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The New K-12, "Full-Access" Computing Architecture: A Reaction to Bull, Bull, Garofalo, and Harris

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Educational computing architectures have evolved from standalone computers in labs and classrooms, through networked computers in classrooms and labs, and lately to mobile, wirelessly networked laptops on carts. The major drawback in all those architectures has been the lack of one-to-one student-to-computer access throughout the school day. However, with the emergence of low-cost (in the \$100-\$200 range) handheld computing devices, we will see a new educational computing architecture come forward:

- Children will each be equipped with their own personal, palm-sized computer for use all day in school, on the school bus, at home, and so forth, that is wirelessly connected to the school network (while at school).
- Classrooms will have "traditional" personal computers, networked of course, that enable visualization-intensive tasks (3-D rotation of chemical molecules, page layout for the school newspaper, etc.) and include peripherals such as scanners, digital cameras, and so forth.
- Schools and districts will have (a) networked "storage servers" that provide long-term storage (e.g., backup) for each child's handheld computer, (b) "compute servers" on which computation-intensive tasks too demanding for a student's handheld computer (e.g., simulations) are carried out with the results then shipped back over the network to the student's handheld, and (c) "collaboration servers" that support

groups of children, teachers, mentors, and so forth, connected synchronously (and asynchronously) through the palm-sized computers and/or the classroom PCs.

While the low-cost handhelds do not have the functionality of a desktop/laptop computer, they are not being used as standalone devices. Indeed, because they are on a network—running as so-called “thin-clients” connected to servers—the impact of their lack of computational zorch is minimized. In addition, the classroom PCs can be used for specific tasks such as visualization and scanning.

Industry has had the full-access architecture for years and has seen dramatic gains in productivity. Finally, the benefits of the full-access architecture can be enjoyed by school children. The gains in learning that flow from the use of this architecture will be a pleasure to measure.

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