

NK_NM_Hybrid Digital-Physical Hardware Design for Designing and Enhancing User Experiences

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INTRODUCTION | This paper and poster presentation showcase a new research-driven interface and design tool that could transform architectural education. The process uses mixed-methods research design to investigate ways of integrating a hybrid digital-analogue hardware protocol platform known as No Keyboard, No Mouse (NK-NM) into the design studio context. The study examines the influence of the NK-NM platform on pedagogy, research integration, user experience, and aesthetics. It also documents its initial impact as part of a simulation-based feedback loop to iteratively explicate design artifacts. NK-NM advances emerging design tool development research by extending and reshaping design as a thinking medium rather than merely as a process. By emphasizing design strategy and pedagogical planning, this study produced unexpected and unforeseeable outcomes as well as demonstrated enhanced creativity in non-designers, and both novice and expert designers.

METHOD | As Sylvia Lavin states in her interview with the Los Angeles Forum, “Increasingly larger amounts of creative resources are being put into producing new tools and concepts that are designed not to make things but, to amplify the creative capacities of others” (Lavin, 2015). It is within this capacity that NK-NM builds its experimental foundation. By applying techniques that blur the boundaries of current computational design processes, NK-NM narrows the boundaries between user experience and the design artifact. NK-NM combines “master-designer” knowledge with qualities that can be tailored to define design parameters, rules, and controls. NK-NM uses advanced digital and physical computational techniques to augment the hierarchical relationship between an experienced designer (master-designer) and those with limited design background (second-designer) to redefine the concept of design instruction. NK-NM is necessarily interactive to influence iterative and reconfigurable design solutions directly, that in turn, results in empowering the team to calibrate and assess lesson plans.

PROCESS | The NK-NM platform includes a combination of software and hardware. The NK-NM-Software is a combination of scripts and modeling techniques, developed by the “master-designer” to bridge between programming platforms (Grasshopper 3D, Processing, and Python), 3D modeling software (Rhino 3D), and physical and digital design customized interfaces. The “software” acts as a design control system to ensure the legibility and cohesion of the design outcomes. The NK-NM-Hardware is a physical and tangible input device that enables users from non-designers to professional designers to freely interface with the NK-NM-Software.

OUTCOMES | The advantage of the NK-NM platform over existing design processes is its inherent potential to harness parametric customization from the software/hardware perspective. NK-NM brings the freedom and the possibility of design to users who have little or no design background as well as those who have advanced design skills. NK-NM ensures the precision and functionality of the design through a “controlled” and flexible design process. Application of NK-NM can occur at any design phase or process; from the schematic/conceptual design to construction detail studies to integrated project delivery. The hybridized NK-NM platform has demonstrated a new way of interacting with the design artifacts that has positively influenced the physical interface of the designers by coupling the interface with directed design environment interaction. These tangible results along with the immediacy of having the digital outcome have shown that the “second-designer” designs more instinctively.

REFERENCES | Lavin, Sylvia. (2015, July 13). “Man vs. Machine: Sylvia Lavin Retools Creativity.” Los Angeles Forum for Architecture and Urban Design. Retrieved from <http://laforum.org/delirious/man-vs-machine-sylvia-lavin-retools-creativity/>

