Opportunity Education

Quest Forward Learning Research Brief

Skills Practice

The Role of Practice in a Post-Memorization World.

JOLENE ZYWICA
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Purpose & Overview

Currently, quests emphasize exploration and discovery. They do not always or explicitly support deliberate practice, which is necessary for developing and applying skills. Thus far, we have said repetitive practice, such as solving a series of similar math problems on a worksheet, does not belong in quests as we run the risk of supporting rote memorization over active discovery-based learning. However, we do need to offer a solution, so learners can gain the skills they need to excel in life beyond school. This brief starts by asking broad questions about the role of skills practice in Quest Forward Learning. It then highlights research on skill development and practice. It concludes by making recommendations for supporting practice in Quest Forward Learning. These recommendations serve as guideposts as we continue to refine and test experience concepts that can be developed to support practice within Quest Forward Learning.

Guiding questions:

- What does it take to acquire new skills and to continue to develop and advance a specific set of skills?

- How does reflection support practice and skill development?

- How do we help people learn to practice something effectively, so they learn deeply and keep skills over time?

In Quest Forward Learning, we define several types of skills that are essential for learners. These include self skills (e.g., mindfulness, managing emotions), social skills (e.g. assertiveness, collaboration), work skills (e.g. reacting to feedback well, problem-solving), and academic skills, which vary widely depending on the Quest Forward Learning program objectives. In conducting this research and writing this brief, I considered all practices and skills that could potentially be a focus of a Quest Forward Learning program.

Findings from Research

To explore skill acquisition, I primarily focused on research as it pertains to athletes, musicians, chess players, and experts in the medical field, as these are professions that require extensive practice and have been a focus of research. I also looked more broadly at the role of practice as it relates to twenty first century skills. The following information stood out in the research:

Practice is a process in which individuals try to improve by noticing performance and making adjustments (Rotherham & Willingham, 2010).

1. Experience and practice are both essential for developing skills. Performance and play are also necessary experiences for acquiring some skills, such as musical or athletic skills (Ericsson, Krampe, & Tesch-Romer, 1993).

2. Repetition is key. For many skills, repetition should happen daily in order to become part of routines (e.g. mindfulness, recognizing and managing emotions). All skills should be practiced regularly. Practicing a skill once likely isn't enough to acquire the skill and use it in different situations and many skills are lost over time without practice.

3. What is done while practicing is more important than how much is done (Starkes, 2000).

Practice is most beneficial when learners are motivated to achieve a specific goal.

Skills are developed and maintained over time by making sense of different types of knowledge, working with experts, working alone, and developing flexible routines (Rotherham & Willingham, 2010).

1. Learning to read and synthesize different types of information and knowledge is essential for developing a holistic set of skills. For example, people need to know how to communicate clearly and effectively. To do this, they need:

   - to understand how to be persuasive and the importance of persuasion.

   - specific strategies for creating a convincing argument.

   - knowledge of acceptable grammar usage and how to apply those rules.

   - to understand the audience they are trying to reach and be empathetic towards them.

   - skills for using tools to communicate ideas.

2. Working with experts exposes learners to knowledge and skills. It can be in the form of formal coaching or apprenticeship (Charness, Tuffiash, Krampe, Reingold, & Vasyukova, 2005). For example, being coached by someone who is really good at presenting and communicating is a good way to improve presentation and communication skills and gain related knowledge.

3 Working alone is important, too. Independent practice allows situated, context-specific knowledge to become embedded in personal routines. For musicians, individual practice is most effective, especially when learners have control over time spent practicing and when they practice. In the example of communication skills, a learner might have to practice a presentation or specific skill repeatedly on their own prior to communicating with others.

4 Routines should be personal, individualized, and flexible. Likely, practicing something the same way repeatedly will result in improvements only to a certain point; then, the learner will plateau. To move past a plateau, routines and practices need to be changed and forms of practice need to improve or be adjusted (Ericsson et al., 1993).

Practice is most beneficial when learners are motivated to achieve a specific goal (Ericsson et al., 1993).

1 Learners need to understand longterm consequences and benefits of practice and how practicing can help them achieve specific goals. Learners need to feel like practice is useful and appropriately challenging and will help them with something important.

2 Practice requires effort and isn't inherently enjoyable. Without effort or attention, practice is not effective. Learners need to care about the big picture for them to put forth effort during practice.

Relevance and context are critical.

1 Skills must be practiced as learners acquire knowledge - not separately (Rotherham & Willingham, 2010). Textbook facts and information aren't sufficient for becoming an expert. Becoming an expert requires practice in the social context. (e.g. Doctors can't always follow the rules in the book. They need to adapt based on specific situations and patients' needs.) (Smith, Goodwin, Mort, & Pope, 2003).

2 Skills like problem-solving, leadership, collaboration, and communication need to be practiced in context. An effective way to practice these skills is through problem-based learning and completing numerous projects that require collaboration and communication with experts or the community (Barell, 2010).

Noticing and being self-aware are a part of practicing, and reflection is essential for deep learning.

Reflection is the process of turning experience into learning (Boud, 2001; Schon, 1987). It is what shifts surface learning to deep learning (Moon, 1985). Reflection occurs during three occasions:

1 **Reflection prior to an event** emphasizes making the most of a future event. There are three aspects of this kind of reflection. First, the focus is on the learner, their goals, expectations, and intentions. Second, the context is considered. The learner practicing asks questions about the situation, the possibilities, what might happen, and who else is involved. Third, they focus on skills needed, including what they will need to notice, which strategies or tools they'll need, and what needs to be rehearsed in advance. Reflection prior to an event focuses on what might happen and what one can do to be prepared.

2 **Reflection in the midst of action** is essential for learning from an experience, particularly practice. Learners reflect through noticing, intervening, and reflection in action. Learners become aware of what is happening and intervene to change the situation. Reflection in action is the process of noticing and intervening to interpret events and the consequences of actions. Often, this kind of reflection is done unconsciously, but not until someone is effective at practicing.

3 **Reflection after events** has three elements: Returning to experience, attending to feelings, and re-evaluating the experience. During this process, learners connect new knowledge with old, determine authenticity of ideas and feelings, and incorporate new ideas into routines.

Immediate feedback and knowledge of performance is needed to improve (Ericsson, Krampe, & Tesch-Romer, 1993; Charness, Tuffiash, Krampe, Reingold, & Vasyukova, 2005).

1 More repetition will not lead to improvements or skill acquisition if the learner isn't getting feedback and making adjustments.

2 Practice is more effective when monitored by an expert. One-on-one practice and monitoring is more effective than group practice for many skills.

3 Feedback is effective in combination with individual practice and performance when learners use the skills to accomplish a goal.

Many tools are used to support practice, and their effectiveness varies.

For these tools to be effective, they need to be supporting a learner's goal. The tools should help learners practice skills that are needed to solve a relevant and important problem or address a need the learner cares about.

1 **Practice problems**: Schools often use worksheets with problems as a tool for practice. This can be effective if the student is practicing a skill they need in order to do something else. For example, completing math problems can be relevant if you need the skill to calculate how much tile you need to purchase for a bathroom remodel. Completing a worksheet to prove to the teacher that the learner knows multiplication is less effective or useful, and it is likely de-motivating.

2 **Games**: Many games have been created to support the practice of skills, such as typing and math skills. These can be effective if they are fun, challenging, or immediately relevant for addressing a need (e.g. I want to type faster to save time, so practicing typing through a game is relevant.)

- Typing games (e.g. http://www.typingtest.com/play-free-typing-games/)

- Math games (e.g. Dragon Box, http://dragonbox.com/products/algebra-12)

- Flashcard games (e.g. Tiny Cards, https://tinycards.duolingo.com/)

- Social studies games (e.g. Stack the States, https://itunes.apple.com/us/app/stack-the-states/id381342267?mt=8)

(3) Apps: There are many apps that support practice of mindfulness, reflection, and observation. They often include reminders and alerts, guided practice activities, and new tools for practicing (e.g. new meditation activities to practice).

- Mindfulness reminders (e.g. http://www.mindfulnessdc.org/bell/ or https://itunes.apple.com/us/app/mindfulness-reminders/id991671660?mt=8)

- Meditation tools (e.g. Headspace, https://www.headspace.com)

(4) Templates and forms: When practicing collaboration, communication, or project planning, templates are useful tools to scaffold the process. These typically guide learners through a process that might include defining roles and expectations, setting goals, defining means of communication, etc. Over time, as learners develop these skills, the templates are no longer needed.

- Project planning guides (e.g. http://dfa.tigweb.org/upload/studentguide.pdf, http://pbl101.weebly.com/uploads/3/1/3/1/31318861/form_-_k-5_bie_1011-team_work_plan.pdf)

(5) Productivity tools: Some skills can be practiced by providing learners with the right productivity tools--communication tools (email, Slack), collaboration tools (Google Docs, Dropbox), and project planning tools (Dapulse or Trello).

(6) Journals, Reflection tools: Journaling is an important tool for supporting reflective practices (Boud, 2001).

- Journaling can deepen learning by enabling learners to understand and reflect on their own processes, increasing active involvement, enhancing creativity and professional practice, and providing a voice to learners.

- Journaling is an effective activity prior to and after an event.

- It can be challenging to convince learners to journal regularly. If learners know they're being assessed, they write what they think the teacher wants them to write, not what they're really thinking (Hobbs, 2007). Make it easier for them by making journals private, giving learners the option to share their writing, and avoiding the grading or assessing of journal entries.

Conclusions

This section describes general experience needs as they relate to practice. These were developed after reflecting on the research just presented and considering the needs of Quest Forward Learning users. These are guiding ideas that inform concept and feature recommendations we make, but they are generally useful guidelines for anyone wanting to support learners in developing skills.

1. **Learners should only be asked to practice a skill if the skill is immediately relevant for accomplishing a specific and meaningful goal.** Learners should practice with purpose. If learners do not see the relevance, or if the relevance is simply to cover a Common Core Standard or prepare for a standardized test, it will not be an effective form of practice or useful to the learner. Practice should directly help learners accomplish something they care about or a longterm goal. Academic materials are often not inherently related to longterm goals and this connection must be clear for practice to be effective.

2. **Learners should feel that activities that involve practice are ongoing and accessible.** Practice is something that is rarely "finished" or "complete." Learners should be able to practice when they need it. These activities should be easily accessible, not hidden (and forgotten) in quests or in levels that have already been completed. They should also feel lighter and less intense than quests or projects. While this may not actually be true (practice can be hard and intense), it's important that learners feel practice is accessible and something they can do in the moment when they need it.

Learners should practice with purpose. If learners do not see the relevance, or if the relevance is simply to cover a Common Core Standard or prepare for a standardized test, it will not be an effective form of practice or useful to the learner.

3 In order to address a variety of skill and practice needs, learners will need to employ three different types of practice: a) practice independent of quest activities, b) practice to enhance quest activities and c) practice as experience.

Here are some scenarios when learners might practice:

- **Independent practice:** Learners will need to practice some skills in a manner completely independent of other learning activities. For example, practicing stress management can be engaging and valuable as an independent experience because it addresses a personal goal. This experience can be meaningful without needing to complete any other learning experiences.

- **Practice to enhance other learning activities:** Sometimes learners will need to practice a skill in order to achieve a larger goal in a quest. Practicing source citation properly is useful if you want to publish one of your quest artifacts for others to read on a blog. In this example, practice should be coupled with a broader experience (and quest) and goal.

- **Practice as experience:** Some skills, such as collaboration, communication, problem-solving, and critical thinking, should be practiced through experience, such as working with others on a project. For example, noticing and reflecting on your collaboration skills is a useful practice when you're working on a design-based project and want to improve your group's efficiency.

4 **Learners need to be aware of what they're practicing and why.** Quest Forward Learning can support this in a few ways:
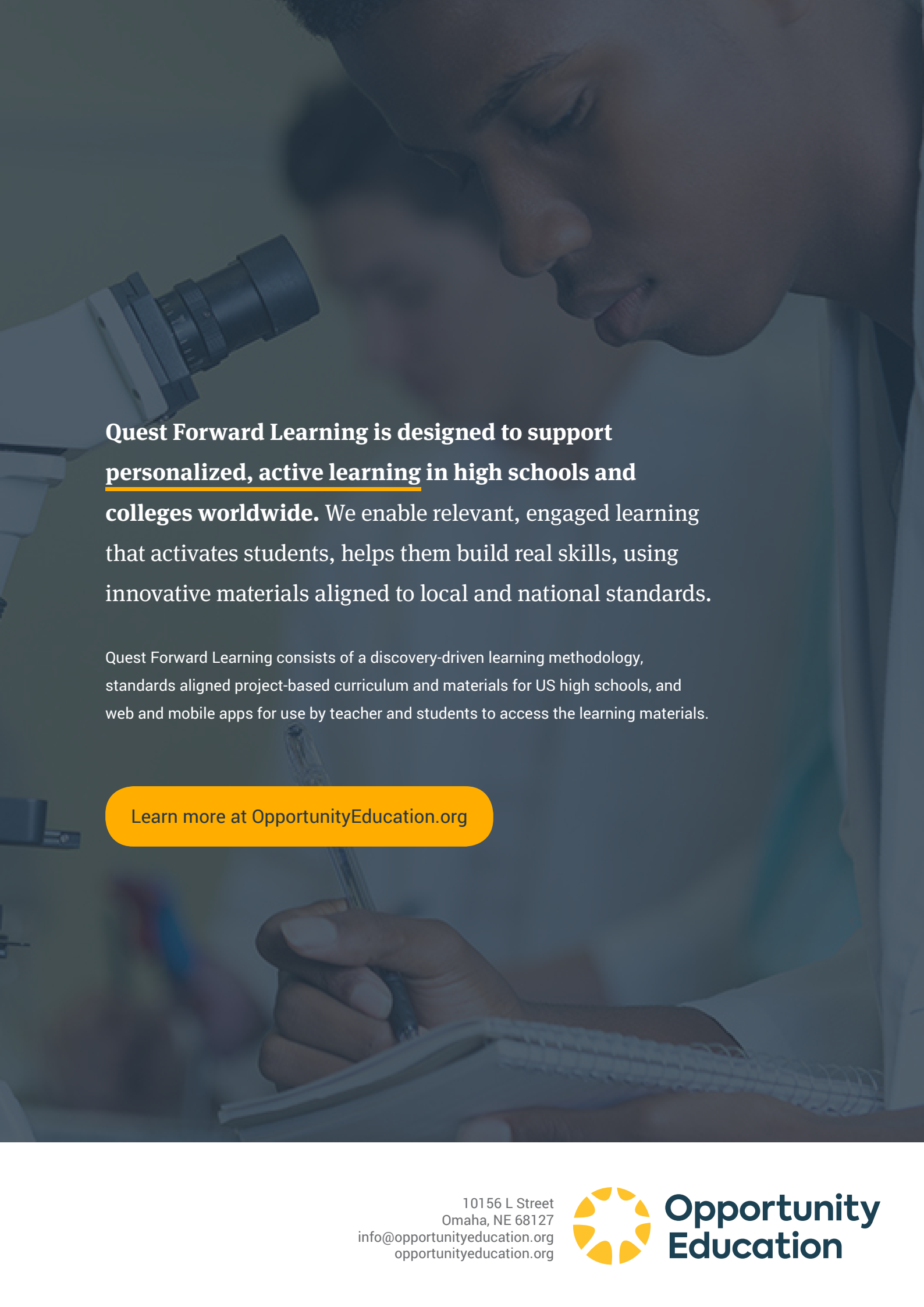
- Provide ways for people to learn more about the skills they are practicing and to get feedback on their abilities.

- Help learners become more aware of how a skill is useful.

5 **Learners need to practice some skills individually and other skills with a group.** Some skills are best practiced individually, while other skills need to be practiced socially. For example, the practice of managing emotions should be done individually, while practicing collaboration must be done with others.

6 **Learners need to notice and reflect prior to, during, and after practice, and they need to know how to improve. This speaks to the importance of self-reflection and feedback.** This is an area where we need to help learners develop reflection skills, but also be cautious, as we could quickly ask learners to reflect too frequently, resulting in frustration and disengagement.

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