Lady Bugs

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ABSTRACT

Lady Bugs is an audio-visual installation that invites multiple users to experience and contemplate how technological errors and uncertainty, often viewed as 'bugs' to be eliminated, may foster creativity in computing inquiry. This work involves a custom-designed nonlinear audio-visual system, allowing the users to discover error-engaged and unanticipated sonic and graphical aesthetic collaboratively. This paper explains the background and details of this installation and discusses the value and risks of featuring such an error-engaged way of learning and making in HCI and CSCW.

CCS CONCEPTS

• **Human-centered computing**; • **Computing**;

KEYWORDS

Creativity, Error-engaged Inquiry, Andy Warhol

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1 INTRODUCTION

The work 'Lady Bugs' (Figure 1) is the fourth version of the author's project, Breaking AndyWall [14], which explores how factors often considered negative, such as errors, mistakes, or uncertainty, may actually support creative, playful, and inspiring ways of inquiry and design in the fields of computing and the broader STEM fields. This interface is set up on a dining table and features a large vertical monitor, customized audio-visual synthesizers, and three different user interfaces (a cranking handle, piano, and microphone). These not only individually produce certain synth sounds but also interfere with and modulate the sound qualities of the other interfaces, such as pitch modulation, harmonics, and effects. Through this computer-supported cooperative interface, users can explore not-fully-determinate but unique sounds collaboratively.

In addition, this system analyzes the volume and frequency of this sound and translates it into diverse audio-visual responses. These include randomly selected radio signals, the brightness of bulbs and disco balls, as well as the intensity of glitches in images of ladies on the screen. These images are digitally painted in the style of Warhol's pop art, with doodlings from Solanas' text in her manifesto [22]. By interacting with this nonlinear style (situated, error-engaged, interdependent [12]) of computing system, users can experience a not-fully-transparent, and therefore need-to-improvise-together, way of interaction with other human and the system. Please find more detailed information about this project on its website: https://www.leokang.com/ladybug

2 ERROR, TRANSGRESSION AND UNCERTAINTY IN CSCW AND HCI

In the early days of HCI and computer science, influenced by behavioral science and engineering, designing interactive systems was usually understood as a purposeful and goal-directed process that unfolded predictably through linear and instrumental progressions. This perspective viewed interaction as a series of stimulus-response couplings between individuals and their environments, without fully appreciating the emergent properties of circumstantial and material factors that shape and reconstruct ongoing situations [3]. Such a traditional engineering perspective often defined 'making an artifact' as a 'design' activity that was supposed to follow clear procedures and blueprints drawn by specific authorities, such as designers or engineers, a priori. This view reflected what anthropologist Tim Ingold called the 'hylomorphic perspective,' in which making gives teleological forms to a mostly inert world of matter [9]. From this perspective, computational systems that involve error, unpredictability, or disturbance are often seen as undesirable 'bugs' that engineers and designers should eliminate or fix [16, 18].

On the other hands, in fields like art and music, mistake, error, and uncertainty are often viewed as creative mechanisms for discovery and expression, where these components become a 'feature' rather than a bug. For instance, cool jazz musicians like Bill Evans or Jim Hall often involved disruptive 'blue notes' and interdependent collaboration that defy expectations of harmony and develop new jazz expression [2]. Similarly, mid-century artists like Andy Warhol, John Cage and Nam Jun Paik explored the situational nature of aesthetics and creativity through novel, misaligned, and indeterminate inquiry processes that can naturally embrace errors and mistakes as important aesthetic ingredients.

In the HCI and CSCW community, some scholars have started to explore design creativity and innovation based on error, transgression, and uncertainty through various academic projects (see, among others [5, 8, 19, 23]). For instance, Song and Paulos introduced the concept of 'unmaking,' which celebrates the failure of creative materials and suggests that mistakes and errors are not something to be eliminated but can be vital sources of creativity, insight, and aesthetic beauty [23]. Some works by Devendorf et al [4] have explored how related factors such as instability, non-knowing, and strangeness in HCI can inspire new thinking about computational fabrication. In addition, along with ecological responsibility, recent research in sustainable HCI [10, 17, 20] has also highlighted

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Figure 1: Lady Bugs, Leo Kang (2023)

the potential for design creativity in repairing and repurposing broken or obsolete technologies. These studies draw attention to the often-overlooked links between design, aesthetics, and consumption, showing how technologies can have alternative lives beyond their original contexts and functions. Drawing on ethnographic studies of electronic artists and musicians, the author [11, 13] has also proposed a framework of "techno-aesthetic encounters" that emphasizes a nonlinear way engineering through trust-based experiments, error-engaged studio practices, and art-based ethnography.

3 DISCUSSION

The above sections explain the background and details of the author's work 'Lady Bugs,' which describes the possible value of error-engaged and transgressive ways of learning and making in computing. Then, how can we bring this nonlinear approach into our current learning space, and what are the advantages and risks that we need to consider? In critical pedagogy, these practices are often encouraged for purposes of social critique, self-realization, and more interactive inquiries that aim to examine and challenge relations of power between learners, teachers, and the wider social and educational systems [6]. Various studies [1, 24] also suggest that this approach can be an assistive model of pedagogy for those with particular learning styles or challenges. For example, for learners with ADHD (attention deficit hyperactivity disorder) or ODD (oppositional defiant disorder) who may struggle with monotonous and unilateral modes of learning, this approach can provide an alternative mode that supports them in engaging more with their school life.

However, some critics have questioned whether higher educational institutions should promote such disruptive, unsettling, or risky ways of learning [7, 21]. For example, Valerie Solanas, a mid-century American writer, produced an "articulate, angry, and funny" (Guardian, 2005) depiction of societal problems through her work, SCUM [22], that provoked and inspired a broad range of feminists and other social activists. However, her evolving error-engaged and transgressive mindset ended up leading her into a tragic incident in which she shot Andy Warhol in his New York studio on June 3, 1968, casting a lasting shadow over Warhol's life and career. Although this tragedy should not overshadow the more diverse and positive landscape of feminism and social activism, it is essential to recognize the risks associated with an error and transgression-driven way of expression. This installation is also designed to open up a discussion on how we can build a more interdependent educational space in which not only do learners feel safe in "giving yourself over to what the activity provokes, and then following these possibilities assiduously [15]," but also teachers and other administrative staff can run the system in stable and expected ways.

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