ABSTRACT

KRISTINA JANE BENDER. A Recursive Processing Sketchbook: Programming Play with Language and Numeracy. (Under the direction of Professor Thomas Lisk.)

When we blend domains of knowledge not normally considered together, opportunities unfold for higher-order cognitive development. At the core of my project is this multidisciplinary play. Throughout my study, I marshal an array of interests into Processing, an open-source programming language that accommodates experiments with dynamic connections between texts and algorithms. Since the programs animate the spirit of the search rather than declare something found, this engagement with language and numeracy through code generates meaning in the tensions between self-reflexivity and interactivity, between constraint and opportunity.

Two processes that integrate language and numeracy guide my project. The first is invention: making by self-reflexive, multimodal means, such as with Oulipian constraint and experimental poetic methods. My process of ideation, design, and coding emphasizes invention with language—an ethic of building and crafting—rather than codified theoretical approaches to canonical texts. These programs demonstrate literate, numerate, and rhetorical dimensions: some programs work as constraint-based writing environments, others display text according to algorithmic methods, and other hybrid tools function as dynamic interfaces mediating the production and consumption of texts.

The second process is education: a “radical equation” of social and economic empowerment through community-driven, experiential learning and teaching, as pioneered by the civil rights activist, numeracy advocate, and mathematician Dr. Robert Moses. Aligned with Moses’s radical pedagogy, my project traces how I take ownership of my learning approaches, compelling me to wonder how I may share this multidisciplinary engagement beyond the present context. As Moses’s cultivation of the Algebra Project shows, such grassroots movements demand the communal construction of knowledge to empower a diverse range of learners and develop authentic equality in society and education.

By embracing programmable moments of connection between language and numeracy, I cultivate a fresh work ethic and an expansive perspective on pedagogy as play. Addressing the two operations—invention and education—that most intimately influence my project, I focus my efforts on designing programs and writing code, but further research should address how numeracy, social justice, and equity in education relate to experiential, code-centered multidisciplinary work.

As a collection, the programs do more than simply combine disciplines through play: they stage live experiences of this dynamic hybridity, developing capabilities and challenging the mind. Such intensive intellectual enterprises require multiple literacies. From surprising, defamiliarizing multidisciplinary situations, creative thinking and self-awareness emerge. Programming play involves recursive invention and experiential education, fostering individual empowerment and creating possibilities for cultural change.