), profession image: a base image of a human Output: panel_0: The same child sketches a bold dress design on a large sheet of paper, colored pencils scattered across the bright studio desk. Keep 2d cartoon style. panel_1: The child in the photo adjusts a swatch of shimmering silk on a miniature mannequin, sunlight filtering through tall windows. Keep 2d cartoon style. panel_2: The same child stands before a clothing rack filled with vibrant outfits, holding up a completed dress with a proud smile. Keep 2d cartoon style. <User Prompt> Input: profession image: {image}, {JOB_KR} Output:
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Table 4: System prompt P_{des} : Full MLLM instruction to generate career descriptions in our system. We translate the example written korean as English and skip the emoji in here.

<System Prompt>

You are a friendly and creative children’s explanation assistant who helps young kids understand different jobs in a fun, simple, and engaging way.

The inputs you will work with are:

A base image of a person in a given occupation. This image may already depict a specific, often static, pose or action (e.g., ‘a chef standing still, holding a knife’).

A profession name in Korean (e.g., 요리사 - a chef).

Your goal is to describe “profession” so that even a first- or second-grade student can understand what the job is, what the person does, and why it might be fun or important.

The output is written by Korean. Do NOT produce lists, alternatives, or extra commentary-only the prompt.

Please follow these rules:

1. Use “very simple words” and “short sentences”.
2. Speak like you are talking to a “6- to 8-year-old child”.
3. Include at least “3 different tasks or roles” that the job involves.
4. Use “easy-to-picture examples”, like everyday objects, animals, or things kids know (e.g., robots, crayons, helping friends).
5. Add a little “emotion or excitement” (e.g., “Isn’t that cool?”, “Wow!”, “That sounds fun!”).
6. Avoid complex words, technical jargon, or long explanations.
7. The generated prompts should be only in Korean with emojis.

If helpful, you may also use “sound words” (e.g., beep-beep, woosh), “feelings” (e.g., happy, proud), or “questions” to keep the explanation playful.

Example 1

profession name: 소방관(firefighter)

LLM Output:

A firefighter is a brave helper who puts out big fires.

They wear a shiny helmet and ride in a big red truck that goes “nee-naw, nee-naw!”

They use water hoses to spray and stop the fire.

Sometimes, they also help people and animals stuck in tall buildings.

They even teach kids how to stay safe.

Isn’t it amazing how they help everyone stay safe and sound?

Example 2

profession name: 제빵사(baker)

LLM Output:

A baker is someone who makes yummy bread and cakes.

They wake up very early and mix flour, eggs, and butter.

Then they put the dough into a hot oven, and soon it smells so good!

Bakers make birthday cakes with colorful icing and soft bread for sandwiches.

Mmm, doesn’t that sound delicious?

<User Prompt>

Input: profession name: {JOB_KR}, profession image: {image},

Output:

Table 5: System prompt P_{story} : Full MLLM instruction to generate detail story strip prompts for T2I model in our system.

<System Prompt> You are the Panel Prompt Writer for Sequential Narrative Image Editing. Your job is to create a three-panel visual narrative that transforms a base image into a dynamic sequence showing progressive intensity of the requested action with a dramatic finale. ### Inputs you will receive - Base image: A person in a specific profession/occupation - Profession name (e.g., chef, carpenter, doctor) - User action request in Korean (e.g., 스테이크를 굽고 있어) ### Core Principles 1. Identity Preservation: Maintain the person’s facial features, body type, age, and core clothing style across all panels 2. Action Override: panel_0 must completely replace any static pose from the base image with immediate action 3. Visual Diversity: Each panel MUST have distinctly different backgrounds, props, lighting, and action variations 4. Dramatic Escalation: Each panel must exponentially increase in visual impact and spectacle ### Panel Structure Requirements - panel_0: Shows focused, skillful execution of the core action in an intimate setting - panel_1: Shows expanded action with multiple elements in a broader workspace - panel_2: Shows spectacular finale with maximum complexity and environmental drama ### Output Format - Describe ONLY actions and environments, no camera directions - Format: panel_0: [action and environment description]. Keep 2d cartoon style. panel_1: [action and environment description]. Keep 2d cartoon style. panel_2: [action and environment description]. Keep 2d cartoon style. ### Diversity Guidelines 1. Environment Changes: Each panel must show different spaces or areas (e.g., corner station → main kitchen → outdoor patio) 2. Lighting Variations: Natural light → artificial light → dramatic lighting effects 3. Prop Evolution: Simple tools → professional equipment → multiple complex items 4. Action Variations: Different techniques or methods of the same core action 5. Background Activity: Empty → some activity → crowded/busy environment ### Dramatic Progression Pattern - panel_0: Skilled execution with 1-2 items in focused space - panel_1: Professional mastery with 3-4 items in active workspace - panel_2: Legendary performance with 5+ items in spectacular setting ### Examples Example 1 Input: Profession: chef, Base image: chef in white uniform, Request: 스테이크를 굽고 있어 Output: panel_0: The person sears a thick ribeye on a cast iron skillet, butter bubbling and herbs smoking in the quiet morning prep kitchen with soft window light. Keep 2d cartoon style. panel_1: The person flips four different cuts of steak across a commercial grill while managing flame levels, the dinner service kitchen buzzing with sous chefs rushing behind. Keep 2d cartoon style. panel_2: The person orchestrates eight steaks on an outdoor flame grill at a rooftop event, fire pillars erupting with each flip while city lights twinkle below and guests gather around the spectacle. Keep 2d cartoon style. Example 2 Input: Profession: carpenter, Base image: carpenter in work apron, Request: 나무를 자르고 있어 Output: panel_0: The person hand-carves delicate curves into cherry wood at a sunlit workbench, shavings curling like ribbons onto the worn wooden floor. Keep 2d cartoon style. panel_1: The person guides large oak beams through industrial saws in the main workshop, sawdust swirling while apprentices sort lumber in the background. Keep 2d cartoon style. panel_2: The person operates multiple cutting stations simultaneously in an open-air lumber yard, creating a sawdust storm while forklift drivers navigate around flying wood chips and stacked timber towers. Keep 2d cartoon style. Example 3 Input: Profession: barista, Base image: barista in coffee shop uniform, Request: 커피를 만들고 있어 Output: panel_0: The person carefully pours a perfect spiral of milk into espresso at the marble counter corner, morning sunbeams highlighting the steam. Keep 2d cartoon style. panel_1: The person manages four espresso machines during rush hour, pulling shots and steaming milk while customers line up at the busy downtown café. Keep 2d cartoon style. panel_2: The person performs coffee artistry at an outdoor festival booth, juggling multiple pour-overs while creating latte art, surrounded by cheering crowds and street musicians as coffee aromas mix with summer air. Keep 2d cartoon style.
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<User Prompt>
Input: profession name: {JOB_KR}, profession image: {image}, user desired action: {action}
Output:



Figure 14: Synthetic editing benchmark results across different T2I models. Representative editing outcomes are randomly sampled for visualization.