When Stories Stop Early: Supporting Depth in Intergenerational Storytelling

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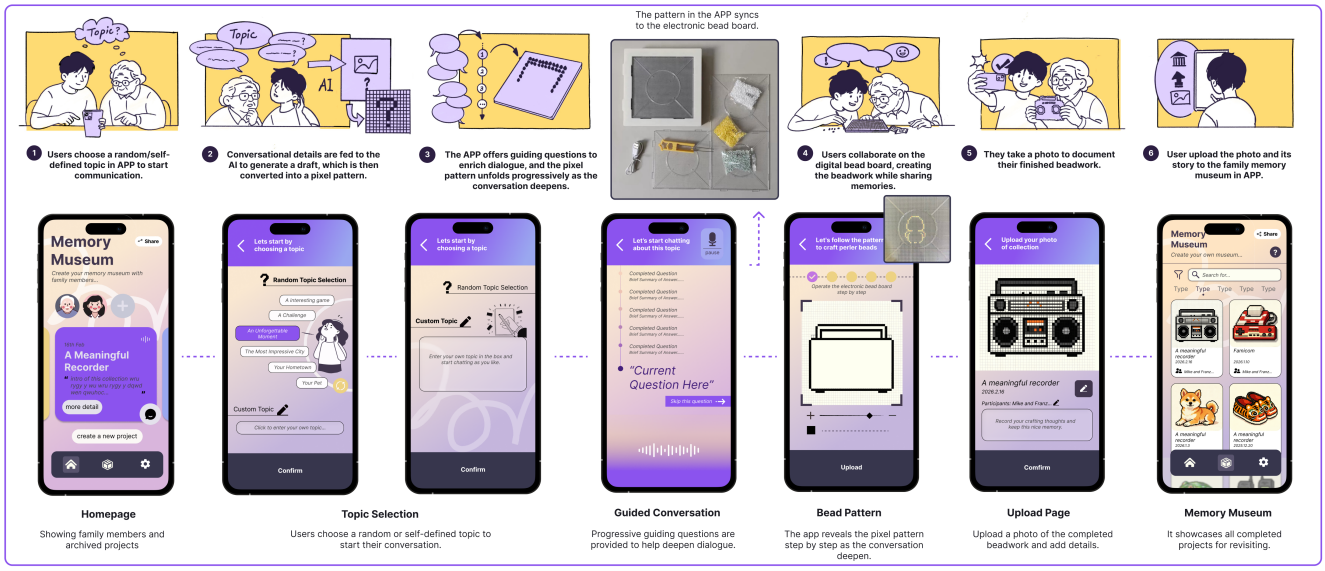


Figure 1: AI-Assisted Progressive Questioning Bead Art Co-Creation System: User Flow and System Design

Abstract

Intergenerational storytelling (IGS) helps families preserve memories and allows younger generations to understand elders' lived experiences. However, many stories stop after brief factual exchanges, before emotions, personal meanings, and family context can unfold. This paper presents a question-driven bead art co-creation system that connects storytelling with shared craft. Informed by a co-design workshop with six real older-younger family dyads, the system uses AI-assisted question classification and progressive visual reveal to turn story details into emerging bead patterns. Rather than scoring questions or forcing emotional disclosure, it supports deeper IGS while keeping narrative control with family members.

CCS Concepts

• **Human-centered computing** → **Collaborative and social computing systems and tools**; *Collaborative and social computing design and evaluation methods*; Empirical studies in HCI.

Keywords

Intergenerational Storytelling, Co-Creation, Conversational Scaffolding, Progressive Reveal, AI-Assisted Interaction

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1 Introduction

Intergenerational storytelling (IGS) refers to stories shared across generations about past experiences, family memories, life events, and cultural traditions [21]. Unlike ordinary small talk, IGS places personal experience inside family relationships and across time [4, 7]. When older adults tell stories, they revisit moments from their own lives. Younger family members learn how earlier generations lived, made decisions, and understood the world [3, 16]. Family memory develops through this iterative process: stories are told, questioned, corrected, and reinterpreted over time [8, 14].

We treat factual questions as useful story openings. Questions such as "Where was this photo taken?" or "What is this object?" help younger family members enter a memory. The difficulty comes after the first answer. Once an elder gives a factual response, both sides may treat the exchange as finished. Other parts of the story remain untouched: why the moment mattered, how the elder felt, what social background shaped it, or how the family later remembered it. Prior work shows that family stories depend on both narrators and listeners; younger family members shape stories through their questions, pauses, and attention [9, 11]. This raises a design question: how can a system help families continue a story after the first factual answer without making the exchange feel forced?

Research has explored photo displays, digital archives, mementoes, heirlooms, ambient displays, shared reading, tangible objects, and AI-supported storytelling for family memory and intergenerational communication [2, 5, 6, 12, 13, 15, 17–20]. These systems show the value of prompts and shared artifacts. They also reveal a risk: direct emotional prompts or dominant AI-generated content may make family members focus on satisfying the system instead of listening to one another.

This research presents a question-driven bead art co-creation system. The system links family storytelling with a bead image that appears gradually. It avoids scores, question rankings, and required emotional prompts. A workshop with real family dyads informed the design.

2 Co-design Workshop

We conducted a co-design workshop with six existing older-younger family dyads: six older adults (3 males, 3 females; M = 69.50, SD = 3.62) and six young adults (4 males, 2 females; M = 25.33, SD = 3.50). All dyads were actual family pairs rather than separately matched participants. The workshop did not observe natural conversations at home. Instead, each dyad recalled one family story that had stopped too early, reenacted the short version, marked where it stalled, and discussed how it might continue. Printed materials, including a Story Depth Ladder, Conversation Replay Sheet, Mechanism Flow Sheet, and Dot-vote Board, helped participants identify barriers and sketch design ideas [1, 10]. We also used a low-fidelity probe with paper hidden images and bead-pattern sketches.

This workshop shaped three design decisions. Factual questions should remain valid openings, since they help families enter a story. Gradual image reveal can give younger family members a reason to keep asking. Yet reveal-based interaction may also push people to search for the "right" question, so the system needs skip, pause, topic change, and manual reveal controls.

3 Prototype Design

We designed a question-driven bead art system that connects intergenerational storytelling with hands-on craft. The system includes a mobile app and an electronic bead board. The board uses an ESP32 controller and a 52×52 LED dynamic scanning dot matrix driven by a 74HC595 cascade circuit, combined with a transparent positioning pegboard, to provide real-time backlit guidance for pixel patterns and ensure stable, low-power operation. The app supports topic selection, question guidance, audio recording, AI-assisted story processing, and memory archiving.

3.1 Interaction Flow

The interaction starts with topic cards in the app, such as "A Memorable Moment," "That Special Day," "A Place I Still Remember," and "An Object with a Story." These prompts are short and open. They help the elder begin without asking for a complete life story.

After choosing a topic, the younger family member starts with concrete questions about color, shape, material, location, time, or people involved. The elder can answer briefly, add details, correct a misunderstanding, or skip the topic.

As the conversation continues, the system extracts visual elements from the elder's responses, such as objects, colors, places, people, and symbolic details. These elements are turned into a simplified bead-art sketch. At first, the board shows only vague outlines or broad color areas. The younger family member places beads based on the visible guidance. More regions appear as the story develops.

The activity creates a simple loop: ask, listen, make, reveal. The younger family member needs story details to complete the artifact, while the elder decides how much to share. When the bead artwork is finished, the app can save the final image, selected dialogue excerpts, and optional audio reflections in a digital Memory Museum.

3.2 AI-Assisted Question Classification

AI supports the process by classifying conversational turns, but it does not evaluate users. The system uses four broad question types: descriptive questions about visible or factual details, contextual questions about background and setting, interpretive questions about why the memory mattered, and affective questions about feelings or personal attachment.

The system does not treat emotional questions as automatically deeper. A simple factual question can lead to a rich story if the elder responds with personal meaning. A direct emotional question may lead nowhere if the elder gives a short answer or seems unwilling to continue. For this reason, the system reads the question type together with the elder's response and willingness to continue.

3.3 Bead Pattern Generation and Progressive Reveal

The bead pattern is generated from visual elements extracted from the conversation. For example, a story about riding a childhood

bicycle near a river may produce a bicycle outline, blue-green regions, and a small bridge. The system then divides the image into reveal layers.

Early layers show outlines and broad colors. Later layers add background objects, spatial details, and symbolic elements connected to the elder's story. The image becomes clearer over time, but the system does not show progress scores or label one question as better than another.

Users can override the reveal at any point. If the elder wants to stop discussing a topic, they can pause the reveal, skip the question, move to a new topic, or reveal part of the pattern manually. The goal is not to make the family unlock an image. The image works as a quiet guide for shared storytelling.

4 Discussion and Future Work

The prototype treats factual questions as openings, not failures. A family story often begins with a small detail. The harder task is helping that detail lead somewhere when the elder wants to continue. This approach builds on prior work that describes family memory as something shaped through interaction between narrators and listeners [8, 11]. In our system, the younger family member listens and asks questions while helping make the bead artifact.

The system also draws from HCI work on tangible memory objects, photographs, and mementoes [6, 13, 18]. Here, the memory object is not fixed at the start. It appears gradually. Its unfinished state gives the family a reason to keep asking, listening, and making.

The main tension lies in the reveal mechanism. Gradual reveal can support curiosity, but it can also pressure people to ask questions that seem more likely to unlock the image. This concern relates to earlier warnings about directive storytelling systems and AI-generated prompts [5, 15]. Our design treats AI classification as a soft guide. It avoids scores and question rankings, and gives the elder several ways to slow down or redirect the interaction.

Future work will evaluate the system with family dyads over longer use. We will examine how younger family members ask follow-up questions, how older adults decide what to share, and whether finished bead artworks help families return to the same memories later.

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