

Beyond Interdisciplinary Teaching and Research: Remembering Julie Thompson Klein during the Early Days of Text-Generating AI

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Julie Thompson Klein tirelessly advanced knowledge about interdisciplinarity and transdisciplinarity with her crossdisciplinary research and its dissemination. As Cathy Davidson has pointed out, Klein's breadth of knowledge was astonishing (Davidson, 2015, p. x). Nevertheless, any descriptions of Klein as a modern-day Renaissance woman, implying that she was a generalist, would be a great disservice to her legacy. Comparing Klein with eighteenth-century French Encyclopedists such as Denis Diderot and Voltaire would also be grossly inaccurate. Although she edited and co-edited encyclopedic handbooks and anthologies with contributors across various fields and geographic locations (Frodeman, Klein & Mitcham, 2010; Frodeman, Klein & Pacheco, 2017; Klein et al., 2001), Klein's acquisition of knowledge about interdisciplinarity was intentional, purposeful, practical, productive, and transformative. She continuously sought new knowledge, to be informed by it, and to share it with others. She analyzed the knowledge that she gathered, synthesized, and mapped, from which she drew innovative insights and conclusions. As she detailed more than once, Klein triangulated existing research methods, particularly those from history, sociology, and rhetorical studies, to develop her uniquely interdisciplinary approach to producing new knowledge (Gibbs & Beavis, 2020; Klein, 2015, 2021b; Lotrecchiano & Hess, 2019).

Klein trained to be a literature professor, receiving a PhD in English from the University of Washington in 1971. After arriving at Wayne State University in 1970, Klein found herself teaching in an interdisciplinary studies program geared toward working adults. Klein adapted to the situation by modifying her teaching and curricula. Her capacity to adapt would serve her well throughout her career. She sought out and befriended experts in interdisciplinarity, such as philosopher Joseph Kockelmans (1979), to learn more about the subject. Eventually, students and scholars of interdisciplinarity would seek out her expertise. Klein befriended many of them, supported their careers, and collaborated with them on research projects and publications. She joined what was then called the Association of Integrative Studies (AIS)—the first academic organization devoted to the study of interdisciplinarity—even as it focused on

interdisciplinary education more than the nature of interdisciplinary research and practices. Nevertheless, Klein was not content to be just a member of an organization. She contributed to its journal and rose to the ranks of its leadership, serving as AIS President from 1986–87. This experience, too, would serve as a blueprint for her subsequent involvement with other interdisciplinary organizations.

Klein's endeavors as a teacher and involvement in AIS also fueled her research on interdisciplinarity, which led to the publication of her landmark 1990 book *Interdisciplinarity: History, Theory and Practice*. Her study was multi-purpose. First, it offered a history of interdisciplinarity. Second, it provided useful definitions and taxonomies that enabled readers to understand typological distinctions among interdisciplinary practices. Third, it examined and analyzed the rhetoric of interdisciplinarity, highlighting, for example, how language reified disciplinary turf wars with the deployment of military metaphors. Fourth, it charted an overview of interdisciplinary practices, such as borrowing, problem-focused research, and teamwork in the sciences and healthcare. Fifth, it surveyed interdisciplinary education. Moreover, it quoted Lawrence Wheeler's fable about a planning group designing a house for an elephant (pp. 121–122), which gave readers a concrete example of how experts from different disciplines may approach the same topic, object, or concept differently depending on their disciplinary perspectives and "blind spots." The conclusion introduced Klein's theoretical framework for thinking about integration based on Habermas' theory of communicative action. But that's not all. The conclusion additionally surveyed autobiographies and personal narratives of notable interdisciplinarians. It even summarized the existing literature on "certain character traits of interdisciplinary individuals" while eschewing essentialism (pp. 182–183). Significantly, Klein made a strong case in her book that the existing scholarship on interdisciplinarity needed to catch up with its robust, albeit often disrespected, practices. What may have at the time seemed like the defining treatise on interdisciplinarity turned out to be a foundational text upon which many of her subsequent research currents would build.

Two of Klein's main research currents during the 1990s were boundary work and interdisciplinary studies education. Her 1990s publications on interdisciplinarity's more conceptual and theoretical aspects were matched at every turn with those on interdisciplinary education. Case in point: In 1993, Klein published "Blurring, Cracking, and Crossing: Permeation and the Fracturing of Discipline," a book chapter that, as far as I can deduce, inaugurated her interest in boundary work. In 1994 she co-edited *Interdisciplinary Studies Today* with William G. Doty (Klein & Doty, 1994). Two years later, in 1996, she published a book on boundaries entitled *Crossing Boundaries: Knowledge, Disciplinarity, and Interdisciplinarity*, which considered how disciplines and disciplinary interactions were conceptualized by focusing on boundary metaphors. Klein did not view disciplinary boundaries as fixed but as fluid and permeable. That

same year she also co-wrote with William H. Newell “Advancing Interdisciplinary Studies,” in which she and Newell proposed a definition for interdisciplinary studies that to this day remains influential: “Interdisciplinary studies may be defined as a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession” (Klein & Newell, 1997, p. 3). Continuing her commitment to interdisciplinary studies, she next published *Mapping Interdisciplinary Studies* in 1999 as part of the Association of American Colleges and Universities’ The Academy in Transition series.

Klein’s research interests expanded towards the new millennium with an eye toward internationalism, which is unsurprising given that she had previously spent a year as a visiting professor in Japan in 1978–1979 and held a Fulbright in Nepal during the 1986–1987 academic year. At the same time the study of transdisciplinarity in its own right was emerging in what could be described as multiple currents or “schools.” Klein was “all in” right from the start, just as she had been when she began researching interdisciplinary and interdisciplinary education. She attended the First World Congress of Transdisciplinarity at the Convento de Arrábida of Portugal in 1994 (Gibbs & Beavis, 2020), which became associated with Basarab Nicolescu and the “French” school. She participated in the watershed colloquium on transdisciplinarity at L’Abbaye de Royaumont, Ansières sur Oise, which took place May 25–29, 1998, as well as contributed to its published proceedings (Klein, 2000a, 2000b; Klein & Macdonald, 2000). In February 2000, Klein was one of the organizers of the International Transdisciplinary Conference in Zurich, Switzerland. Nearly 800 participants attended from around 50 countries. As Klein (2001a) stated during her presentation published in the conference proceedings, which she co-edited, “the International Transdisciplinary Conference was a pivotal event in the evolution of a new discourse.” Klein ended her talk by making a case for “the global need for transdisciplinarity” (p. 35). The proceedings were published as *Transdisciplinarity: Joint Problem Solving among Science, Technology, and Society—An Effective Way for Managing Complexity* in 2001 (Klein et al., 2001). As the volume’s title indicates, research on transdisciplinarity in Switzerland and additional German-speaking European countries, which eventually began to be known as the “Swiss” or “Zurich” school, was at the time (and arguably, still is) heavily skewed towards the sciences. It is not that much of a stretch to assume that Klein decided in response to investigate interdisciplinarity in the humanities by publishing in 2005 a survey of the interdisciplinary humanities, *Humanities, Culture, and Interdisciplinarity: The Changing American Academy* (Klein, 2005). Between those two projects, Klein (2001b) weighed in on William H. Newell’s (2001) bold claim, published in this journal, that interdisciplinarity was grounded in complexity with a pointed rebuttal to his assertion that there had been no published theory of integration, citing, among others, her own theoretical framework (Klein, 1990). Klein (2002) continued her research on

interdisciplinary studies education by editing *Interdisciplinary Education in K–12 and College: A Foundation for K–16 Dialogue*.

By the mid-2000s, numerous undergraduate interdisciplinary programs dealt with “the politics of interdisciplinary studies” (Augsburg & Henry, 2009), including her own at Wayne State, which closed in 2007, dispersing its tenured faculty to various departments. Shipped rather unceremoniously to the English department, Klein quickly pursued new lines of research. She received a grant from the National Endowment of the Humanities that afforded her a part-time appointment with the library and guest professorships at both Michigan State and the University of Michigan, which offered her the opportunity to do research in the digital humanities. Her oblique response to the unpleasantness and counter-productiveness of her institution’s politics of interdisciplinary studies was to research how interdisciplinarity could be advanced for good at the administrative and structural levels, publishing *Creating Interdisciplinary Campus Cultures: A Model for Strength and Sustainability* (Klein, 2010). Her research also coincided with her active involvement in what Cathy Davidson and Bruce Janz (2019) have described as “the world’s first and oldest social Network, Humanities, Arts, Science, and Technology Alliance and Collaboratory” (HASTAC) (p. 134), even serving as the co-director of the fifth international HASTAC conference, “Digital Scholarly Communications,” which was held at the University of Michigan in December 2011.

During this era, she weighed in on debates within AIS revolving around integration, cautioning against orthodoxy. She followed her own interests, and, as Klein told her interlocutors Gaetano R. Lotrecchiano and Andi Hess in 2018, she “reached more widely into research and team-based collaboration.” In so doing, she expanded her “purview to include the European-based notion of trans-sector transdisciplinarity and the U.S.-based notion of team science . . . underscoring the heterogeneity of interdisciplinarity while distinguishing [her] descriptive approach from prescriptive ones” (Lotrecchiano & Hess, 2019, p. 176). Along the way she received invitations internationally to speak about interdisciplinarity and forge international alliances in Switzerland with TD-Net and the TdLab; in Australia with Integration and Implementation Sciences (i2S) at Australia National University; and internationally with the Science of Team Sciences. In 2008 she was invited to be an advisor for the Toolbox Project (O’Rourke & Crowley, 2013). While putatively “confined” to a university disciplinary department, she helped internationalize interdisciplinary education, co-editing a special volume of *Issues in Interdisciplinary Studies* on Canadian K–12 interdisciplinary education with Yves Lenoir in 2010 (Lenoir & Klein, 2010). She furthered her interest in interdisciplinary education beyond curriculum development and pedagogy. Also in 2010, Klein served as an associate editor of the *Oxford Handbook of Interdisciplinarity* (Frodeman et al., 2010) and its second edition in 2017 (Frodeman et al., 2017).

In 2015, she retired from Wayne State after 45 years of teaching there, enabling her to focus on research and writing. Klein was highly prolific in the last decade of her life, even when faced with illness and tragedy, particularly the untimely death of her beloved daughter Sarah in 2013. She published three books: *Interdisciplining Digital Humanities: Boundary Work in an Emerging Field* in 2015; *Beyond Interdisciplinarity: Boundary Work, Communication, and Collaboration* in 2021; and co-edited *Institutionalizing Interdisciplinarity and Transdisciplinarity Collaboration across Cultures and Communities* with Bianca Vienni-Baptista in 2022 (Vienni-Baptista & Klein 2022). That same year she was a founding co-editor of the new academic journal that launched in 2022, *Global Social Challenges Journal*.

While the above cursory academic biography documents how Klein's professional experiences enmeshed with her research interests, it does not adequately indicate how her thinking about interdisciplinarity evolved. Her commitments to interdisciplinary education, social justice, boundary work, typologies, rhetoric, and practices remained constant. In her book chapter on boundary work, Klein (1993) credited Thomas Gieryn (1983) with inventing the concept and coining the term. While Klein may have "borrowed" the term from Gieryn, it "traveled" (Bal, 2002) from the sociological history of science to Klein's distinct interdisciplinary methodology and discourse. In 2018, Klein quoted from her then-forthcoming book during her dialogues with Lotrecchiano and Hess, signaling that she preferred "boundary work" over "interdisciplinarity":

[The term "interdisciplinarity"] is no longer adequate to describe the plurality and complexity of crossing boundaries today. Even though the term continues to be an umbrella label, research and education are crossing divisions of not only disciplines but also interdisciplinary fields, and sectors of society including government, industry, and local communities. "Boundary work" is a composite label for claims, activities, and structures by which individuals and groups work directly and thorough institutions to create, maintain, break down and reformulate between knowledge units. (Lotrecchiano & Hess, 2019, p.175)

Klein had previously published similar definitions of boundary work (for examples, see Klein, 1996, p. 1; 2015, p. 5). In *Interdisciplining Digital Humanities: Boundary Work in an Emerging Field*, she additionally observed how the study of boundary work had evolved: "Boundary work studies initially focused on disciplines, especially the demarcation of science from non-science. Subsequently, though they were extended to interdisciplinarity" (Klein, 2015, p. 5).

The evolution of Klein's own thinking about "boundary work" is evident in how the emphases of her inquiries shifted over the years. In *Crossing Boundaries*, Klein focused on boundary practices such as borrowing and hybridity. In *Beyond Interdisciplinarity*, she foregrounded contextualizing and mapping

boundary work practices by highlighting heterogeneity, collaboration, and communication. However, as she made clear in her keynote address at the 2018 conference on “*Politiques et Pratiques de L’interdisciplinarité*,” Klein continued to “ground” her inquiries “in linguistic understanding of the changing semantics in use of words,” which in her view “is the heart” of her 2021 book *Beyond Interdisciplinarity* (Klein, 2018).

Another notable recent shift in Klein’s published scholarship was her reactivation and preferred usage of the word *crossdisciplinary*, undoubtedly inspired by how other researchers had reclaimed the word after years of neglect. In her 1990 book *Interdisciplinarity*, the word “cross-disciplinary” is only mentioned once (p. 55), although, curiously enough, listed as “crossdisciplinary” in the index under the “Nomenclature” entry (p. 330). In an article that traced how “a new discourse of transdisciplinary problem solving was emerging,” Klein (2004) modified Becker, Jahn, Stiess, and Whelings’s (1997) and Becker and Jahn’s (1999) deployments of the term “cross-disciplinary” (p. 4). In so doing, she amplified their reclaiming of the word, inspiring Michael O’Rourke and associates (Eigenbrode et al., 2007) to alter “cross-disciplinary” further to indicate “research that crosses traditional disciplinary boundaries” (p. 55) and “broader collaboration that spans disciplines” (p. 56). O’Rourke reflected on how and when he and his collaborators began using “cross-disciplinarity” circa 2007 (Crowley et al., 2010; Crowley et al., 2016; Eigenbrode et al., 2007; Laursen & O’Rourke, 2019; Looney et al., 2014; O’Rourke & Crowley, 2013; O’Rourke et al., 2016) in an email to the author:

“Interdisciplinarity” is often made to do double duty—as a medium-range integrated modality (between multidisciplinary and transdisciplinarity), and as a generic, cover term for all integrated activity involving multiple disciplines. We wanted to use a term that was not already in widespread use as a cover term, so we chose to use that one [cross-disciplinarity]. (personal communication, March 20, 2023)

Since circa 2021, O’Rourke and his collaborators have followed Klein’s example by adopting her preference for the unhyphenated spelling of the term, *cross-disciplinary*, as an umbrella term to designate interdisciplinary and transdisciplinary endeavors. In *Beyond Interdisciplinarity*, Klein defines crossdisciplinarity as the following:

Crossdisciplinary encompasses multi-, inter-, and trans-disciplinary forms of research and education. Some have stipulated specific connotations, but the term appears increasingly as a generic adjective for these and other forms of crossing disciplinary boundaries, especially in the academic sphere. (Klein, 2021b, p. 5)

Linking the two terms, Klein describes the boundary rhetoric of crossdisciplinary work (and *cross-sector work*, another term she embraced in *Beyond Interdisciplinarity*) as follows:

It encompasses acts of spanning, crossing, and bridging; processes of interacting, integrating, and collaborating; strategies of brokering, mediating, and negotiating; operations of demarcating, constructing, and refiguring; new relations of interdependence and convergence; and outcomes of breaching, transgressing and transforming. (Klein, 2021b, pp. 22–23)

Including “strategies of brokering, mediating, and negotiating” reveals Klein’s ongoing perceptive attention to issues of power and communication (Klein, 2004; Lotrecchiano & Hess, 2019). Her 2023 article (published online in October 2022) signaled Klein’s extending interests in examining further connections between power relations and social justice in boundary work, highlighting recent efforts to decolonize the sciences and advocating for balance (Klein, 2023).

The shifts in Klein’s lexicons and research interests over her last decade, I would submit, reflected her 2021 call published in this journal to reflect on the similarities and differences among five of the founding organizations of the growing Global Alliance for Inter- and Transdisciplinarity, to which she was deeply committed (Klein, 2021a). The text was not only a call for action, however. It was arguably an activist manifesto without calling it as such, written by a someone who evidently preferred to be known as a collaborative and innovative crossdisciplinary scholar, theorist, and researcher rather than be associated with infamous manifesto writers who have been regarded unfavorably throughout history as fanatical ideologues, radical political revolutionaries, pie-in-the-sky thinkers, artistic hellraisers, or anarchist troublemakers. It exemplified Klein’s integrative methodology, which combined and triangulated history, reflection, documentation, description, synthesis, mapping, and projection as Klein traced the history and development of each of the five organizations, teasing out significant features in order to delineate the heterogeneity of their practices while making a case for commonalities that *can* and *should* strengthen their alliances and opportunities for collaboration. It is no accident that she concluded *Beyond Interdisciplinarity* by offering summaries of each of the five organization’s available resources, claiming that “their efforts also underscore three final overriding lessons” regarding the future of interdisciplinarity, which I would paraphrase as the following: 1) the absolute necessity of contextualizing knowledge about interdisciplinarity, 2) the necessity of understanding that interdisciplinary practices are *always* specific to their particular locations, and 3) the utmost necessity of creating and using resources while seeking options. Klein underscored the importance of the third lesson by unequivocally stating, “Practitioners often learn by doing. Yet, failing to use pertinent literature and other resources is as *inexcusable* [emphasis added] for crossdisciplinary and cross-sector work as it is for disciplines and professions” (p. 135).

Klein thus was wholly committed to advancing crossdisciplinarity by not only doing research but also by disseminating knowledge however she could.

After her retirement, she would occasionally visit classes and interact with students as a guest speaker. For instance, in early February 2021, she visited my interdisciplinary humanities graduate seminar at San Francisco State University, “Introduction to Integrative Studies,” to discuss the interdisciplinary humanities and her 2005 book on the subject, which I had assigned as the course’s initial foundational reading. A lively discussion about contemporary humanities canons and the ethics of canonization ensued. Subsequently, Klein graciously accepted my invitation to serve as the discussant to “Rethinking the Interdisciplinary Humanities Critical Theory Canon: Innovative Interdisciplinary Humanities Course Proposals by Graduate Students at San Francisco State University,” the student panel I organized and moderated at the 2021 AIS conference that featured four students’ final research seminar projects. As the conference occurred during the COVID-19 pandemic, the session was recorded virtually over Zoom. Fortunately, it can be viewed on YouTube, and beginning at the 50-minute mark in the video viewers can watch Klein responding energetically and attentively to each panelist’s presentation with cogent insights. Besides offering detailed feedback, Klein congratulated all four panelists for representing the next generation of interdisciplinary scholars and researchers. Her participation on the panel was a *tour-de-force* academic performance of humanistic interdisciplinary inquiry by an eminent scholar, researcher, teacher, and mentor.

Julie Thompson Klein’s passing on January 15, 2023 occurred roughly six weeks after the release of the text-generating artificial intelligence (AI) chatbot ChatGPT 3 on November 30, 2022. Its novelty was quickly eclipsed by the appearance of ChatGPT 4 four months later on March 14, 2023. I discovered the current shortcomings of text-generating software when I first asked ChatGPT on March 16, 2023, who was Julie Thompson Klein, followed by queries about Klein’s accomplishments and achievements. Since both ChatGPT 3 and 4 only have access to information up to October 2021, ChatGPT considered Klein as still alive in March 2023, two months after her passing. ChatGPT’s responses lacked nuance and details in discussing her work, and listed some of the titles of her books and awards incorrectly, and, evidently, invented some additional publications and even accolades from non-existent organizations (see the bolded text in the Appendix). Such inaccuracies or “misfires” are not uncommon and have been termed as “hallucinations” for “untethered” text generation in AI (Lee et al., 2018; Zimmer, 2023).

Knowing how Klein was a stickler for accuracy (Augsburg, 2019), I can well imagine that she would have had a dim view (at best!) of the sheer abundance of errors in existing AI-generated accounts about her work. Despite all the hype revolving these AI programs, the glaring current limitations of their knowledge bases, coupled with the prolific, often misleading inaccuracies of their generative writing makes me appreciate Klein and her work even more. The general and at times inaccurate summaries are incapable of conveying

how inimitable and incomparably brilliant a human was Julie Thompson Klein, who, as mentioned previously, was legendary for her vast breadth and scope of knowledge as well as her nonpareil analyses.

I thereby conclude with my own micro “call for action” to the reader in order to appreciate Klein’s research contributions and achievements: Read carefully the selected ChatGPT summaries about Klein and her work that were generated on March 16, 2023 in the Appendix. Compare such derivative, error-prone writing with Klein’s illustrious and pathbreaking scholarship, of which only a portion has been cited in this text. Then decide for yourself the value of such AI-generated writing as I have. We humans, in my final estimation, can still learn so much from Klein’s exceptional example as a twenty-first-century polymath—even though she is no longer with us—by reading her preeminent research and scholarship.

Biographical Note

Tanya Augsborg, PhD, is an interdisciplinary feminist performance scholar, educator, curator, and arts writer. She is Professor of Liberal Studies in the areas of the interdisciplinary humanities and creative arts at San Francisco State University. She is additionally the Art Historian-in-Residence Executive Board Member for the Northern California Women’s Caucus of Art and is a member of the College Art Association’s Committee on Women in the Arts. She is a former executive board member of the Association for Interdisciplinary Studies and currently Associate Editor of *Issues in Interdisciplinary Studies*. She regularly contributes as an arts writer to the online journal, *The Art Section: An Online Journal of Art and Cultural Commentary*. Her research interests include contemporary feminist art and performance, art writing, the interdisciplinary arts, and interdisciplinarity. Her favorite pastime is helping students succeed. More information about Tanya Augsborg can be found at <http://www.tanyaaugsborg.weebly.com>.

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Appendix

Sample Chat GTP Inquiries Conducted by Author on March 16, 2023

Sample Query #1: What were Julie Thompson Klein's contributions and achievements?

Sample Response A

Factual inaccuracies (also known as “hallucinations”) **in bold** and [corrections in brackets].

Julie Thompson Klein is a prominent scholar in the field of interdisciplinary studies. Her contributions and achievements include:

- She has served as the editor of the **Journal of Interdisciplinary History**, and has written extensively on the subject. [There is no evidence that Klein has published in the journal, let alone edited it].
- Publishing numerous influential works . . . “Interdisciplinary Studies Today” (2014), [the year is incorrect, see Klein & Doty (1994)], and “**Interdisciplinarity: A Critical Assessment**” (2017). [The author(s) and year are incorrect. The correct citation is the following: Jacobs, J. A., & Fricke, S. (2009). Interdisciplinarity: A critical assessment. *Annual Reviews of Sociology*, 35, 43–65. First published online as a “Review in Advance” on April 2, 2009, <https://doi.org/10.1146/annurev-soc-070308-115954>.]
- Receiving numerous awards and honors including the inaugural **Joseph Katz Award** for Excellence in Research in the Field of Interdisciplinary Studies from AIS in 2003. [The award title is incorrect. Klein was awarded the Kenneth Boulding Award for contributions to scholarship on interdisciplinarity from the Association for Integrative Studies in 2003.].
- She was also awarded **the Distinguished Scholar Award** by the Association for General and Liberal Studies in 2010. [The award title is incorrect. Klein was awarded the Joseph Katz Award for Distinguished Contributions to the Practice and Discourse of General and Liberal Education from the Association of General and Liberal Studies in 2010.].

Sample Response B

With CHAT GPT different answers to the same query can be generated by clicking “regenerate response.”

- **She has also served as the editor of the journal Interdisciplinary Studies in Literature and Environment.** [Klein's name does not come up in a search on the journal's website and there is no bibliographic evidence that Klein published in this journal.].

- Klein's work has been recognized with a number of awards and honors, including the **Kenneth Boulding Award from the International Society for the Systems Science**, [as already mentioned, Klein received the award from AIS], the **Derek Price/Rod Coombs Memorial Award from the Research in Management Learning and Education Special Interest Group**, and the **John Naisbitt Award for Outstanding Scholarship in Global Higher Education** from the Association for the Study of Higher Education. [Klein did not list either award on her cv. A cursory internet search could not confirm the existence of either award.].

Sample Resonse C

Julie Thompson Klein is a scholar in the field of interdisciplinary studies, with significant contributions to the development and promotion of interdisciplinary approaches in research and education. She has authored numerous books, articles, and edited volumes on interdisciplinary studies and has been involved in interdisciplinary research and teaching **for over 30 years**. [Klein was involved in interdisciplinary teaching for over 50 years.].

Some of her major contributions and achievements include:

- **Development of the Four-Phase Model of Interdisciplinary Inquiry: Klein's Four-Phase Model of Interdisciplinary Inquiry is a widely used framework that guides interdisciplinary research and collaboration. The model consists of four phases: problem identification, information gathering, synthesis, and communication.** [Klein's 1990 theoretical framework was not a four-phase model.].
- **Leadership in the Interdisciplinary Studies Movement:** Klein has been a leading advocate for interdisciplinary studies and has served in various leadership positions in organizations promoting interdisciplinary research and education, including the Association for Integrative Studies, the **International Network for Interdisciplinary Research** and the **International Association for the Study of Organized Creativity** [There is no online evidence for the existence of either organization.].
- **Authorship of Interdisciplinary Textbooks:** Klein has authored **several widely used textbooks** on interdisciplinary studies, including "**Interdisciplinary Studies: A Connected Learning Approach**" and "Crossing Boundaries: Knowledge, Disciplinarity, and Interdisciplinarity." [Klein did not author textbooks and did not author the first book listed.].
- **Awards and Recognition:** Klein has received numerous awards and recognition for her contributions to interdisciplinary studies, including the President's Medal for Excellence in Scholarship and the Outstanding Interdisciplinary Faculty Award from Wayne State University, where she taught for many years. **She is also a Fellow of the Association for Integrative Studies** [This is the old name of AIS and AIS does not have fellowships.].

Sample Query #2: What are Julie Thompson Klein's contributions to interdisciplinary education?

Sample Response

Founding the Association for Interdisciplinary Studies: In 1979, Klein co-founded the Association for Interdisciplinary Studies, which is an international organization dedicated to promoting interdisciplinary education and research. [AIS was founded by William H. Newell that year, though Klein joined soon after and remained active throughout her life.].

