Learning as Identity Formation:
Implications for Design, Research, and Practice

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Abstract: Increasingly, research is acknowledging the importance of identity for understanding and supporting learning. Identity is a particularly useful concept for highlighting extraordinary individual experiences, interpreting rich social contexts, and viewing learning at multiple timescales, from an instant reaction to lifelong psychosocial development. However, identity is complex—it is conceptualized differently by various academic traditions. This inherent diversity can lead to a confusing or murky notion of identity. In this symposium, we clarify the concept, integrating the relevant theoretical perspectives of social and psychological identity to assess its implications to design, research, and practice. We provide concrete examples from our own research of the benefits of viewing learning as identity formation and the challenges to conducting such research.

Learning as Identity Formation

The learning sciences are manifold, acknowledging contributions from numerous academic traditions (education, psychology, computer science, design, etc.) and recognizing multiple perspectives on learning, both their *power* and *limitations*. Bransford and Schwartz (1999) argue that having a more fine-grained notion of transfer has powerful consequences for how we understand and promote learning. In his keynote at ICLS 2002, Roy Pea noted the limitations of the learning model imposed by the then-new "No Child Left Behind" legislation: that learning gains can be quantified through testing and thereby directly compared. In this symposium, we examine the perspective of *learning as identity formation*—people use their personal experience to actively construct their identity in relation to ideas, others, and to themselves. We provide concrete examples from our own work on the value of this perspective to design, research, and practice. As with any lens, there are limitations: While there is significant overlap, learning is not the same as identity formation (Nasir & Cook, 2009). On the other hand, important aspects of learning come into clearer focus.

In the preface of his seminal book "Mindstorms: Children, Computers, and Powerful Ideas," Seymour Papert (1980) describes his early fascination with the differential gear. "I believe that working with differentials did more for my mathematical development than anything I was taught in elementary school" (p. xviii). He viewed the multiplication tables as gears. His first brush with two variable equations (e.g., $3x + 4y = 10$) immediately evoked the differential. The gears of his childhood served him as useful model to assimilate the world and to form his identity as a mathematician. While the cognitive component was significant, Papert credits more power to the *affective component* (his "love" of the gear) in shaping his life. Problematically, such a profound example of learning cannot be easily understood through conventional means: "A 'pre- and post-' test at age two would have missed them" (p. xx).

How can we study such experiences and use our understanding to facilitate them? To better understand the challenges involved, it is worthwhile noting the peculiarities of Papert's experience. First, the learning took place largely outside a classroom. Second, the full story takes place over a long time, spanning from playing with toy trucks at age two to using his relationship with gears to inform his studies with Piaget and ultimately his theories of how the computer can support learning. Third, it was a highly individual story of identity formation. Papert admits that others would not have taken away the same things from those experiences. Fourth, it takes place in a larger social context, where he was able to use his passions to inform his school studies and his professional career.

Characterizing learning in a larger social context has been well represented inside the learning sciences. In particular, *communities of practice* has been an influential framework to incorporate social aspects of learning. That theory originated with observations of how traditional methods of career training (e.g., tailors, butchers) have substantially different properties than school-based education. Lave and Wenger (1991)

document how successful implementations of legitimate peripheral participation can allow newcomers to join a community of practice and progress to being central to that community. Wenger (1998) further theoretically expands the implications to identity formation through the twin processes of becoming and belonging. Over time, an apprentice will learn new skills and take over more responsibility to *become* a tailor. Concurrently, both the apprentice and the tailoring community will increasingly acknowledge that he *belongs* to that community. There is both an individual and a social component.

There has been substantial work on studying the social components of identity in evocative situations, pointing out the key differences to classroom learning, and then integrating the positive aspects into other learning settings (Gee, 2000). For example, Bryant, Forte, and Bruckman (2005) studied how contributors to Wikipedia became part of that community. They found that a particularly powerful incentive for people to freely contribute their time was that others would see their work (i.e., that it made a difference to a sizable audience). This contrast sharply with standard classwork, which is usually only viewed by the teacher. To exploit the advantage of an audience, Forte and Bruckman (2006) had learners construct a publically available wiki based on their in-class learning and independent research.

Studies of identity in meaningful social contexts can help us reflect on existing research and practice. When studying how high schoolers played dominoes in their free time, Nasir (2005) found that players were not just trying to win the game; they also used sophisticated and subtle strategies, often bending the rules of the game, to scaffold weaker players. This stands in contrast to Barron's (2003) work documenting common problems in group-work (e.g., ignoring contributions by a peripheral group member). It suggests that children do have the inherent ability to support each other given the right social context. The design challenge is creating the right context. In another study, Nasir and Cook (2009) focused on learning in after-school athletic activities, such as track and basketball. As voluntary activities, there was a different social impetus and individual commitment to these activities. Coaches explicitly facilitated learning as identity formation. One track coach informed a skeptical student, "you are a hurdler." That statement indicated a specific learning trajectory: While she was struggling at the time, she would become a successful hurdler—a position of value in this context. Similar sentiments (e.g., "you are a scientist") are much more rare in a conventional classroom.

Independent of the social and skill-based aspects of identity, there is a *core identity*—an identity so core to the person that it is important in all situations (Erikson, 1963). In Freudian psychology, this core identity roughly equates to the ego. Whether it be in outfitting a home (Csikszentmihalyi & Rochberg-Halton, 1981), writing a computer program (Turkle, 1984), participating in a MUD (Bers, 2001; Turkle, 1995), or working on a simple worksheet (Wenger, 1998), people consciously or unconsciously "play with" their core identity. The tools we provide learners are thus not neutral in that regard. Bers (2001) has explicitly aimed at creating *identity construction environments*, technologies and technologically-rich psychoeducational interventions that support explorations of self. She designed the Zora virtual community to allow children to create and share different things (virtual places, objects, heroes, and villains) that reflect their core values. Bers (2006) later expands the term to include an explicit focus on promoting positive youth development. Positive youth development focuses on promoting six aspects of identity for youths: competence (cognitive abilities and healthy behavioral skills), positive bonds with people and institutions, character (integrity and moral centeredness), confidence, caring, and contribution to a civil society. Such vital components of psychosocial development are often neglected in school curricula and by evaluations that focus on cognitive aspects of learning.

Complimentary Perspectives on Identity Formation

This symposium brings together insights from four separate research projects to demonstrate how learning as identity formation can inform the design of learning environments, learning sciences research, and educational practice. Rick will present how different notions of identity overlap and how, to understand the rich learning in such complex situation, certain theories may be more applicable to one person's experience than another's. Devane and Clegg will provide two perspectives on how to study identity formation at different temporal scales, from the instance of an "aha" moment to lifelong psychosocial development. Peters will present on the role of disciplinary identity in science education research—how the knowledge, methods, and culture associated with specific academic domains shapes both our approach to research (i.e., the "practice") as well as the products and outcomes that educational research seeks to achieve.

Presentation 1 — A Confluence of Identity
Jochen Rick

Personal home pages are outgrowing their playful beginnings to serve serious purposes. At the forefront of this emergence is academia, where they are becoming a meaningful way for researchers to engage each other. In computer science, it is common for researchers to visit their colleagues' home pages to find research articles and contact information. Additionally, a personal home page acts as an informal curriculum vitae or an über-business card. Graduate students are advised to maintain a professional page. Many include a link to their home

page when applying for a faculty position. Likewise, some faculty members polish their pages before promotion.

Yet, the medium is still in its infancy: The medium, its adopters, and their practices are unduly constrained by current technology. To better study the meaning and use of personal home pages in academia, I created a better personal-home-page system to loosen these constraints. That system applies wiki technology to facilitate easy editing, to enable interaction, and to focus the user on content creation. To honor its origins in the WikiWikiWeb, the software was named AniAniWeb. Whereas "wiki wiki" means quick in Hawaiian Creole (the quickest way to create a website is to ask any visitor to be an author), "aniani" means mirror (an appropriate metaphor for a tool to write about oneself).

> Mirrors, literal and metaphorical, play an important role in human development. In literature, music, visual art, or computer programming, they allow us to see ourselves from the outside, and to objectify aspects of ourselves we had perceived only from within. (Turkle, 1995, p. 155)

The dissertation research presents a case study of six graduate students and their experience with AniAniWeb over a period of two years (Rick, 2007). Their practices are viewed through three analytical lenses: media theory, communities of practice, and core identity theory. When combined, these frameworks led to a rich understanding of personal home pages in academia. This work is not unique in combining these frameworks to understand a new medium. Turkle (1995) combines aspects of each of these perspectives to understand identity in MUDs (i.e., text-based multiplayer real-time virtual worlds). As a clinical psychologist, her main focus was on the individual—how does the technology affect the individual? Meyrowitz (1985) combines Goffman's (1959) framework on social interaction with a McLuhan (1964) perspective on technology to understand television. His main focus is on understanding the societal changes that television has caused.

Going into the case study, I hypothesized that these frameworks would be useful in explaining the use and meaning of personal home pages in academia. The results have confirmed that. All three frameworks contribute to a better understanding of the whole. At times, the frameworks are orthogonal—they explain different things. For some adopters, their experience hardly reflects their core identity; AniAniWeb was simply a useful tool for them. For others, AniAniWeb does act as a mirror allowing adopters to play with who they are. At other times, the frameworks are complementary—illuminating different aspects of the same phenomenon. Graduate students are on a learning trajectory inside of the academic community of practice. When they use their home page to address that audience, the meaning is necessarily social in nature. However, their reflection on how successful they have been in that goal can strongly impact their core identity.

As self-presentation environments, authoring a personal home page is naturally about presenting oneself to others. But, who are these others? At times, such as in the middle of a job search, there is a clear primary audience and the home page can be tailored to that audience. More frequently, multiple audiences are simultaneously served by the same home page. A home page can be visited by friends, family, colleagues, fellow academics trying to find out more about you, potential employers, your boss, etc. Compounding the problem, AniAniWeb so facilitated content creation that several adopters primarily used the technology for themselves—to keep notes or to record their lives. Authoring a personal home page that serves these different audiences to the author's satisfaction is the *multiple audience problem*. Authors in asynchronous media only have a hazy awareness of who their audience is; often they even fail to realize that they have one (Forte & Bruckman, 2006). Authoring a personal home page without useful feedback on how others receive the page is the *audience awareness problem*.

For prolific users, such as those studied in this work, negotiating these two problems can be a challenge. In face-to-face conversation, we can (and do) change how we present ourselves based on our audience (Goffman, 1959). A waiter acts differently while in the kitchen than in the dining room. People act differently at home and at work. When these barriers break down (e.g., introducing your boss to your parents at your wedding), figuring out how to integrate the multiple roles can be tricky. People who simultaneously inhabit multiple spheres, such as teleworkers (Nippert-Eng, 1996), must continually negotiate which roles they play.

Electronic technologies have a tendency to change such interpersonal dynamics (McLuhan, 1964; Meyrowitz, 1985). They can radically alter our *self epistemologies*—how we view ourselves. Because the virtual persona is not tied to an actual body, the Internet is a particularly fertile ground for playing characters radically different than your physical self. In a MUD, an able-bodied man can convincingly play a crippled woman in a chat room (Van Gelder, 1985). Turkle (1995) concludes that electronic media foster a *fragmented self epistemology*, where it is possible to be radically different in different settings; however, there are several electronic media where it is unacceptable and uncommon for the presented self to be substantially different from the physical self. Personal home pages are one such case. As only one site comes at the top of a Google query for your name, it is nearly impossible to separate content to different audiences. Personal home pages encourage an *integrating self epistemology*, emphasizing a core self that exists across multiple aspects of the adopter's life.

Presentation 2 — Identity in Time: Theoretical and methodological approaches

Ben Devane

Studies in the learning sciences focused on the importance of identity to social learning have increased in number and prominence (e.g., Bers, 2001; Sfard & Prusak, 2005; Barab et al., 2007; Nasir & Hand, 2008). At the same time that identity has become an increasingly important construct in much of learning science research, what learning science researchers mean when they discuss 'identity' can often be indistinct, uncertain or vague. In the broader social science research literature, two major conflicting theories of identity predominate, *developmental* (Erikson, 1959) and *interactionist* (Mead, 1934). Learning sciences research often uses the term identity without making clear what theory of identity is intended to be understood, leading to unnecessary confusion and disagreement.

In this presentation, I argue that these two theories of identity do not necessarily represent conflicting views of social identity. Instead I argue that these differing theories are the result of disciplinary methods that focus on distinct *timescales*, the chronological units used to examine social processes (Lemke, 2000). In doing so, I briefly review the major social sciences literature on the two theories of identity, describe the major methodological differences between the two approaches, and outline the relevance of timescales to the particular methodological approach. This presentation pays particular attention to the relationship between short, "moment-to-moment" timescales of identification, commonly called identity enactment or performance, and longer timescales of identification, known as identity formation or development.

Perspectives on identity – interactionist vs. developmental

Developmental and interactionist perspectives on identity are each associated with a formative scholar for the theory, Erik Erikson and G.H. Mead respectively. Developmental perspectives typically understand identity as a normally singular and continuous process of mental and emotional development, emphasizing the importance of both social institutions and social groups like families in said developmental process (see Erikson, 1959). Erikson wrote that identity "connotes both a persistent sameness within oneself (selfsameness) and a persistent sharing of some kind of essential character with others" (1959, pg. 102). In the learning sciences, developmental perspectives on identity have examined the relationship between learning and long-term, core aspects of identification like sexuality, ethnicity, morality and self-esteem (Halverson, 2009; Kirshner, 2008).

Rooted in Pragmatist scholarship in psychology and sociology, interactionist perspectives on identity place emphasis on a person's unique social experiences and social roles. G.H. Mead, often recognized as a key figure in *symbolic interactionist* school, wrote that identity resulted from a dialogue of an individual's unique set of experiences with the "importation of the social process" from society as a whole (Mead, 1934, p. 186). Identity in this understanding results from a negotiation between social norms, social context and social structure, and is often referenced as being *performed or enacted* (e.g. Goffman, 1956). In the learning sciences, interactionist perspectives often interpret identity as learning to perform of a knowledgeable social role, like developing an identity as a scientist (e.g., Brown et al., 2005; Barab et al., 2007).

Timescales, method and identification

The differences between these two approaches to identity can be understood in terms of their methodological relationship to collecting and interpreting data at a given timescale. Interactionist paradigms focus on understanding identity at smaller timescales. Research in interactional sociolinguistics, for example, may use methods from discourse analysis or conversation analysis examine a few minutes of talk to understand how a person is enacting a particular ethnic, gender or role-based identity. Interactional perspective in the learning sciences may use microethnography to examine the development of a given role-based identity, say as a scientist or mathematician, over a period of months in a classroom. Conversely, identity research from a developmental perspective may use ethnographic methods to look at identity development of the course of a year or more. The different theories of identity are rooted in the distinct "analytic primacy" of their methodological approaches, and not conflicting phenomena (see Penuel & Wertsch, 1995).

Research on identity needs analytic methods that put data on identity enactment at shorter timescales into dialogue with data on identity formation at longer timescales. Going further, this paper will examine methodological approaches focused on understanding the relationship between timescales and processes of identification–such as connective ethnography (Leander & McKim, 2003), ethnographic discourse analysis (Gee & Green, 1998) and microethnography (Erickson & Schutz, 1982)–and discuss the theoretical perspectives connected to each.

Presentation 3 — Understanding Identity Development From Day-to-Day Experiences In Kitchen Science Investigators

Tamara Clegg

Extending from the previous presentation, this presentation also looks at identity across timescales, but with respect to science learning. It is different in that our goal is to promote science learning and identity

development. Also drawing from socio-cultural perspectives of identity (Wenger, 1998), we analyzed learners' day-to-day experiences using Gee's (2000) Discourse framework. In order to understand how learners' day-to-day experiences are becoming more stable aspects of their identity, we analyzed learners' scientific dispositions. We define disposition as values of, ideas about, and ways of participating in a particular discipline (in this case, scientific reasoning) that come frequently, consciously, and voluntarily (Gresalfi & Cobb, 2006; Katz, 1993). Simply put, scientific disposition is the initiative learners take to use scientific practices. We see disposition in the increased amount and complexity of learners' scientific practices and in their use of those practices in different contexts (Bereiter, 1995).

In this presentation, I look at learners' development of disposition in the context of Kitchen Science Investigators (KSI). KSI is an after-school or summer camp program we designed to help learners begin to have the types of day-to-day experiences that would promote their scientific identity development. We designed KSI to promote development of scientific disposition through using science to make and perfect recipes. In this after-school program, participants learn science content and design experiments to learn more about ingredients and how to use them to accomplish cooking and baking goals. In such a context, there are opportunities to learn much about chemistry, biology, physics, and arithmetic and to develop competence in a variety of scientific practices. In this presentation, I look at the case studies of two KSI participants in a 9-month implementation of KSI who began to develop scientific dispositions as a result of KSI experiences. We analyzed those cases to identify how that development progressed, and the components of the learning environment (and other experiences in their lives) that promoted that development.

We analyzed learners' scientific participation in KSI and their reports of scientific participation outside of the program, in other settings of their lives. Specifically, we found the disposition development process was initiated as learners used science to accomplish personally meaningful goals in the context of making and eating tasty dishes. As learners began to use science to accomplish their goals, they began to take on more scientific roles. As learners had more scientific experiences and as they continued to participate scientifically, their values shifted. While learners' experiences, participation, and values were different, each of these aspects of their participation became more scientific, leading to their development of more scientific dispositions, or stable aspects of themselves. In this presentation, I will describe these shifts in each case across the contexts of learners' lives (e.g., school, home, KSI). I will then present aspects of the learning environment that promoted that development.

Presentation 4 — Blurring the boundaries: Understanding disciplinary identities in science education research

Vanessa L. Peters & Nancy Butler Songer

In STEM education, improvements to teaching and learning depend on the collective efforts of scholars who bring disciplinary expertise to research collaborations. To date, research studies have provided limited understanding of how specific individuals – such as learning scientists and natural scientists – exchange and synthesize expertise towards project deliverables and outcomes. For STEM education research to be truly transformative, scholars must collaborate deeply and effectually not only within and across academic domains, but also with other learning organizations including schools, community programs and industry. In this presentation, I report on a study that examined the knowledge exchange and creation process of an interdisciplinary science education research team, and describe how disciplinary identities shaped the interactions and work practices of collaborators.

Interdisciplinarity: Are we there yet?

Promoting effective interdisciplinary collaboration has been a top priority for policy makers and federal agencies. In 2005, the US National Academy of Sciences (NAS) published a comprehensive report that summarized the current scope of interdisciplinary scholarship, with the goal of providing findings and recommendations to funding organizations and academic institutions for how such research could be facilitated. The findings of the report discussed at length the institutional-level challenges facing interdisciplinary collaboration, such as the disciplinary-specific rules that govern hiring, promotion and the allocation of resources. Yet the top challenge reported by researchers about interdisciplinary work involved the development of effective strategies for enhancing communication among project members in disciplinary disparate research teams. Guidelines for communication have yet to be developed, pending an analysis of the interactions and discourse strategies used during interdisciplinary exchanges. As Leshner (2011) observes, "The need for interdisciplinary approaches has increased tremendously… although we have been discussing it for 40 years, collectively we never seem to get it right. If we could come up with a series of distilled lessons learned, principles, and action steps that count be taken, then I think we could make tremendous progress" (AAAS, 2011).

Interdisciplinarity has been defined in many ways. Although the terms inter-, multi-, cross- and trans-disciplinary all refer to pluralistic disciplinary approaches, there are differences in how the disciplines are

combined. These differences are perhaps best described has having some placement on a continuum of disciplinary integration. At one end of the continuum is monodisciplinary, the traditional approach that employs the theories, methodologies and epistemologies of a single domain (Yang, 2011). Next are multi- and crossdisciplinary approaches that consider the dimensions of different disciplines in parallel, with little attempt to synthesize theories, methods or research findings (Klein, 2010). Interdisciplinary – the most broadly used term – is a problem-oriented approach that seeks to establish a common terminology and epistemological framework among the disciplines for academic inquiry (Knights & Willmott, 1997). At the far end of the continuum is transdisciplinary, an emerging approach that transcends disciplinary boundaries through the integration of knowledge and the fusion of methodologies, often with the aim of developing new theoretical paradigms (Hadorn, Pohl, & Bammer, 2010).

Characterizing interdisciplinarity

This research used a case study approach to examine how knowledge is exchanged and synthesized in a large interdisciplinary research team collaborating on curriculum development work for science education. Data were collected from team research meetings (including both in-person and videoconferencing), interviews and project documents. Project meetings are a fundamental component of research collaborations, and often the only forum in which all members participate simultaneously. Thus, their inclusion as a data source is necessary for an in-depth understanding of the complexities of interdisciplinary collaboration. In this presentation, I discuss the role of disciplinary identities in science education research—how the knowledge, methods and language associated with traditional academic domains shapes both our approach to research (i.e., our "practice") as well as the products and outcomes that educational research seeks to achieve. I will describe a model of communicative behavior that explains the process of disciplinary knowledge exchange in educational research, and provide recommendations for a research approach that promotes transdisciplinary perspectives over traditional domain-based approaches.

Participants (alphabetical order)

Tamara Clegg — Presenter 3

Tamara Clegg received her Ph.D. from Georgia Tech's School of Interactive Computing specializing in the Learning Sciences. She is currently a postdoctoral fellow at the University of Maryland with the Computing Innovations Fellows program. Her work currently focuses on developing technology to support life-relevant learning environments where children engage in science in the context of achieving goals relevant to their lives. She is using participatory design with children to design these new technologies and new uses of existing technologies. Her work currently includes creating new life-relevant learning environments to understand how identity development happens across these environments. From this analysis, she aims to draw out design guidelines for life-relevant learning activities and technology in various contexts (e.g., sports, gardening).

Ben DeVane — Presenter 2

Ben DeVane is assistant professor of Digital Arts & Sciences in the University of Florida Digital Worlds Institute. Trained at the University of Wisconsin Games, Learning & Society initiative, his dissertation research was a four-year ethnographic study of identity and learning in a game-based learning community for working-class youth. His design research has focused on developing and assessing learning games about topics like public health, environmental science and financial literacy. His scholarship been published in *E-Learning, Games & Culture*, the *International Journal of Learning and Media*, and *Theory into Practice*.

Susan R. Goldman — Discussant

Susan R. Goldman (PhD., University of Pittsburgh) is Distinguished Professor of Liberal Arts and Sciences, Psychology, and Education and Co-Director of the Learning Sciences Research Institute at the University of Illinois at Chicago. She conducts research on subject matter learning, instruction, assessment, and roles for technology, especially in literacy and mathematics. A particular focus of her current research is on understanding the literacy demands in different disciplinary contexts and the implications of these demands for supporting learning. She is Executive Editor for *Cognition & Instruction* and Associate Editor for *Journal of Educational Psychology*. Goldman is a board member and President of the International Society of the Learning Sciences (2011–2012).

Cindy E. Hmelo-Silver — Session Chair

Cindy E. Hmelo Silver is Professor of Educational Psychology at Rutgers University. She received an M.S. in Educational Technology from SUNY at Stony Brook and a Ph.D. in Cognitive Studies from Vanderbilt University and served postdoctoral fellowships at Georgia Institute of Technology and the University of Pittsburgh's Learning Research and Development Center. She is Editor-in-Chief of the *Journal of the Learning Sciences*.

Vanessa L. Peters — Presenter 4
Vanessa is a postdoctoral research fellow at the University of Michigan, where she is collaborating with an interdisciplinary research team to develop curricular units for teaching middle and high-school students about the ecological impacts of climate change. Her work on the project has focused on the development of SPECIES, an online learning environment with an embedded predictive distribution modeling tool that has been repurposed for younger audiences. Vanessa completed her Ph.D. at the University of Toronto, where she conducted a design-based study on knowledge community and inquiry practices in secondary science education. Her research interests include scripted collaboration, discourse processes in teaching and learning social computing.

Jochen "Jeff" Rick — Presenter 1
Jeff's research interests are in designing innovative applications for leading-edge technologies to support collaborative learning through active inquiry, exploration, and construction. As a design-based researcher, he has found it particularly useful to employ qualitative methods (e.g., ethnographic-style interviews, detailed video analysis) to understand the relation that an individual or a specific learning group has to a system. He received a Ph.D. in Computer Science (specialization of Learning Sciences and Technology) from Georgia Tech in 2007. From 2007 to 2010, he worked as a research fellow on the ShareIT project, investigating how new shareable interfaces (e.g., interactive tabletops) can support co-located collaboration. Since then, he has been on the faculty of the Department of Educational Technology, Saarland University. His latest research focuses on two students working with one iPad; he is particularly interested in how children combine physical gestures and verbal communication to collaborate.

References

American Association for the Advancement of Science. (2011, April). *Experts at U.S. symposium urge efforts to encourage and support interdisciplinary research – News archive*. Retrieved August 6, 2011 from http://www.aaas.org/news/releases/2011/0418science_on_fire.shtml.

Barab, S., Dodge, T., Thomas, M., Jackson, C., & Tuzun, H. (2007). Our designs and the social agendas they carry. *Journal of the Learning Sciences*, *16*(2), 263–305.

Barron, B. (2003). When smart groups fail. *Journal of the Learning Sciences*, 12(3), 207–359.

Bereiter, C. (1995). A dispositional view of transfer. In A. McKeough, J. Lupart & A. Marini (Eds.), *Teaching for transfer: Fostering generalization in learning* (pp. 21-34). Mahwah, NJ: Lawrence Erlbaum Associates.

Bers, M. U. (2001). Identity construction environments: Developing personal and moral values through the design of a virtual city. *Journal of the Learning Sciences*, 10(4), 365–415.

Bers, M. U. (2006). The role of new technologies to foster positive youth development. *Applied Developmental Science*, 10(4), 200–219.

Bransford, J. D., & Schwartz, D. L. (1999). Rethinking transfer: A simple proposal with multiple implications. *Review of Research in Education*, 24, 61–100.

Brown, B. A., Reveles, J. M., & Kelly, G. J. (2005). Scientific literacy and discursive identity: A theoretical framework for understanding science learning. *Science Education*, *89*(5), 779–802.

Bryant, S. L., Forte, A., & Bruckman, A. (2005). Becoming wikipedian: Transformation of participating in a collaborative online encyclopedia. In *Proceedings of GROUP '05*, pp. 1–10. New York: ACM Press.

Csikszentmihalyi, M., & Rochberg-Halton, E. (1981). *The meaning of things: Domestic symbols and the self*. Cambridge, UK: Cambridge University Press.

Erickson, F., & Schultz, J. (1981). When is a context? Some issues and methods in the analysis of social competence. In J. Green & C. Wallat (Eds.), *Ethnography and language in educational settings* (pp. 147–159). Norwood, NJ: Ablex.

Erikson, E. (1956). The problem of ego identity. *Journal of the American Psychoanalytic Association*, *4*(1), 56.

Erikson, E. H. (1963). *Childhood and society* (second ed.). New York: W. W. Norton & Company.

Forte, A., & Bruckman, A. (2006). From Wikipedia to the classroom: Exploring online publication and learning. In *Proceedings of ICLS 2006*, pp. 182–188. ISLS.

Gee, J. P. (2000). Identity as an analytic lens for research in education. *Review of Research in Education*, 25, 99–125.

Gee, J., & Green, J. (1998). Discourse analysis, learning, and social practice: A methodological study. *Review of research in education*, *23*(1), 119–63.

Goffman, E. (1959). *The presentation of self in everyday life*. New York: Anchor Books.

Gresalfi, M. S., & Cobb, P. (2006). Cultivating students' discipline-specific dispositions as a critical goal for pedagogy and equity. *Pedagogies: An International Journal*, 1(1), 49–57.

Hadorn, G. H., Pohl, C., & Bammer, G. (2010). Solving problems through transdisciplinary research. In R. Frodeman, J. T. Klein, C. Mitcham, & J. B. Holbrook (Eds.), *The Oxford handbook on interdisciplinarity* (431–452). Oxford, UK: Oxford University Press.

Halverson, E. (2005). InsideOut: Facilitating gay youth identity development through a performance-based youth organization. *Identity*, *5*(1), 67–90.

Katz, L. (1993). Dispositions as educational goals. *ERIC Clearinghouse on Elementary and Early Childhood Education: ERIC Digest.*

Kirshner, B. (2008). Guided participation in three youth activism organizations: Facilitation, apprenticeship, and joint work. *Journal of the Learning Sciences*, *17*(1), 60–101.

Klein, J. T. (2010). A taxonomy of interdisciplinarity. In R. Frodeman, J. T. Klein, C. Mitcham, & J. B. Holbrook (Eds.), *The Oxford handbook on interdisciplinarity* (pp. 15–30). Oxford, UK: Oxford University Press.

Knights D., & Willmott, H. (1997). The hype and hope of interdisciplinary management studies. *British Journal of Management*, 8(1), 9–22.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, UK: Cambridge University Press.

Leander, K., & McKim, K. (2003). Tracing the everyday 'sitings' of adolescents on the Internet: A strategic adaptation of ethnography across online and offline spaces. *Education, Communication & Information*, *3*(2), 211–240.

Lemke, J. L. (2000). Across the scales of time: Artifacts, activities, and meanings in ecosocial systems. *Mind, Culture & Activity*, 7(4), 273–290.

McLuhan, H. M. (1964). *Understanding media: The extensions of man*. Cambridge, MA: MIT Press.

Meyrowitz, J. (1985). *No sense of place: The impact of electronic media on social behavior*. New York: Oxford University Press.

Nasir, N. S. (2005). Individual cognitive structuring and the sociocultural context: Strategy shifts in the game of dominoes. *Journal of the Learning Sciences*, 14(1), 5–34.

Nasir, N. S., & Cooks, J. (1999). Becoming a hurdler: How learning settings afford identities. *Anthropology & Education Quarterly*, 40(1), 41–61.

Nasir, N. S., & Hand, V. (2008). From the court to the classroom: Opportunities for engagement, learning, and identity in basketball and classroom mathematics. *Journal of the Learning Sciences*, *17*(2), 143–179.

National Academy of Sciences (2005). *Facilitating interdisciplinary research.* Washington, DC: National Academies Press.

Nippert-Eng, C. E. (1996). *Home and work*. Chicago: The University of Chicago Press.

Papert, S. (1980). *Mindstorms: Children, computers, and powerful ideas* (second ed.). New York: Basic Books.

Penuel, W., & Wertsch, J. (1995). Vygotsky and identity formation: A sociocultural approach. *Educational Psychologist*, *30*(2), 83–92.

Rick, J. (2007). *Personal home pages in academia: The medium, its adopters, and their practices*. Unpublished doctoral dissertation, Georgia Institute of Technology, Atlanta, GA.

Sfard, A., & Prusak, A. (2005). Telling identities: In search of an analytic tool for investigating learning as a culturally shaped activity. *Educational Researcher*, *34*(4), 14–22.

Turkle, S. (1984). *The second self: Computers and the human spirit.* New York: Simon & Schuster.

Turkle, S. (1995). *Life on the screen: Identity in the age of the Internet*. New York: Simon & Schuster.

Van Gelder, L. (1985, October). The strange case of the electronic lover: A real-life story of deception, seduction, and technology. *Ms. Magazine*, XIV(4), 94–124.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, UK: Cambridge University Press.

Yang, A. S., (2011). Interdisciplinary and critical inquiry: Visualizing at the Art/Bioscience interface. *Interdisciplinary Science Reviews*, 36(1), 43–55.

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