Publication Review

Recent books and articles related to constructivist approaches

> Upshot • This section lists publications related to constructivist approaches – constructivism, second-order cybernetics, enaction, non-dualism, biology of cognition, etc. – that recently have been published elsewhere, and which the reader of the journal might find interesting. The entries are ordered alphabetically and clustered according to their respective primary disciplinary backgrounds or application. The increasingly extending bibliography can be consulted at http://www.constructivistfoundations.info/bib/

Artificial intelligence

> Stalph P. & Butz M. V. (2011) Learning local linear Jacobians for flexible and adaptive robot arm control. Genetic Programming and Evolvable Machines (Online First): 1–21.

>> This paper details an algorithm that develops a representation of its arm (forward and inverse kinematics) for behavioral control. It essentially constructs the sensorimotor reality of its own body (an arm) and can exploit this knowledge to interact with its environment in a way that is goal-directed and with high dexterity.
http://cm.inf.uni-tuebingen.de/publications/chair-publications.html

Cognitive science

> Butz M. V., Shirinov E. & Reif K. (2011) Self-organizing sensorimotor maps plus internal motivations yield animal-like behavior. Adaptive Behavior 18: 315–337.

>> This article investigates how a motivational module can drive an animat to learn a sensorimotor cognitive map and use it to generate flexible goal-directed behavior. Inspired by the rat's hippocampus and neighboring areas, the time growing neural gas (TGNG) algorithm is used, which iteratively builds such a map by means of temporal Hebbian learning. The algorithm is combined with a motivation module, which activates goals, priorities, and consequent activity gradients in the developing cognitive map for the self-motivated control of behavior. The resulting motivated TGNG thus combines a neural cognitive map learning process with top-down, self-motivated, anticipatory behavior control mechanisms. While the algorithms involved are kept rather simple, motivated TGNG displays several emergent behavioral patterns, self-sustainment, and reliable latent learning. We conclude that motivated TGNG constitutes a solid basis for future studies on self-motivated cognitive map learning, on the design of further enhanced systems with additional cognitive modules, and on the realization of highly adaptive, interactive, goal-directed, cognitive systems. The system essentially constructs a spatial reality. At the same time it learns to interact with this reality, driven by its internal motivations (Hullian drives).
http://cm.inf.uni-tuebingen.de/publications/chair-publications.html

> Combs A. (2011) Consciousness explained better: Towards an integral understanding of the multifaceted nature of consciousness. Paragon House, St Paul MN.

>> An integral theory of consciousness with a strong emphasis on developmental stages of the Piagetian variety. The book also considers the history of art in a developmental framework.

> Froese T. (2011) Breathing new life into cognitive science. Avant. The Journal of the Philosophical-Interdisciplinary Vanguard 2/2011: 113–129.

>> In this article I take an unusual starting point from which to argue for a unified cognitive science, namely a position defined by what is sometimes called the "life-mind continuity thesis." Accordingly, rather than taking a widely accepted starting point for granted and using it in order to propose answers to some well-defined questions, I must first establish that the idea of life-mind continuity can amount to a proper starting point at all. To begin with, I therefore assess the conceptual tools that are available to construct a theory of mind on this basis. By drawing on insights from a variety of disciplines, especially from a combination of existential phenomenology and organism-centered biology, I argue that mind can indeed be conceived as rooted in life, but only if we accept at the same time that social interaction plays a constitutive role in our cognitive capacities.
http://avant.edu.pl/wp-content/uploads/breathing-new-life-into-cognitive-science.pdf

> Kolchinsky A. & Rocha L. M. (2011) Prediction and modularity in dynamical systems. In: Advances in artificial life. Proceedings of the Eleventh European conference on the synthesis and simulation of living systems (ECAL 2011).MIT Press, Cambridge MA: 423–430.

>> This paper aims at understanding modular organization in multivariate dynamical data. In contrast to information-theoretic approaches, the authors start from the complementary point of view of statistical modeling and prediction of dynamical systems. They arrive at the conclusion that modularity is not necessarily an objective property of a system's organization but rather is inferred by cognitive systems as it can simplify learning and lead to gains in predictive power. This conclusion may prove useful for constructivist approaches as the paper establishes in formal ways that learning agents may perceive modularity and correlations among variables in their environments, even when such variables are actually dependent on others.
http://informatics.indiana.edu/rocha/ecal11.html

> Moshman D. (2011) Adolescent rationality and development: Cognition, morality, and identity. Third Edition. Psychology Press, New York.

>> This book provides a constructivist account of the development of reasoning, rationality, morality, and identity in adolescence and early adulthood. The final section includes a chapter entitled "Pluralist rational constructivism" that looks directly at constructivism as a metatheory of development. It builds on earlier discussion to develop a version of constructivism that is rooted in the rational constructivism of Jean Piaget but more pluralist than traditional stage theory.

> Rambusch J. (2011) Mind games extended. Understanding gameplay as situated activity. Linköping Studies in Science and Technology Dissertation No. 1359, Sweden.

>> This thesis addresses computer gameplay activities in terms of the physical handling of a game, players' meaning-making activities, and how these two processes are closely interrelated. It examines in greater detail what role the body plays in gameplay as well as how gameplay is shaped by sociocultural factors outside the game, including different kind of tools and players' participation in community practices. An important step towards an understanding of these key factors and their interaction is the consideration of gameplay as situated activity where players who actively engage with games are situated in both the physical world and the virtual in-game world. To analyze exactly how players interact with both worlds, two case studies on two different games have been carried out. Three different levels of situatedness are identified and discussed in detail in this thesis on the basis of existing theories within situated cognition research.

http://liu.diva-portal.org/smash/get/diva2:375941/FULLTEXT01

> Scheider S. & Kuhn W. (2011) Finite relativist geometry grounded in perceptual operations. In: Egenhofer M., Giudice N., Moratz R. & Worboys M.(eds.) Spatial information theory (COSIT'11). Springer-Verlag, Berlin: 304–327.

>> We propose a constructivist account of experiential geometry. Constructive geometry can be used to expose the experiential roots of relevant metric qualities, such as depths, lengths, and volumes, as well as location concepts. The challenge lies in the choice of concepts to consider as primitive vs. those to be constructed. It also lies in accounting for the relativity and finiteness of experiential space from the perspective of an observer. Following von Glasersfeld, geometrical concepts are constructed based on the human apparatus for guiding attention and by performing geometric comparisons relative to a reference frame of perceived point-like features.

http://www.geographicknowledge.de/pdf/experiential-geometry.pdf

> Sloman A. (2011) Comments on "The Emulating Interview... with Rick Grush". Avant. The Journal of the Philosophical-Interdisciplinary Vanguard 2/2011: 35–44.

>> The conception of emulation is crucial for one for most important ideas about constructing self, body, and reality. The author comments on Rick Grush's statements about emulation and the embodied approach to representation. Many theorists of embodied cognition ignore the variety of types of functions for which physical action can be used and the variety of types of reflective cognition that can precede, accompany or succeed physical action. The author proposes his modification of Grush's definition of emulation, criticizing the notion of "standing in for." He defends the notion of representation. He thinks that radical embodied theories may be a good approximation to many sorts of insect cognition and microbe cognition, but not to all cognition. In his opinion, interactions with models when reasoning, or planning, are very different from interactions with the things they are models of. Whether representation and cognition occur fully internally or make use of external representations to reason with, what is going on is different from what goes on when an animal (or robot) merely acts on the environment or when a computer game engine simulates some portion of a physical world to produce consequences of a simulated action.

http://avant.edu.pl/wp-content/uploads/Avant_2_2011_online.pdf

Communication science

> Cobley P. (2011) Observership: The view from semiotics. In: Thellefsen T., Sorensen B. & Cobley P. (eds.) From first to third via cybersemiotics: A festschrift in honor of Professor Søren Brier on the Occasion of his 60th Birthday. Scandinavian Book, Frederiksberg: 423–447.

>> Although semiotics has not consistently and explicitly developed a theory of observership, constructivism has, particularly in its radical form (see, for example, Watzlawick 2008, Poerksen 2004). However, it envisages a theory of the observer that amounts to a form of nominalism. This paper takes its cue from Sebeok's (1986, 1991) comments on John Archibald Wheeler's conception of the "participatory universe" and tries to explicate the relevance of Wheeler's (1994, 1998) philosophy of science for semiotics. The paper contributes to recent key debates in the field on "knowing" sciences (Kull 2009) and on relation (Deely 2010).

Cybernetics

> Scott B. (2011) Explorations in second-order cybernetics. Reflections on cybernetics, psychology and education. Edition echoraum, Vienna.

>> Having a collection of my papers published is a most welcome way of summing up my career to date and of providing me with the impetus and motivation to carry on being academically productive. I should say "careers" as my working life has spanned three main phases: full-time researcher, working with Gordon Pask (1968–1978), schoolteacher and educational psychologist (1979–1990), and educational technologist working in higher education (1990–2010). The one common thread that runs through all the chapters in this volume is my love of cybernetics. My first encounters with that discipline transformed my way of thinking and, bit by bit, cybernetics also transformed my way of being in the world.

> Espejo R. & Kuropatwa D. (2011) Appreciating the complexity of organizational processes. Kybernetes 40(3/4): 454–476.

>> This paper discusses the evolution of a company in Argentina with the support of Stafford Beer's Viable System Model and the Viplan Method. This company had had a cybernetic intervention in the 1980s and in 2002 went out of business. The authors' purpose was to revisit the company through the lens of current organizational cybernetics to find new insights from its history. It was found that a representational, functionalist application of the VSM yielded limited insights into viability. However, the assessment of the relationships among actors within the organization and between these actors and environmental agents offered much more valuable results. The particular relationships of interest were those constructing or failing to construct effective recursive autonomy within the company.

> Espejo R. & Reyes A. (2011) Organizational systems: Managing complexity with the viable system model. Springer Verlag, Heidelberg.

>> This book clarifies the application of cybernetic ideas to organizational diagnosis and design. It uses Stafford Beer's Viable System Model and Maturana and Varela's autopoietic epistemology. Readers learn to appreciate the relevance of seeing the systemic coherence of the world as constructed by people's interactions. Organizational systems emerge from the closure of these interactions and as such are autonomous, structurally determined, and have their own cognitive capabilities. The book offers methodological support and also methods to make use of these ideas.

> Müller K. H. (2011) The new science of cybernetics. The evolution of living research designs. Volume II: Theory. Edition echoraum, Vienna.

>> "Cybernetics comes in two flavors: a more engineering flavor (first-order cybernetics) and the lesser-known, though in many ways older, second-order cybernetics, relating more to the humanities, design, and social sciences. This second-order cybernetics has been under-theorized in universities and other research environments. Karl H. Müller's new book, his second volume on the New Science of Cybernetics, provides outstanding, general, innovative coverage that should enable scholars to bridge the gap between the work of second-order cyberneticians and others who work with similar approaches, and these institutions. It is an important book that can lead to significant insights, methods and actions." (Ranulph Glanville)

> Parini P. (2009) L'attualità di Silvio Ceccato. D'ARS Magazine of contemporary art and cultures No.197.

>> When Silvio Ceccato began to collaborate with D'ARS in 1963, in his first article, "Cybernetics and Art" (No. 2 March-May), he concluded that perhaps a new chapter of pedagogy in the field of art had opened. Although he was aware of the innovative strength of his ideas, he could certainly not predict the promising results that would have been achieved later with the experimentation in teaching and in particular in the context of aesthetic enjoyment. Even though schools were able to profit from his advanced ideas, the most important indication coming from his research certainly concerns its contribution to robotics. The model of mental operations that he designed from the sixties at the Center of Cybernetics and Linguistic Activities of the University of Milan can still help tackle the problem of artificial intelligence, which is, of course, controversial, but of compelling actuality.

> Pask G. (2011) The cybernetics of self-organisation, learning, and evolution. Papers 1960–1972. Selected and introduced by Bernard Scott. Edition echoraum, Vienna.

>> Due to his strong preferences for formal languages, for machine environments, for cognition and learning processes, and for epistemological issues, Gordon Pask probably came closest to the BCL work of Heinz von Foerster, which concentrated mostly on these domains as well. Pask produced a stream of radical breakthroughs that he accomplished from his early publications onwards. Most of these breakthroughs can be considered as genuinely new, even for todays's intellectual environments. Many of his ideas are still waiting to be adapted and accommodated to the current technological and cognitive landscapes. For the first time, this book grants broad access to a research program within the radical constructivist tradition that has so far not found the attention that it already richly deserved in recent decades.

Education science

> Bettoni M. (2011) Success factors for community learning: A constructivist perspective. In: Barolomé A. et al. (eds.) Self-regulated learning in technology enhanced learning environments: Problems and promises. Shaker Verlag, Aachen: 105–112.

>> Community learning in TELEs (Technology Enhanced Learning Environments) is supported by several kinds of online community interactions, for example in forums and wikis. I suggest that a radical constructivist theory of knowledge could shed new light on these written interactions and provide some relevant benefits to social SRL (Self-Regulated Learning) in a CSCL (Computer Supported Cooperative Learning) environment. After a short introduction to my radical constructivist perspective, I present practical recommendations for written community interactions interpreted in the light of that perspective. I conclude by linking them to demands that CSCL imposes onto SRL.
http://www.weknow.ch/marco/A2011/STELLAR/Bettoni_2011_Community_Learning_Constructivist.pdf

> Rizzo A. (2010) Vertigini coevolutive. L'educazione nel processo di coesistenza. In: Colazzo S. (ed.) Sapere pedagogico. Armando, Roma: 116–127.

>> The paper is based on an unpublished statement of Humberto R. Maturana concerning the sense of education in a process of co-existence between living systems, that is, "education is flowing in a process of coexistence." Through an inductive and hermeneutic methodology, this work aims to highlight some possible pedagogical perspectives and implications by delving into the implicit theoretical premises of that statement.

> Scaife J. A. & Wellington J. J. (2011) Varying perspectives and practices in formative and diagnostic assessment: A case study. Journal of Education for Teaching 36(2): 137–151.

>> A constructivist perspective on education emphasizes the value of diagnostic and formative assessment, informing teachers and learners about where learners are starting from. In comparison with the

school sector, these forms of assessment have received relatively little attention in higher education. This article reports on an in-depth study of assessment across one university, exploring views and practices in each of the five faculties. Our data indicate that: there is very little common understanding of the terms often used to describe forms of assessment in policy documents and other literature; students, contrary to popular belief, do value assessment that carries no marks, although a form of "deferred instrumentalism" may be at work here; staff are sometimes engaging in formative and diagnostic assessment without explicitly recognizing it; and students in this case study do value assessment that relates to and will be valuable for life after University. The article concludes by suggesting frameworks and terminology for future discussion and issues for staff development.

Knowledge management

> Bettoni M. (2009) Weak ties cooperation with Web 2.0. KappaeMme 1–09: 26–31.

>> In this paper we introduce the concept of Knowledge Cooperation, a participative approach to Knowledge Management based on a constructivist knowledge model. We then present its implementation in the weak ties knowledge network CoRe, a distributed Community of Practice of researchers ("Community of Research") supported by an online platform that implements a Web 2.0 approach based on MOODLE.
http://www.weknow.ch/marco/A2009/KappaM/Bettoni_2009_Weak_Ties_Cooperation_with_Web_2.pdf

> Bettoni M. (2010) Negotiations of meaning with MOODLE: Concept, implementation & experiences. In: Ertl B. (ed.) E-collaborative knowledge construction: Learning from computer-supported and virtual environments. IGI Global, Hershey PA: 40–53.

>> This chapter presents a design for an e-collaboration environment and its implementation with MOODLE within the context of a research knowledge network at a university. The first part introduces our constructivist knowledge model and then presents what we call a "design for meaning," explaining its theoretical foundation and developing its conceptual features. In the second part we show how we have implemented this concept with MOODLE to support a community-based knowledge network of researchers at our university and we reflect on the experiences that we have collected during this 3-year pilot project.
http://www.weknow.ch/marco/A2010/ECKC/Bettoni_2010_Negotiations_of_Meaning_with_Moodle.pdf

> Bond P. L. (2009) Toward a living systems framework for unifying technology and knowledge management, organizational, cultural and economic change. In: Harorimana D. (ed.) Cultural implications of knowledge sharing, management and transfer: Identifying competitive advantage. IGI Global, Hershey PA: 108–132.

>> New forms of explanation for organization and culture are developed from a foundation of Maturana and Varela's biology of cognition to produce a synthesis of knowledge management and new philosophical, sociological, anthropological, and, distinctively, biological perspectives on technology. This effectively reconciles the practices of technology, knowledge, and cultural change management. The biology of cognition is proposed as an appropriate foundation for a new scientific paradigm able to reconcile the social and natural sciences.
http://liverpool.academia.edu/PeterBond/Papers

Linguistics

> Pinardi D. (2010) Narrare – Dall'Odissea al mondo Ikea. Una riflessione teorica. Un manuale operativo. Paginauno editore, Milan.

>> Constructivism is based on the assumption that all knowledge exists only in the head of people as a construction based on personal experience. But how does mankind socialize this individual experience and make it collective? One way is narrating. From classic mythologies to Stendhal's novels, these are all narrations, as we all know. But sociological analyses and journalistic chronicles are narrations too, as are historiographic reconstructions and the promises of politics, the dreams of film, and the paradises of marketing. Not to mention the closing arguments of court cases, television formats, and even scientific theories. This book looks for the deepest roots of narrative techniques both in narrations "of invention" and in narrations "of reality."

Media science

> Graf H. (2011) Interviewing media workers. MedieKultur. Journal of media and communication research 49: 94–107.

>> The focus of this article is on the use of Niklas Luhmann's systems theoretical approach in order to analyze interviews conducted with media workers concerning their experiences of ethnic diversity in newsrooms. Applying systems theory means constructing the interview as a social system and seeing the "data" as observations produced by the observer and not as representations of a reality. The first part of the article describes the interview methodology and the second part provides examples, from the current study, of how systems theory can be applied in order to analyze interviews. Using a difference-theoretical approach means looking at the distinctions the informants make when talking about their experiences.
http://ojs.statsbiblioteket.dk/index.php/mediekultur/article/view/2401/3377

Philosophy

> Foerster H. von, Müller A. & Müller K. H. (2011) Radikaler Konstruktivismus aus Wien. Eine kurze Geschichte vom Entstehen und vom Ende eines Wiener Denkstils. Bibliothek der Provinz, Weitra.

>> This book pursues two different agendas. On the one hand this volume presents two important contributions by Heinz von Foerster, which are both related strongly to Vienna. The first contribution is a reprint of Foerster's early book on memory (Das Gedächtnis), published in 1948. The second contribution is a reflection by Heinz von Foerster on the Vienna Circle as a parable for a specific style of thought. The second agenda for this book lies in a historic and

systematic account of a Viennese intellectual tradition or, to use Ludwik Fleck's term, a Viennese thought collective with a specific style of thought. This thought collective comprises, inter alia, Ernst Mach and Otto Neurath as their most prominent exponents. In this book the argument has been made that Heinz von Foerster became socialized into this specific style of thought, which manifests itself clearly in his first big publication, namely in his book on memory. Moreover, it can be shown that the roots of important components of radical constructivism already existed within this specific Viennese thought collective.

> Janew C. (2011) Dynamic existence. Journal of Consciousness Exploration & Research 2(6): 887–888.

>> Interconnection is established by the alternation of the focus of consciousness. Therefore, in a world in which everything is interconnected, all focuses must reciprocally transition into each other. "Reality" is a common "goal," a focus that all participants can switch into and that is conscious to them as such as a potential one. Its "degree of reality" is the probability of its fully becoming conscious (or more simply: its current degree of consciousness).
http://jcer.com/index.php/jcj/article/download/160/170

> Janew C. (2011) Laws of Form: Why Spencer Brown is missing the point. Journal of Consciousness Exploration & Research 2(6): 885–886.

>> What Spencer Brown wants to rationalize out of existence is alternation itself – the prerequisite of his whole operation! In doing so he simplifies (identifies) more than he says. Furthermore, he does not say all that is important.
http://jcer.com/index.php/jcj/article/download/161/171

> Mitterer J. (2011) Das Jenseits der Philosophie. Wider das dualistische Erkenntnisprinzip [The beyond of philosophy. Against the dualistic principle of knowledge]. With a new preface for this edition. Velbrück Wissenschaft, Weilerswist.

>> "Philosophy does not begin with problems. It begins with unproblematized presuppositions. These presuppositions are dichotomic distinctions: in epistemology and philosophy of language, for example, the dichotomies are between language and world, description and object, being and consciousness, subject and object." – This book tries to explicate these presuppostions and their consequences within the framework of a nondualistic argumentation that neither presupposes nor creates a *beyond* as a means of regulating discourse.

> Mitterer J. (2011) Die Flucht aus der Beliebigkeit [The flight from contingency]. With a new afterword for this edition. Velbrück Wissenschaft, Weilerswist.

>> "The critical part of this book is a construction of the dualistic technique of argumentation and its presuppositions. One aim is achieved when the dualist understands my construction as a *re*construction, when the dualist accepts my presentation of the dualistic discourse as a *re*presentation of his discourse. Insofar as this aim is achieved, the dualistic argumentation will no longer be persuasive: it will be transparent and no longer transcendent." – The main thesis of *The Flight from Contingency* defies the self-understanding of philosophy as a truth-oriented enterprise: philosophy is an argumentation technique that allows the immunizaton of any arbitrary opinions held as true, correct or adequate and that allows the criticism of any counter-opinion as false or mistaken.

> Müller A. & Müller K. H. (eds.) (2011) Re-discovering and re-inventing Heinz von Foerster. Special Issue of Cybernetics and Human Knowing 18(3–4).

>> The first part presents Heinz von Foerster directly, with four largely inaccessible or unpublished texts, mostly from the 1960s. The second part offers thirteen reinventions of Heinz von Foerster by friends and colleagues, including Ranulph Glanville, Humberto R. Maturana, Siegfried J. Schmidt, Bernard Scott, and several significant others. Together, both parts underline the high relevance of Heinz von Foerster's work to contemporary contexts and its wide scope, which was genuinely transdisciplinary at a time when the term "transdisciplinarity" was almost unknown.

Social science

> Restivo S. (2011) Red, Black, and Objective: Science, sociology, and anarchism. Ashgate Publishers, Surrey UK.

>> Drawing on the empirical findings generated by researchers in science studies, and adopting Kropotkin's concept of anarchism as one of the social sciences, Red, Black, and Objective expounds and develops an anarchist account of science as a social construction and social institution. Restivo's account is at once normative, analytical, organizational, and policy oriented, in particular with respect to education. With attention to the social practices and discourse of science, this book engages with the works of Feyerabend and Nietzsche, as well as philosophers and historians of objectivity to ground an anarchistic sociology of science. Marx and Durkheim figure prominently in this account as precursors of the contemporary science studies perspective on the perennial question, "What is science?" This book continues Restivo's long-term project of applying social constructionism (understood as the fundamental theorem of sociology) in the context of an emancipatory agenda.

> Bond P. L. (2011) A complex systems theory and model of distributed team development. In: Millhauser K. L. (ed.) Distributed team collaboration in organizations. Emerging tools and practices. IGI Global, Hershey PA: 126–149.

>> This is a major departure from traditional approaches to team and social group dynamics and is based firmly in Maturana and Varela's explanation of language, (languaging and conversing). The obvious audience is academics and practitioners involved in team working and team work theory. However, for proponents of Maturana and Varela, the paper shows how the biology of cognition can be a foundation of a multidisciplinary theory of social group dynamics. Somewhat controversially, I suspect, I believe I have found a point of agreement between the "complexity scientist," Stuart Kauffman, and Maturana and Varela. The result is a concept of supracritical conversational networks that are nonlinear dynamical systems and hence the source of "complexity" in social systems.
http://liverpool.academia.edu/PeterBond/Papers

> Canaparo C. (2009) Geo-epistemology. Latin America and the location of knowledge. Peter Lang, Bern.

>> This is the first full length monograph dedicated to the question of epistemology from a peripheral perspective. It explores all the consequences of science as defined by mainstream theories and the impact it has in peripheral areas of the planet in terms of knowledge, learning, and understanding. The book assumes, among other aspects, (i) that space and not time is the relevant realm to discuss in terms of knowledge, (ii) that any knowledge is a local construction, (iii) that all concepts have a meaning issue as well as questions of historiography, and (iv) that there are no pre-conceptions in terms of knowledge but all theories are part of a negotiation with the immediate environment. The book also develops and tries to take forward Maturana's notion of "deriva" and "lenguajeando."

> Mesquita M., Restivo S. & D'Ambrosio U. (2011) Asphalt children and city streets: A life, a city, and a case study of history, culture, and ethnomathematics in Sao Paulo. Sense Publishers, Rotterdam.

>> This work explores the urban experiences of street children in Sao Paulo, Brazil through the mathematical epistemic regimes at the core of their survival strategies. We also draw attention to the situation of street children across time, space, culture, and history. Our goal is to recognize, understand, and validate forms of mathematics constructed and used outside of the established institutions of mathematical production. We base our analysis on "the mathematical imagination," which draws together social constructionism, and ethnomathematics. Theoretically, we draw heavily on the Durkheimian tradition in sociology and anthropology. We focus on a form of practice that links the formal and the informal in order to realize the full power of mathematical knowledge as a social thing (in Durkheim's sense), a product of the collective consciousness that expresses collective realities, and a category of knowledge present in every culture. Our work contributes to an emerging political manifesto of the marginal that demonstrates the social realities and social power of their mathematics.

> Murray J., Rash J.-L., Creaton R., Cooley P. & McClelland D. (2009) Views from the inside. Common Ground, Urbana-Champaign IL.

>> This book describes a two-year project to build leadership capacity in residents of government housing estates. The project was based on the belief that learning is constructed by the learner out of his/her own history of interactions over a life time and from whatever there is in the environment that fits with the learner's current state and is therefore recognized by him/her in some way. Thus any changes brought about in the learner as s/he interacts in the learning environments provided by the project leader are in fact learning. Such an approach means that there can be no "voice of authority" telling the learning what to learn and no expectation that the learner will learn whatever it is that the project leader has intended.