
How Fast Fish Sink or Swim: Adopting an Agentive View of Learners

***Applying Learning Sciences Research to
Learning and Workforce Development for
Next Level Learning Brief Series***

Tina Grotzer, Emily Gonzalez, and Tessa Forshaw



Next Level Lab:
Applied Learning Sciences for
Access, Innovation and Mastery (AIM)
Harvard Graduate School of Education



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For years, scientists studying fish were puzzled. Fish could actually swim much faster and more efficiently than any of their fish models could explain. It wasn't until they put the model into water and studied the interaction between the fish and the water that things made sense. They came to realize that fish create vortices as they move to push off from. Suddenly the performance of fish made sense. Scientists understood how fish and their environment interact to enable "fast fish"!¹

Executive Summary

Workforce development programs have at their core, conceptions of human beings and what they are capable of. In a series of briefs, we set forth a broadened notion of human learners as Next Level Learners that accounts for thriving in a workforce context. This first brief invites us to consider learners as agentive within and across contexts. Inspired by the quote above, it focuses on agency within the interactions between learners and their environments. It draws upon research in the learning sciences, neuroscience, and cognitive science to reposition how we think about the relevant variables and the supporting environment.

In education writ large, it is common to aim for engaged, attentive learners—people who deeply learn the content that is presented to them. We agree that this is important to achieving and maintaining mobility and stability in the workforce today. However, we argue that it is not nearly enough. Like “fast fish” that create eddies and vortices to push off from to propel performance, we suggest that humans must be able to be agentive in their learning and to learn within *malleable contexts that they can actively adjust to be supportive of their growth and performance*. The brief presents the cognitive science behind why this aspect of Next Level Learning that we refer to as “*fast fish learning*”—of being agentive and leveraging contexts—presents a more powerful workforce development vision to adopt and for whether displaced workers ultimately sink or swim.

Framing Questions:

- How does our vision of the learner impact their potential?
- What do agentive learners do? What is “fast fish learning” and why is talking about it important?
- Why is it important to situate learning in context for fast fish learning?
- How does being an agentive learner impact transfer of learning?
- How can workplaces encourage and support agentive learners?
- What steps might support a transition towards an agentive view of learners and workers?

Introduction

Jaylen is hitting his stride in his new job as a computer programmer for a shipping company. His manager, Devon, gave him the opportunity *to rearrange the workspace* so he has better access to the necessary data and people he needs to interact with. Recently, he realized that Devon doesn't know the details of the job the way that he does. In fact, Devon prefers to have Jaylen come to him with *proposed solutions to problems that they discuss together*. Jaylen also knows that he, like many people who have experienced trauma at some point in their lives, needs *to absorb feedback over time before responding to it*. He asked Devon to give feedback on his work performance that incorporates this delay whenever possible. Jaylen found that it *helps him to be open-minded towards feedback and to use it well*. These adjustments are helping Jaylen learn more and perform better on the job. He is learning the *self-regulatory skills* that allow him to modify the physical, social, emotional and cognitive environment.

Rosa is a student in a technical high school who is learning about being a dietitian. She is a quiet, but very dedicated student who studies hard and does well on the tests in class. As part of her program, she also has an internship in a program at a local hospital. This program is opening her eyes to the realities of working as a dietitian. For the first time, *she is beginning to ask questions in class and to push her teacher for answers about how to apply what she is learning in class to the challenging aspects of the job*—such as getting a child who refuses to eat foods of certain colors to become more flexible or encouraging an elderly man to give up red meat for healthier choices. Given just how dedicated she is, Rosa is finding that people at her internship are giving her more and more responsibility. Sometimes it feels like too much, too fast. This happened to her before at a summer camp job where she ended up working so hard that it became unsustainable and she felt like a failure despite her all-in efforts. Rosa is recognizing the early feelings of being overwhelmed in her internship and wants to figure out what to do about them. *She decides to talk to the teacher supervising her internship to get ideas about how to approach the lead dietitian for support.*

Jaylen and Rosa are learning to be agentive in their learning and work contexts. They are attending to important features in their own learning and work contexts and seeking ways to use those to support their learning and work performance. Just like fast fish that create eddies and vortices from which to propel as in the quotation above, they *make adjustments to their work contexts and push off of those—relationships, agreements, physical changes, and so forth—to do their best work*. Ultimately, whether Jaylen and Rosa sink or swim in their jobs may have more to do with these types of adjustments than the specific skills related to computer programming or dietary planning.

How Does Our Vision of the Learner Impact Their Potential?

How we envision the nature of people in the workforce has deep implications for how we support learning, development, expertise, and their work performance. Traditionally learners in training programs are viewed as passive recipients of information, charged with putting received knowledge to work. Current conceptions in education research focus on learner engagement and deeper learning. We argue here that while engagement and deeper learner are helpful and desirable, it isn't enough. *We need to develop agentive learners—learners who behave like fast fish in pushing off the contexts around them to enable their best learning and performance*. The research in the cognitive, neuro, and learning sciences supports more

powerful visions for learning than mere engagement. Further, we posit that developing agentive learners will lead to deeper learning and increased engagement in the long run, thus one does not need to choose between one or the other.

Being an agentive learner is essential to learning and transfer of knowledge because educators can't follow learners through their careers. Learners must figure out how to develop and apply their skills and knowledge. They must learn how to learn well, to understand how their minds work, to understand the interactions between their cognitions and emotions, and to manage these in the contexts around them.

Broadly defined, enabling learners to be agentive or to have agency means encouraging them to take a proactive role in setting and working towards learning goals, in actively pursuing learning opportunities, and in shaping the contexts of their learning. Human agency is critical to constructing knowledge, developing expertise, and knowing when and how to apply it.² Learners need to be able to assess the state of their understanding, set goals, and pursue knowledge they view as valuable through active engagement and processing.

Cognitive Neuroscience Research Reveals That Effective Learners Are:

1. Agentive
2. Self-Regulating
3. Goal-Oriented
4. Adaptive
5. Social, Emotional, Physical, and Cognitive Beings
6. Holding Performance-Based and Learnable Conceptions of Intelligence

*Current conceptions in education focus on learner engagement and deeper learning.
This is not enough.*

*We must take learning to the next level. We need agentive learners
who understand the nature of learning and take charge of their learning.
Like fast fish, they push off the surrounding contexts to enable their best learning and performance.*

Cognitive, neuroscience, and learning sciences research supports powerful, next level visions for life-long learning.

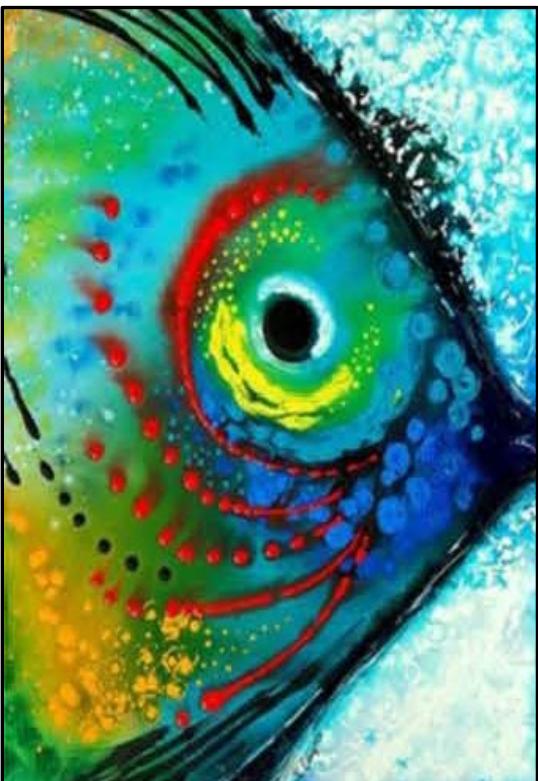
In the context of a learner who is facing job disruption, viewing learners as agentive means giving them permission to take control of their learning experience and content. Instead of designing instruction that positions them as passive consumers of knowledge, we need to invite them to determine what they need to learn and to control aspects of how and when their learning occurs. Envision the difference between passive learners in a Massive Open Online Course (MOOC) that tells them what they need to know and agentive learners in a coding bootcamp who may have chosen the camp because they believe that this learning will make a difference to them. In the second case, when their code does not work, they actively seek out collaborative support and continue to iterate until they summit their challenge. They self-reflect on what caused the bug, how they fixed it, and use that learning to influence their decision making moving forward.

Before reading on, take a few minutes to think about a time when you were able to be highly agentive in your learning and work context. What are some of the things that you did? What are some of the ways that the context (including the people, tasks, and physical environments) enabled you? How did it feel to be able to take a proactive, agentive stance? How did your vision of yourself as a learner impact what you were capable of? Many people find it highly satisfying and that it gives them a greater appreciation for their work and learning contexts, both the affordances and challenges. How did the vision that others held of you impact what you were able to do? Many people are able to perform at a higher level when they are viewed as capable by others. Keep these thoughts in mind as you read on in the brief. The brief focuses first on the tendencies of agentive learners and then considers how learners need contextual support to be able to act agentively.

What Do Agentive Learners Do?

Learning effectively requires being agentive, taking a proactive stance. Agentive learners regulate and manage their own learning processes and strategies; they are self-regulating. They manage their social and emotional needs, their abilities and those of others in their work contexts. They are active processors who use metacognition to assess their understanding in the moment and plan forward in their learning. They also manage the contexts, broadly construed, around them.³ As explored further below, just like “fast fish” acting upon the water, *agentive learners adjust their physical, emotional, social and cognitive environment for peak performance—managing up, down, and across the social context.* They get to know resources in their physical, cognitive, social, and emotional context and draw upon appropriate resources to support their work and learning.

Agentive learners often hold skills related to Adaptive Expertise, an ability to think flexibly, adapt to varied contexts, and gain new understandings, as explored further in the third brief. They gain information about how their minds work and use it to support their best learning and to manage learning and work contexts. For instance, they may understand that affect and cognition are inextricably linked and so they attend to feelings that interact with their ability to learn and do their best work, as in the examples of Jaylen and Rosa above. They may also know how our minds work when it comes to learning new



Agentive Learners:

- notice opportunities to learn or to “up their game” and have the abilities and inclination to follow through.
- bring their whole selves—emotional, social, physical, and cognitive—to learning opportunities.
- attend to the social, emotional, cognitive, and physical aspects of the environment and, like “fast fish,” adjust the context—emotional, social, physical, and cognitive—to support their learning and work performance.
- adopt a reflective stance about what is and is not working and pursue strategies that result from prior learning to use this learning forward.
- hold a mastery stance towards self-actualization.



information. For instance, they may know that it can be difficult to hold information in mind while processing it, so it is better to download the information, such as using learning tools like concept maps to illustrate their growing understandings to allow them to process it. Or they may realize that knowing something very deeply can lead to rigidity in our thinking such that it can be helpful to interact with others who bring a different set of understandings in order to think creatively in familiar problem spaces, as well as look for other possible applications outside of their immediate repertoire of knowledge.

Current research in neuroscience, cognitive science, and the learning sciences brings a wealth of information about the nature of learning, the kinds of strategies that are likely to be effective, and the kinds of challenges that we are likely to face. It also helps us to understand neurodiversity and how our minds might differ from those of others. This work supports next level visions of learning.

Being agentive in one's learning also includes seeking out Future-Oriented Feedback as in the Adaptive Expertise brief. Progressive feedback, or "Feedforward" feedback, aids learners in setting out learning paths and figuring out what kinds of contextual support will help the learner accomplish their learning and work performance goals. Like Jaylen in the example above, being effective in seeking and receiving feedback, means that one needs to manage the emotions involved, especially in instances when the feedback may be useful but not thoughtfully conveyed.

Why Is it Important to Situate Learning In Context for Fast Fish Learning?

Educational opportunities and workforce development typically focus on the learner—on the fish in the case of our analogy. While this is understandable, it minimizes what is possible and increases the likelihood of sinking by undervaluing the importance of context and the relationship between the learner and the context. It is a bit like instructing children on how to swim, giving them a multiple-choice test, and then sending them off to swim in the deep end of the pool. Unanticipated challenges inevitably arise. Putting the fish back in water enables the fish to create the vortices that it can then push off from for high level performance. It is also what enables learners to bring their whole selves to learning, and actively pursue learning contexts that matter to their identity and culture increasing authentic relevance, so that social-emotional and relational challenges don't derail performance.



Every human is immersed in and grows in a cultural context that becomes an essential aspect of their identity. Every work environment also has a cultural context. In each case, assumptions are made about basic structures and concepts in the world—how to engage and relate to others, how to structure one's day, how to speak to people at different levels of authority and roles, when it is time to focus and when breaks are warranted, for example. These assumptions interact in deep and implicit ways with everything that we do and with the expectations that we hold.

Understanding them empowers people to consider how they relate to the context around them and how to communicate with others about it. Silvana Rueda of New Futures Scholars and Harvard University has developed instructional materials focused on conceptions of time, how these are influenced by culture, and how it is important for people at all levels to reflect upon and become aware of these assumptions.⁴ The brief on Adaptive Expertise discusses the tendency to attend to ways to navigate such cultural assumptions as an aspect of what enables people to work flexibly and to orient to new domains. It also considers this tendency to navigate cultural context as an important aspect of what managers do in supporting workers. Putting learners in context creates opportunity for reflection on their essential cultural elements of self and identity.



Putting the fish in water is also important for what we know about encouraging a dispositional stance. As discussed further in the second brief, in order to have a disposition to engage in certain tendencies, one must notice or be sensitive to occasions to do so, have the requisite ability to do so, and must be inclined or motivated to do so.⁵ Context is essential to learning to notice, within the flow of everyday events, opportunities to engage in high level thinking and learning. Ability is also supported by context because the nuances of the moves that one engages in become more evident. It is better to find out these details before swimming on your own in the deep end of the pool! Further, while it is possible to instruct learners in one context and have them transfer it to another one, as we shall see in the fourth brief on transfer, this introduces a number of challenges such that learning often gets stuck. Finally, motivation is often supported by contextual factors—both intrinsic to the flow of being engaged in a task or the pride of completing it well, and extrinsic as in the social recognition and support from others or tangible job rewards in terms of salary, raises, and benefits.

How Does Being an Agentive Learner Impact Transfer of Learning?

Transfer refers to using abilities and knowledge gained in one context in another context. The opening quote about fish forming eddies or vortices to push off of to increase their speed beyond what scientists thought was possible also provides the inspiration for a new conception of transfer, referred to as an “Agentive Leveraged Contexts Model,” that we introduce in the fourth brief. It has, at its core, a self-actualizing human being who proactively manages the social, emotional, physical, and cognitive contexts in which they engage towards more expert performance.

As elaborated in the fourth brief, an Agentive Leveraged Contexts, or for short, “Fast Fish” model, combines the features of other models of transfer where learning happens in work contexts. This makes it possible for learners to gain textured, nuanced understandings. The model combines this with strategic efforts to extract generalizable elements of learning towards transferring knowledge and skills. It puts the agentive behaviors of the learner at the center of the model. It highlights what learners *learn about how to learn* in each context that informs their future learning, their ability to swim up to speed in new contexts, and to consider the broader contexts themselves—not just immediate task performance. Thinking about future contexts is becoming especially critical for workforce development programs to consider in their conceptualization of transfer. Work in the next several decades will involve reacting to disruptions and transformations and thriving in contexts not yet considered today.

How Can Educational Programs and Workplaces Encourage and Support Agentive Learners?

As we think about the examples of Jaylen and Rosa, it is important to ask, “What is working in each example? What makes their success possible?” While there are specific actions that Agentive Learners take, we also must consider, “How can we create environments for learners to become agentive, engaging their whole selves, and managing the contexts around them to enhance their learning and performance?”

Like fast fish that create eddies and vortices to push off to propel performance, humans must be able to learn and transfer knowledge within *malleable contexts that they can actively adjust to be supportive of their growth*. It is important to acknowledge that being “agentive” is the shared responsibility of the learner and the learning environment. Learning environments can support agency and the development of self-regulation, and there are limits to how agentive one can be without environments that foster it.

What might such environments look like in Workforce Development learning? In the broad sense, these environments are “deliberately developmental,” as Robert Kegan and his colleagues write about. They create a “safe enough and demanding enough culture” that it allows for and supports growth.⁶ More specifically, environments that support agentive learners welcome learners’ thoughts, feelings, and actions, are patient for self-paced learning, provide rationales for why things are being taught, offer

What Does Research Say About Educating for Agentive Learners?

Being an agentive learner is essential to life-long learning and transfer because educators can't follow learners through their careers. How can we support learners in being agentive?

1. Set up contexts that invite agentive learners to have the awareness of occasions to pursue active learning, the ability to do so, and the inclination to follow through.
2. Create opportunities for them to recognize areas for improvement, to act upon that recognition and support their motivation to follow through.
3. Make space for agentive learners to bring their whole selves—emotional, social, physical, and cognitive—to learning opportunities and to manage those aspects of the context.
4. The social, emotional, physical, and cognitive contexts should be malleable and invite learner agency. Inviting them to bring their whole self to learning opens the possibility for a richer conception of learning and transfer because the learner develops complex, interconnected skills.

learning opportunities designed to encourage active processing, foster a strengths-based approach to problem solving, hold a mastery-oriented view to learning, and encourage connections and relationships between peers. These environments typically avoid controlling language and behaviors and de-emphasize grades and rewards that are not directly connected to inherent task outcomes.

Agentive and Self-Regulating learners can become more effective learners when they are recognized as social, emotional, physical and cognitive beings. One of the most important shifts that cognitive neuroscience contributes to our view of learners has to do with the importance of recognizing learners through this lens. It requires a departure from traditional notions which suggested that being cool and detached was essential to effective reasoning. Current research illustrates that cognition without emotion is ineffective in that decisions often cannot be made in a reasonable time frame and are often unworkable.⁷ We do not think about things deeply without some emotional response to it. Our “gut instincts”—what has been called “body knowledge” or “somatic markers”—are critical to efficient and effective decision-making.⁸ Thinkers who are encouraged to mine their gut instincts are more effective⁹, and workplaces can support workers in making good use of emotion rather than ignoring it or banning it in the workplace.

What Steps Might Support a Transition Towards an Agentive View of Learners and Workers?

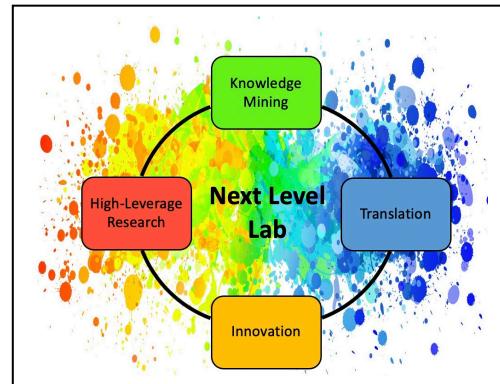
We believe that a shift towards a broadened vision of learners with an agentive, fast fish framing at the center holds a lot of promise for workforce development. We know that this raises questions about how to best implement and support such learners. Fortunately, research in neuroscience and the cognitive and learning sciences offers useful information about helping learners to become more effective and able to leverage the contexts around them. Next steps in this endeavor include developing approaches to fast fish learning based upon this research and then studying and reporting findings for the approaches.

It is important to clarify that we believe that specific strategies and research findings should be brought to bear in developing interventions to test. There is increasing conversation in the fields of education and workforce development about the importance of agency. While we agree in general, we think that the details are critical to whether it is a passing fad or an enduring educational innovation that leads to workplace success. Explicating the details and sharing research-based approaches with those who focus on workforce development, job placement, and advancement are important next steps in developing learners who can swim effectively in the deep end and for the distance.



About the Next Level Lab:

This work was developed through the Next Level Lab: Applying Cognitive Science for Access, Innovation, and Mastery (AIM) at the Harvard Graduate School of Education (HGSE) with funding from Accenture Corporate Giving (ACC). Any opinions, findings and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the funder. The Next Level Lab is pursuing this work as we articulate the findings from research in cognitive science, neuroscience, and learning sciences that inform approaches to education and workforce development. Our work sits at the intersection of mining extant research of promise; conducting research questions with the potential for high leverage impact; translating research on learning and the mind for public use; and innovating in the space of technology and learning to develop new visions for what is possible in developing human potential.



We are a small research lab. We view our mission as one of providing purpose and guidance to the field. Buckminster Fuller talked about the power of small influences in his description of a trimtab in this quote.

“Something hit me very hard once, thinking about what one little [person] could do. Think of the Queen Elizabeth again: The whole ship goes by and then comes the rudder. And there’s a tiny thing on the edge of the rudder called a trim tab. It’s a miniature rudder. Just moving that little trim tab builds a low pressure that pulls the rudder around. It takes almost no effort at all. So I said that the individual can be a trim tab. Society thinks it’s going right by you, that it’s left you altogether. But if you’re doing dynamic things mentally, the fact is that you can just put your foot out like that and the whole ship of state is going to turn around....” -Buckminster Fuller.

It is our hope that our small lab can function as a trimtab to create better outcomes for humankind.

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