

*Reflective practitioners want to know the why, how, and motivation behind their behaviors, decisions, and performances and will take the time needed in order to step back and process these questions to increase their meta-cognition.*

Becoming a reflective practitioner is a challenging growth process because it requires increased consciousness of thoughts, feelings, and behaviors that are typically habitual, unconscious, or assumed (i.e., requiring no explanation). It is not easy to determine what experiences or challenges, contexts (e.g., learning activities, teams, organizations), or tools (e.g., designed forms, assessment rubrics) will trigger or lead to growth in reflective practice. Furthermore, if we are to experience greater or more frequent reflective insights, we as individuals must challenge both social norms and institutional roles in order to step outside the habitual and often pre-programmed roles or expectations we have as learners, educators, and administrators. One of the goals of Process Education is for reflection to become a natural meta-cognitive process that drives not only the selection of learning experiences but also the assessment and reflection that make improved quality possible for individuals, teams, and organizations.

### Reflection Time

During Pacific Crest workshops, reflection time was built into the professional development process from the beginning. A journal/record was kept for each event that recorded the learning at end of each activity, at the end of each day, at the beginning of the next day, and at the end of the event. Break periods were even called *reflection time* as presented in *Teach for Learning — A Handbook for Process Education* (Apple, 1993). Chapter 3 of *Learning Through Problem Solving* is titled "Journal Writing" and focuses on improving learning through writing, "a process of recording observations and insights in private, proven to be a valuable self-assessment and learning tool" (Apple, Beyerlein & Schlesinger, 1992). At the end of each chapter, a "reflections" page prompts the learner to answer eight key questions to gain more understanding of themselves. One such prompt reads, "What personal growth occurred from this lesson? Identify an activity you will pursue to support this development."

During 1994, recorder and reflector reports were integrated into the cooperative learning model used during professional development institutes in order to aid faculty in reflecting on both the content and process they were experiencing. This practice was expanded with an *Introduction to Journal Keeping* (Kent, 1994) that included the following reflection tools:

- Skills for Life
- Daily Team Learning Activity Journal Form
- Daily Learning Journal
- Critical Reading Log
- Vocabulary Log
- Free Writing
- Collection Point
- Outside Activity
- Field Notes
- Weekly Ignorance Log
- Week in Review
- Critical Thinking Questions for Students and Teachers

In the *Learning Assessment Journal* (Carroll & Apple, 1995) a set of reflection tools was refined and structured to support a Process Education approach to improving learner performance in key processes: learning, thinking, problem solving, communication, assessing and teamwork. Added to the existing tools were refined versions of the reading log, and self-assessment form, as well as the weekly team recorder, and weekly team reflector reports. The next edition of the *Learning Assessment Journal* (2<sup>nd</sup> ed.) (Carroll & Beyerlein, 1996) again refined existing tools, upgraded the format of others, and added planner and spokesperson reports.

### Incorporating Reflective Practice in a Course

The value and practice of incorporating reflective practice into a course was explored in multiple contexts in the article *The Learning Assessment Journal as a Tool for Structured Reflection in Process Education* (Carroll, Beyerlein, Ford & Apple, 1997) and led to improvements in the 3<sup>rd</sup> edition of the *Learning Assessment Journal* (Carroll & Beyerlein, 1997), which included space for providing practitioner feedback, and the addition of log of entries and glossary forms. In the *Learning Assessment Journal* (4<sup>th</sup> ed.) (Apple, 2000) the forms were upgraded again and an activity assessment form was added to the array of tools.

The *Self-Assessment Learning Journal* (Krumsteg & Miller, 2001) added some guidelines for self-learners with computers: the Learning Process Methodology, learning skills, levels of learner performance, the Information Processing Methodology, the Methodology for Learning a New Tool, the topics of assessment and evaluation, and

the Personal Development Methodology. It also provided customization of existing forms for technology, and added a new lecture/lab notes form. The *Information Technology Self-Assessment Learning Journal* (4<sup>th</sup> ed.) (Krumsieg & Miller, 2008) provided an overview of the concepts of *learning to learn* and *self-growth*; in addition to improved forms, this edition also included a self-assessment project journal and weekly assessment notes.

Scholarship focused on how to engage students in reflection using tools that can be found in the *Faculty Guidebook* (Beyerlein, Holmes & Apple, 2007). The module *Persistence Log* (Atnip, 2007) deals with how to get students to understand when and how their efforts connect to their successes. *Practical Implementation of Self-Assessment Journals* (Miller, 2007a) discusses the principals of implementing reflective practice and self-assessment. There is an awareness of how context impacts reflective practice; *Using Reading and Lecture Notes Logs to Improve Learning* (Miller, 2007b) focuses particularly on building reflective practice in large lecture courses while Hare (2007) tackles the issue of implementing reflective practice within a team structure in *Team Reflection*.

The *Student Success Toolbox* pre-market edition (Pacific Crest, 2009) again upgraded the existing forms, added content on the Classification of Learning Skills, the criteria for team roles, information about the Theory of Performance, instructions for a self-growth gaper, the rubric for levels of learner performance, an activity analyzing a course syllabus, and tips for becoming an "A" student. New forms included concept mapping, addressing and avoiding errors, a learning journal, an SII performance assessment report, team assessment, performance analysis and assessment, a learning contract, mid-term assessment, and course assessment. This set of tools was expanded by providing access to items such as methodologies and rubrics that could be downloaded from a website. The *Student Success Toolbox* (1<sup>st</sup> ed.) (Pacific Crest, 2013) added a mentoring planning form, a mentoring agreement, a preparation worksheet, a weekly planner, and a course record sheet.

## Reflection and Self-Assessment

During a 2001 Advanced Teaching Institute, a community of Process Education practitioners spent some time considering the relationship between self-assessment and reflection, determining how and why they differ from and support each other (Dan Apple, personal recollection). Leise (2010), in his supervisory work with students studying counseling, explored the relationship between assessment and reflection in *Improving Quality of Reflecting on Performance*. He prepared a holistic rubric for assessing the quality of reflection from "unfocused observer" to "integrated reflector" (see Figure 1). He emphasized the importance of growth in selected skills across the cognitive,

social, and affective domains that are necessary for effective reflection (e.g., filtering information, being non-judgmental, and challenging oneself). He further noted that the Process Education perspective on reflection contrasts with philosophical and spiritual traditions; in the Process Education model, assessment of performance prompts reflection, and the discovery of insights from performance experiences is a significant meta-cognitive process that is essential to growth of skills. This scholarship was further advanced in the article *Comparative Analysis of Reflection and Self-Assessment* (Desjarlais & Smith, 2012). A disciplinary exploration of the importance of and methods for building metacognition within engineering practice is offered in *Reflection and Metacognition in Engineering Practice* (Davis, Leifer, McCormack, Beyerlein, Brackin & Trevisan, 2013).

## Reflection, and Meta-cognition in Student Curricula

The scholarly advances made with respect to self-assessment, reflection, and meta-cognition became a cornerstone of each learning experience in *Learning to Learn—Becoming a Self-Grower* (Apple, Morgan & Hintze 2013) and informed the design of learning activities, leading to a section dedicated to reflection, "Learning to Learn Mathematics: Reflecting on and Appreciating Your Learning" in *Quantitative Reasoning and Problem Solving* (Ellis, Apple, Watts, Hintze, Teeguarden, Cappetta, & Burke, 2014) (see Figure 2).

A learning activity that is entirely focused on metacognition is "Metacognition: Thinking about My Thinking,"--Experience 11 of *Learning to Learn: Becoming a Self-Grower*. This learning experience challenges learners to identify something they have learned (by documenting it with a learning journal worksheet) and then to engage in metacognitive exploration of that learning. They use a metacognitive exploration worksheet to do each of the following: record their level of learning, explain how they determined their level of learning, list the learning skills they use when demonstrating or applying their learning, determine and share the steps they used from the Learning Process Methodology in the course of doing the learning, create an outline of how to teach what was learned to someone else, and finally create inquiry questions that will help a new learner explore more deeply or transfer their learning.

Whether the implementation of reflective practice and increased metacognition is at the level of a post-activity prompt, forms/worksheets/tools integrated into a learning activity, or practices integrated into a teaching or learning at the course level, when reflection becomes a natural or familiar meta-cognitive process, the only possible result is improved learning and performance for everyone: learners, educators, individuals, teams, and organizations.

**Figure 1** Holistic Rubric for Assessing the Quality of Reflection

<p><b>5. Integrated Reflector</b> (<i>Reflects on transformative aspects of performance factors</i>)</p>
<ul style="list-style-type: none"> <li>a. Immediately perceives multiple aspects of behavior in any situation that indicate potential performance growth opportunities for self and others</li> <li>b. Assesses multiple performance issues against multiple types of performance standards</li> <li>c. Uses constructs from published theory and research to enlarge the scope of performance growth potential within the context of a system</li> <li>d. <b>Analyses</b> motivation and identity growth of performers in human organizations or systems from a leadership perspective</li> <li>e. Articulates insights about individual, group, and systems performance that can benefit the overall quality of an organization or system</li> </ul>
<p><b>4. Mindful Reflector:</b> (<i>Uses reflection for purposes beyond individual skills growth</i>)</p>
<ul style="list-style-type: none"> <li>a. Reliably captures the essence from an observed performance experience that should be the focus of assessment and analysis for growth</li> <li>b. Guides learners or mentees to assess growth in the transfer of skills needed to become broadly and deeply competent</li> <li>c. Designs learning activities that assist learners, mentees, or supervisees to flexibly gain applied insights from any type of relevant literature</li> <li>d. Uses a wide variety of critical thinking skills in focused ways to illustrate the various perspectives and insights available from the analysis of any performance</li> <li>e. Articulates insights that support the transfer of multiple skills to new or more challenging contexts</li> </ul>
<p><b>3. Applied Reflector</b> (<i>Uses reflection effectively for the growth of one's own skills</i>)</p>
<ul style="list-style-type: none"> <li>a. Consistently perceives and identifies relevant observations about actual performance experiences</li> <li>b. Self-assesses based on accurate observations focusing on differences in quality of current versus previous performance</li> <li>c. Selectively incorporates knowledge from scholarly literature to gain insights about dynamic factors such as how to improve learning conditions, how to benefit from mentoring, and how to apply key insights of experts</li> <li>d. Analyzes alternative assumptions or conceptualizations of what influences the quality of a performance</li> <li>e. Combines the current quality of performance with relevant knowledge about the area of competency to articulate insights about how to continue the growth of a skill</li> </ul>
<p><b>2. Descriptive Reflector:</b> (<i>Reflection at a beginning level; moving toward growth</i>)</p>
<ul style="list-style-type: none"> <li>a. Accurately observes/perceives relevant behavior and conditions related to one skill</li> <li>b. Imprecisely self-assesses because the focus is on abstractly-defined aspects of performance rather than on directly observed performance</li> <li>c. Relies directly on published knowledge about relatively fixed personal factors, e.g., personality or school achievement, to provide a basis for understanding observations about performance</li> <li>d. Evaluates performance using standards based on the expectations of others</li> <li>e. Articulates insights in terms of what a performer should do to meet the expectations of evaluators or other assumed standards</li> </ul>
<p><b>1. Unfocused Observer:</b> (<i>Captured by present assumptions and emotions</i>)</p>
<ul style="list-style-type: none"> <li>a. Demonstrates inconsistent focus of perceptions and observations within a situation, even with guidance</li> <li>b. Uses positive, but "evaluative," descriptors such as "good" or "well done" to characterize performance in a situation</li> <li>c. Relies on personal opinion or impressions for validation of assumptions about current performance</li> <li>d. Accepts current assumptions without question; may be surprised at alternative appraisals from others</li> <li>e. Describes personal reactions about performance as insights</li> </ul>

[Factors: (a) Quality of Observations, (b) Quality of Self-Assessment, (c) Quality of Background Knowledge, (d) Quality of Critical Analysis, and (e) Articulation of Insights]

Figure 2

Learning to Learn Mathematics *Reflecting on and appreciating your learning*

1. What does the saying “A picture is worth a thousand words” have to do with learning and using mathematics?
2. What is the relationship between reasoning quantitatively and interpreting a graphic?
3. Why is a skeptical approach to graphics (i.e., not automatically assuming they are true/correct) preferable for both the mathematician and scientist?

## References

- Apple, D. K. (1993). *Teach for learning: A handbook for Process Education*. Corvallis, OR: Pacific Crest.
- Apple, D. K. (2000). *Learning assessment journal* (4<sup>th</sup> ed.). Lisle, IL: Pacific Crest.
- Apple, D. K., Beyerlein, S. W., & Schlesinger, M. (1992). *Learning through problem solving*. Corvallis, OR: Pacific Crest.
- Apple, D. K., Morgan, J., & Hintze, D. (2013). *Learning to learn: Becoming a self-grower*. Hampton, NH: Pacific Crest.
- Atnip, C. (2007). Persistence log. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty guidebook: A comprehensive tool for improving faculty performance* (4<sup>th</sup> ed.). Lisle, IL: Pacific Crest.
- Beyerlein, S. W., Holmes, C., & Apple, D. K. (Eds.). *Faculty guidebook: A comprehensive tool for improving faculty performance* (4<sup>th</sup> ed.). Lisle, IL: Pacific Crest.
- Carroll, S., & Apple, D. K. (1995). *Learning assessment journal*. Corvallis, OR: Pacific Crest.
- Carroll, S., & Beyerlein, S. W. (1996). *Learning assessment journal* (2<sup>nd</sup> ed.). Corvallis, OR: Pacific Crest.
- Carroll, S., & Beyerlein, S. W. (1997). *Learning assessment journal* (3<sup>rd</sup> ed.). Corvallis, OR: Pacific Crest.
- Carroll, S., Beyerlein, S. W., Ford, M., & Apple, D. K. (1997). *The learning assessment journal as a tool for structured reflection in Process Education*. Corvallis, OR: Pacific Crest.
- Davis, D., Leifer, P., McCormack, J., Beyerlein, S. W., Brackin, P., & Trevisan, M. (2013). Reflection and metacognition in engineering practice. In M. Kaplan & N. Silver (Eds.), *Using reflection and metacognition to improve student learning across the disciplines, across the academy*. Sterling, VA: Stylus.
- Desjarlais, M., & Smith, P. (2012). Comparative analysis of reflection and self-assessment. *International Journal of Process Education*, 4(1).
- Ellis, W., Apple, D. K., Watts, M., Hintze, D., Teegarden, J., Cappetta, R., & Burke, K. (2014). *Quantitative reasoning and problem solving*. Hampton, NH: Pacific Crest.
- Hare, P. (2007). Team reflection. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty guidebook: A comprehensive tool for improving faculty performance* (4<sup>th</sup> ed.). Lisle, IL: Pacific Crest.
- Kent, C. (1994). *Introduction to journal keeping*. Corvallis, OR: Pacific Crest.
- Krumsieg, K., & Miller, R. (2001). *Self-assessment learning journal*. Corvallis, OR: Pacific Crest.
- Krumsieg, K., & Miller, R. (2008). *Information technology self-assessment learning journal* (4<sup>th</sup> ed.). Lisle, IL: Pacific Crest.
- Leise, C. (2010). Improving quality of reflecting on performance. *International Journal of Process Education*, 2(1).
- Miller, R. (2007a). Practical implementation of self-assessment journals. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty guidebook: A comprehensive tool for improving faculty performance* (4<sup>th</sup> ed.). Lisle, IL: Pacific Crest.
- Miller, R. (2007b). Using reading and lecture notes logs to improve learning. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty guidebook: A comprehensive tool for improving faculty performance* (4<sup>th</sup> ed.). Lisle, IL: Pacific Crest.
- Pacific Crest. (2009). *Student success toolbox* (pre-market edition). Lisle, IL: Pacific Crest.
- Pacific Crest. (2013). *Student success toolbox* (1<sup>st</sup> ed.). Lisle, IL: Pacific Crest.