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Inventive Minds

Marvin Minsky on Education

By: Marvin Minsky

Edited by: Cynthia Solomon, Xiao Xiao

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Introductory Remarks to Essay 3

Gary Stager

Although profoundly interested in learning and a gifted teacher, Marvin Minsky gave blessed little attention to K–12 education as an institution. He agreed viscerally with his friend Seymour Papert that schools are bad places for children to learn because they are such bad places for teachers to learn. I suspect that Marvin knew the actual details of day-to-day schooling were worse than he might imagine. None of this means that he called for the destruction of schools or thought little of teachers—quite the contrary. In all of my encounters with Marvin, he was more than respectful of teachers and was interested in their work, thoughts, and aspirations. His comfort with schoolteachers was aided by his inattention to the daily minutia, bureaucratic lunacy, and crackpot pedagogical theories of the world in which teachers operate. Perhaps one can only be a fabulous inventor, scientist, raconteur, pianist, and composer by ignoring the indignities of schooling. But these essays indicate he was indeed aware of various sides of schooling.

Like Papert, Minsky possessed the empathy necessary to recognize that everyone in the world was not like him. At its core, his essay on grade-based segregation is a respectful acknowledgment of diversity.

The longstanding tradition of organizing education by grade-level segregation has its roots in a yearning for a simplistic notion of industrial age efficiency. Its continuing practice may only be viewed as naiveté born of superstition and ideological certainty. The practice defies common sense. Heterogeneous and multiage learning is the norm everywhere outside of school. There are also contemporary examples of effective multiage learning found in schools, not only in multiage primary classrooms but also in instrumental music, choir, drama, and sports. I once heard Papert refer to age-based segregation as grouping kids by similar levels of incompetence.

Mechanistic aspects of schooling, including age-based segregation, subject departmentalization, and the fifty-minute period are rooted in our culture's unwillingness to recognize that learning is natural. Such recognition would result in much more school flexibility and what Seymour Sarason called "productive contexts for learning."[1] As Minsky writes in this essay:

> more generally, children develop at different rates, and each one learns in different ways—so when you put many students in the same room and try to teach the same things to all of them, some will flourish while others get stressed, and some forge ahead while others get lost. Whatever it is that we want to teach, it is hard to design an age-based curriculum that suits the needs of pupils with different abilities.

Students have much to learn with and from not only peers of different ages, but also adults. Jean Piaget teaches us that knowledge is a consequence of experience.[2] Lev Vygotsky, Jean Lave, and Etienne Wenger remind us that much knowledge is socially constructed.[3] Having access to diverse expertise enriches the learning process. One way in which schools may make use of adult expertise is by introducing children to things they don't yet know they love.

For eight consecutive years, Marvin Minsky generously hosted "fireside chats" with the K–12 educators attending my Constructing

Modern Knowledge summer institute. Marvin would spend an hour or two speaking with the educators about any topic. He never disappointed. Each year, one of the greatest scientists of the past century treated classroom teachers like colleagues and shared the full range of his intellect, humor, empathy, mischief, playfulness, and wonder. Each year, I attempted to run the event *and* film Minsky's fireside chats, yet his aura seemingly caused innumerable cameras and recorders to fail. Still, I do remember a number of profound points Marvin made during these events that add to the "Effects of Age-Based Segregation" essay. (These are not verbatim.)

Hobbies Seem to Be a Good Model of Optimum Learning

Although during one fireside chat Marvin argued against joy, fun, religion, sport, and music as frivolous (or worse) pursuits, he did express an admiration for the sorts of learning that emerge through hobbies. Hobbies feature continuous increases in complexity, may be social or solitary, and engage multiple skills and disciplines. I suspect that Marvin would have shared Seymour Papert's notion that the richest learning emerges when a person is engaged in "hard fun."[4] Hobbies do not abide by the strictures of the school calendar or grade levels.

Problem Solving

One educator asked, "Marvin, what do you do when confronting a really hard problem?" Marvin thought for a moment and said, "Don't worry about the problem. Find the right person." Then in the world's greatest humble brag, Minsky continued, "I never worried about solving a difficult problem. I always knew I could call Robert Oppenheimer, John von Neumann, or Claude Shannon." Later

in the conversation, Marvin was asked a question along the lines of, "What should we do about schools?" He paused briefly and wistfully replied, "I never worried about those sorts of questions. I knew I could always just ask Seymour [Papert]."

School Structure as a Curricular Impediment

Marvin once told our group that a major problem plaguing education is that there is no structure allowing for the teaching and learning of topics that may only require ten days to learn. School days are divided into short periods and the academic calendar is divided into semesters, trimesters, or marking periods. The result is that students miss out on experiencing powerful ideas that could be learned in a matter of a couple weeks. Marvin offered information theory as such a domain.

Learning by Making

Although considered the father of artificial intelligence and a computer science pioneer, I understand that Marvin did not enjoy programming, at least in comparison to inventing things, playing the piano, or tinkering. While I do not have research to support this intuition, I suspect that accomplished people share a formative experience of learning with their hands. A ninety-nine-year-old Jerome Bruner told me that building and racing boats on the Hudson as a boy was critical to his intellectual development. Seymour Papert had his gears. Marvin told us that it was a shame that today's kids don't have access to junkyards like his generation did. He expressed a belief that the leaders of post-war science benefited from access to abundant military surplus "junk" as children.

Marvin Minsky supercharged any classroom, lab, or living room into the greatest context for learning. He was interested in anything anyone else found interesting, even if only to wonder why you had such an interest or belief. Having known him just a little bit is one of the highlights of my life. Sharing his genius and spirit with educators brought me indescribable joy. Although he was never my teacher, I will continue to learn from Marvin for the rest of my days.

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