Using Computer Simulations to Foster Concept Generalization
NOAH PODOLEFSKY, WENDY ADAMS, KATHY PERKINS, University of Colorado — We present findings from interviews in which students used a computer simulation to learn about wave winterference. This simulation, part of the PhET project [1], uses water, sound, and light waves as coupled analogical domains based the generic idea of wave interference. The simulation design draws on a research-based model of analogy use, Analogical Scaffolding [2]. Students were asked to use the simulation in order to explain light wave interference. Students received little guidance in using the simulation, and these students were nonetheless able to use the simulation to productively reason about light wave interference. Analogical connections to more concrete water and sound waves were essential to helping these students make sense of light waves. After comparison of these three wave phenomena within the simulation (water, sound, and light) students articulated a generalized notion of waves and wave interference. Students noticed abstract structural similarities in common between phenomena (such as "cancelling") as distinct from concrete surface features of each phenomenon (such as water moving up and down). 1. http://phet.colorado.edu 2. N.S. Podolefsky, N.D. Finkelstein Phys. Rev. ST - Phys. Educ. Res. 3, 020104 (2007)

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