Intercultural Adaptive Expertise: Explicit and Implicit Lessons From Dr. Hatano

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Abstract

Giyoo Hatano was an international scholar -- an adaptive expert himself. His creative methodologies and theoretical insights have enriched the work of researchers in many countries. How Hatano lived his life and treated others provides enriching insights as well.

In this essay, we focus on "adaptive expertise," one of Giyoo Hatano's major contributions to the field. We explore both the explicit information he provided about adaptive expertise and the implicit information gleaned from how he lived his life and made friends with people around the world. By describing Giyoo Hatano's own qualities as an intercultural adaptive expert, we can begin to explore conditions for promoting those qualities.

Giyoo Hatano was a genuinely international scholar. He had an unusual ability to transform what educators and researchers thought and did, both inside and outside Japan. Hatano's creative methodologies and unique theoretical insights have enriched the work of researchers working in many countries. How Hatano lived his life and treated others provides enriching insights as well.

This essay focuses on one of Giyoo Hatano's major contributions to the field --- his and colleagues' work on adaptive expertise. We explore both the explicit information he provided about this topic as well as the implicit information gleaned from how he lived his life and made friends with people around the world.

Explicit Lessons on Adaptive Expertise

Hatano introduced the concept of adaptive expertise in relation to abacus masters. He proposed that abacus masters should be termed routine experts because they have developed a very high, but rather narrow, procedural proficiency with a particular set of cultural tools. He contrasted routine experts with adaptive experts, and he and Inagaki asked the educationally relevant question of how "novices become adaptive experts – performing procedural skills efficiently, but also understanding the meaning and nature of their object." (Hatano & Inagaki, 1986, pp. 262-623).

Hatano and Inagaki (1986) described several qualities of adaptive expertise that distinguish it from routine expertise. These include the ability to verbalize the principles underlying one's skills, the ability to judge conventional and non-conventional versions of skills as appropriate, and the ability to modify or invent skills according to local constraints. Wineburg (1998) and others (e.g., Bransford & Schwartz, 1999) have added to this list by pointing out that adaptive experts are also more prepared to learn from new situations and avoid the over-application of previously efficient schema (Hatano & Oura, 2003).

Hatano and Inagaki suggested that in stable environments, culture typically provides

sufficient resources for learning and executing routine expertise. People have many pockets of routine expertise where they are highly efficient without a deep understanding of why. To further develop adaptive expertise, people need to experience a sufficient degree of variability to support the possibility of adaptation. This variation can occur naturally, or people can actively experiment with their environments to produce the necessary variability. Hatano and Inagaki (1986) proposed three factors, highly relevant to education, that influence whether people will engage in active experimentation.

One factor is whether a situation has "built-in" randomness or whether technology (broadly construed) has reduced the variability to the point where there is little possibility for exploration. Instruction often attempts to reduce all ambient variability to help students focus on the procedural skill. This may have the unintended consequence of preventing students from judging variations in that procedure in response to new situations.

The second factor involves the degree to which people can approach a task playfully or whether there are large consequences attached that limit risk taking. When the risk attached to the performance of a procedure is minimal, people are more inclined to experiment. "In contrast, when a procedural skill is performed primarily to obtain rewards, people are reluctant to risk varying the skills, since they believe safety lies in relying on the 'conventional' version" (p. 269).

The third factor involves the degree to which the classroom culture emphasizes understanding or prompt performance. Hatano & Inagaki (1986) state, "A culture, where understanding the system is the goal, encourages individuals in it to engage in active experimentation. That is, they are invited to try new versions of the procedural skill, even at the cost of efficiency" (p. 270). They proposed that an understanding-oriented classroom culture naturally fosters explanation and elaboration, compared to a performance-oriented classroom culture where the goal is to just get it done the right way.

In sum, Hatano and colleagues characterized adaptive expertise as procedural fluency that is complemented by an explicit conceptual understanding that permits adaptation to variability. The acquisition of adaptive expertise is fostered by educational environments that support active exploration through three tiers. The first tier highlights the variability inherent to the task environment. The second tier highlights the variability permitted in the individual's procedural application. The final tier highlights the variability of explanation permitted by the culture, such that people can share and discuss their different understandings. The implications for the classroom culture are direct, and we consider brief examples from our own work on each of these tiers. We focus on how to help students notice important sources of variability. Life always contains variability, but people can overlook important differences by applying well-worn schemas.

To address the first tier, we help students notice important differences between situations. One approach we have taken is to use contrasting cases. Contrasting cases, like glasses of wine side-by-side, can help students notice important distinctions. For example, in one instructional study on teaching statistics, we wanted to help 9th-grade students learn about formulas for computing variability (Schwartz & Martin, 2004). The student groups received contrasting cases of small data sets, each representing how high a ball bounced when it was dropped on a particular trampoline, and their task was to invent a way to compute which of the two trampolines was more consistent. The first pair was {1 3 5 7 9} v. {3 4 5 6 7}, to which they typically invented a range formula, by subtracting the smallest value from the largest value in each set. We then provided the students with a new pair of contrasts: {1 1 1 1 9} v. {1 3 5 7 9}. This contrast helped the students notice that density is also an aspect of variability. Another contrast {1 3 5} v. {1 1 3 3 5 5} helped students recognize that sample size is an important variation that their formulas need to handle. These "noticing" experiences prepared students to understand the principles behind variability formulas once the teacher showed them

these formulas. A year later, for example, the students were able to explain why variance formulas divide by 'n' (to handle different sample sizes), whereas college students who had taken a semester of college statistics could not.

To address the second tier of procedural variability, we ask students to invent *SmartTools* (Cognition and Technology Group at Vanderbilt, 1997). In this approach, students begin by solving a complex, real world mathematics problem that is presented as a 20 minute video case called, *The Adventures of Jasper Woodbury*. We then present students with "what if" scenarios where we systematically change values in the original problem. The idea is that the students begin to notice the difference between learning to solve a problem and learning to solve a class of problems. The task for the students is to invent a "smart tool" that generalizes across many cases. Students often invent many different solutions, and they have an opportunity to see one another's tools. This activity helps students see the value in different solutions, and they are in a position to evaluate the strengths and weaknesses of each.

To address the third tier of creating a culture that embraces understanding, we try to help students notice the value in considering other people's understanding. One simple example of this approach comes from a curricular cycle called Star Legacy (Schwartz, Lin, Brophy & Bransford, 1999). For example, in a course on Educational Psychology, students see a video clip of children completing the project of making small rockets. Afterwards, students are asked to generate their own ideas about what is good and bad about this type of project-based learning. Typically, the students are rather vague and refer to issues of motivation. After students commit to their ideas, we show video clips of different experts who responded to the same clips. The multiple perspectives of the experts point out a number of important features that the students did not notice. For example, one expert points out the students' effective group work does not happen without teacher support. The value in having students first generate their ideas is that they see how much they missed compared to the

experts. This prepares them to appreciate the insights provided by the expert. In contrast, when students hear the expert perspectives before they generate their own, they tend to dismiss the observations of the experts as obvious. They begin to enter a culture of understanding, with a disposition towards heeding explanations.

In each of these examples, we have emphasized helping students notice variability at different levels, and in practice, we use all these techniques simultaneously. We do not believe it is sufficient to rely on natural variability as it might be found in everyday life. People often fail to notice important sources of variability, because they have developed good enough skills to get by. In educational settings, we can arrange more optimal conditions of variability to help put students on a trajectory towards adaptive expertise.

Implicit Lessons on Adaptive Expertise

Although Hatano never wrote about it, nor perhaps was even aware of it, he lived his life as an adaptive expert. He "walked his talk." His adaptive expertise was manifest in many ways, and included his abilities to move and contribute across international cultural boundaries as well as disciplinary ones.

Giyoo Hatano's own qualities as an intercultural adaptive expert are also important for learners to function effectively in today's global economy. These qualities are typically not emphasized in the expertise literature or education. We describe three important qualities of intercultural adaptive expertise. Ideally, by describing these qualities, educators can begin to explore conditions for promoting them.

Creating and Adding One's Own Ingredients

Perhaps the central quality of Hatano's intercultural expertise was his ability to adapt and restructure what people thought and did. He never simply assimilated into another culture by being just like other people or by doing exactly what other people do. James Greeno (2006) captures the sentiment beautifully in an excerpt from a poem he wrote in honor of Giyoo's

memory:

> Your exquisite experiments, your scrupulous
> care in reasoning,
> your wise conceptual advances
> That seem to be amendments but
> restructured what we had thought
> we understood into new ideas. (p. 167)

At one point, Giyoo provided some advice to the first author, who was neither born nor educated in the U.S. and was struggling to survive in the American academic world. He advised, "Do not try to repeat or cook what your American colleagues are cooking. You probably can never cook as good a hamburger as they do. Bring your dumplings and other dishes to see how they contribute to the food that is already on the table" (Lin & Hatano, 2000).

In this simple bit of advice, Hatano was proposing that one should adapt one's environment, and not just adapt to it. This is an important proposal because it indicates that adaptive expertise does not just involve being reactive. Hatano's example corrects simper definitions like "Adaptability is an effective change in response to an altered situation" (White et al., 2005, p. 2), because adaptation can also include altering one's own situation.

The insights we learned from Hatano helped us appreciate that borrowing educational practices across cultures requires adapting those practices, rather than copying them without modification. In our own work, instead of trying to have teachers from America and China copy each other's values and practices, we use cultural contrasts to help them notice information about their own classroom norms and values that tend to be implicit, yet have important implications for their teaching and learning (Lin & Schwartz, 2003). It is our hope that recognizing each other's values and beliefs will help teachers and students clarify their own practices, and enable them to better adapt lessons from one another.

Genuine Respect for Other Cultures and People

Many people who cross cultural lines fail to strike Hatano's balance between asserting their own beliefs and values while also respecting those of the prevailing culture. Everyone knows the story of the "ugly American" tourist who disregards the sensibilities of the prevailing culture. Everyone also knows examples of people who "go native" and lose the possibility of adding their own element to the mix. There are many lessons to be learned from Hatano about ways to develop intercultural adaptive expertise.

We surveyed a number of scholars who had worked with Hatano to see what they had to say about their collaborations with Giyoo. As a testament to his intercultural adaptive expertise, many people commented that of all the people they knew, Giyoo was the one who best combined a deep understanding of Japanese culture and a deep understanding of U. S. culture. Many people said that he probably understood other cultures equally well.

An especially powerful lesson that we can learn from Hatano is that he entered new cultures by getting to know individuals. He was deeply humanistic. All the scholars we surveyed viewed Giyoo Hatano as a very "close friend" who knew them at a deep individual and family level. When he faced a new culture, Giyoo always exhibited great interest in obtaining deep understanding of its people as human beings. The value of obtaining deep understanding about people in a new culture, which we call *people knowledge*, appears in a study that compared presenting a "general culture" versus presenting individual humans from a culture (Lin & Bransford, 2001). The study arose in the context of a growing concern about a disconnection between foreign professors and their American students. The college students in the study read about the case of Professor X from China who was having difficulties with American college students. Afterwards, half of the students received a general description of Chinese culture, something like a tourist brochure. The other half of the students received a description of Professor X's personal history within China. Finally, students answered a

number of questions about their perceptions of the problem and they proposed solutions. The students who received the “personal” history considered how cultural experiences influenced the professor’s behavior and they integrated this consideration into their solutions. The students who received the more general treatment were inclined to dismiss Professor X as not paying attention to the way American’s do things.

Hatano’s humanistic approach to understanding different types of people extended to his interactions with children and no doubt contributed to his insights about them. Once, when Giyoo had stayed with a colleague’s family for a few days and was about to leave, the colleague’s 5-year-old son said he was sad to see him go. The 3-year-old daughter was also present but was silent. Giyoo asked her if she was also sad that he was leaving. She said "no." When Giyoo asked "Why not," she replied, "Because you're a visitor, and I don't like visitors." Rather than being upset, Giyoo commiserated with her, saying that he could understand how it was difficult having someone outside the family there and how it would be nice now to have things back to normal. He made a friend on that occasion, as he did so on many other occasions throughout his life.

Hatano’s humanistic approach to new cultures is also reflected in his comments about the achievement gap between U.S. and Asia. He was a strong believer that education is often an integral part of each culture (Hatano & Inagaki, 1998). This means that we should be very careful when we try to borrow something about education from other countries (we can do so only after reconstructing it). He always felt that American culture allows a great range of choices, and that this is healthy. He felt that it is wonderful for children to try to find a target domain they like and are good at, and that this may be much more important than to try hard to study any imposed domain such as mathematics or science (Personal communication, 2001). Hatano further suggested that we need to understand how different mathematics achievements are produced before we conclude that one way of teaching is better than another. For example,

he suggested that we need many more studies before we conclude that Asian ways of teaching mathematics are better than other methods. Hatano's approaches stimulated healthy and constructive discussions rather than ones that were defensive.

Combining the Cognitive and the Social in the Inquiry

Hatano's work on the mental abacus provided a compelling demonstration that the development of abacus expertise involves social as well as cognitive variables. Many Japanese parents used to send their children to abacus lessons starting in elementary school, because of a prevalent belief that abacus exercises fostered children's diligence, calculation speed and estimation ability (Hatano, 1997). From our own experiences, we know that children are motivated to excel in the abacus because the adults in the abacus community praise them and the abacus training experiences improve their school status. In this sense, gaining expertise goes beyond the purely cognitive and includes a social process, and it involves changes in values and identities. Yet, Hatano's inquisitive mind did not just stop there. Through numerous cleverly designed studies, he demonstrated how culture could produce a double-sided effect on thinking and learning. Namely, it can both enhance and restrict learning. Hatano believed that it was very important for cultural learning scientists to examine how individuals can be helped to learn something for which their culture does not provide a convenient microenvironment (Hatano & Miyake, 1991).

CONCLUSION

Like many people around the world, we have incorporated Hatano's explicit and implicit lessons about adaptive expertise into our research and our lives. One superior example involves a new interdisciplinary center that we helped to create. The center is called LIFE, which is an acronym for Learning in Informal and Formal Environments. The professors participating in the center have successful research portfolios that can sustain them without the center. The reason we are all are participating in the center is to learn new approaches and

ideas from scholars in other disciplines. This has involved making a new culture of interdisciplinary collaboration, which is not a trivial undertaking. The effort has also been characterized by adapting to one another and adapting one another's ideas. Aptly, the focus of the center is the development of adaptive expertise. We, and the other faculty, are both studying and aspiring to the model adaptive expertise that Giyoo Hatano left us.

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