Process Education is a performance-based philosophy of education which integrates many different theories, processes, and tools in emphasizing the continuous development of learning skills through the use of assessment principles in order to produce learner self-development.

Process Education has its roots in both systems philosophy (Laszlo, 1972) and systems engineering (Schlager, 1956), especially the aspects of systems engineering that focus on discovering patterns and designing and managing complex systems over their life cycles by elucidating and optimizing processes and controls. One of the most powerful tools in systems engineering, is structured dialogue as defined by Christakis (2006). Structured dialog is one of the central processes evident in the Process Education discussions, collaboration sessions, and workshops which have taken place over the last three decades. One of the goals of structured dialogue is to use collaborative interaction to construct theories or schema that are concise, accurate, explanatory, defensible, and powerful; this is a near perfect description of the dynamic and process at the Problem Solving across the Curriculum Conferences that took place in the 1990s (PSAC, 1990 - 1996).

Establishing the Philosophy

The first PSAC conference (Kramer & Beery, 1990) led to the development of Pacific Crest's first teaching institute with the intended result of "building confidence in using Process Education" (Apple 1991). Specifically, this teaching institute focused instructor attention on the stepwise processes or methodologies underlying cooperative learning, communication, self-assessment, discovery learning, critical thinking, and problem solving, also explicitly teaching 26 learning skills that support the successful implementation of these methodologies. During the 1993/1994 academic year, a series of papers were published that explored the implications of these ideas: *Everyone Can Learn to Learn* (Arah & Apple, 1993), *Expanding Mathematics Education into a Process* (Apple, 1993b), and *Education as a Process* (Apple & Lawrence, 1994). This led to the creation of a new teaching institute resource, *Teach for Learning — A Handbook on Process Education* (Apple, 1993a).

A major conclusion drawn from this scholarship and conversations focused on it was that the shared philosophy behind these innovative teaching and learning practices — by this time already referred to as *Process Education* (PE) — needed to be further delineated and explicitly defined. Between 1994 and 1999, a series of papers and documents (see Figure 1) did just that by refining and fortifying the theoretical and philosophical underpinnings of the philosophy.

While the list of processes and tools of Process Education continues to grow even now, the core principles, as articulated between 1994 and 1999 remain constant. These are enumerated in Figure 2.

As Process Education began to be implemented in practice, its impact was chronicled in a number of reports as shown in Figure 3.

Figure 1 Scholarship Focused on Process Education: 1994 to 1999

Transforming Engineering Education from a Product to a Process (Neff, Beyerlein, Apple & Krumsieg, 1995)

Process — The Missing Element (Hanson & Apple, 1995)

Concept Map of Process Education (Duncan-Hewitt, 1995)

Process Map for Mentoring (Duncan-Hewitt, 1999)

A Primer for Process Education (Apple & Duncan-Hewitt, 1995)

The Taxonomy of Process Education (Duncan-Hewitt & Apple, 1996)

The Classification of Learning Skills for Educational Enrichment and Assessment (Apple, 1997)

Process Education — A New Educational Mission (Apple, 1997)

A Model of Higher Education (Apple, 1997)

Comprehensive Overview of Process Education Philosophy (Apple & Foreman, 1999)

Figure 2 The Core Principles of Process Education

1	Faculty must fully accept responsibility for facilitating student success.
2	In a quality learning environment, facilitators of learning (teachers) focus on improving specific learning skills through timely, appropriate, and constructive interventions.
3	Mentors use specific methodologies that model the steps or activities they expect students to use in achieving their own learning goals.
4	A Process Educator can continuously improve PE concepts, processes, and tools used by doing active observation and research in the classroom.
5	Educators should assess students regularly by measuring accomplishments; they should model assessment processes, provide timely feedback, and help students improve their self-assessment skills.
6	Every learner can learn to learn better, regardless of current level of achievement; one's potential is not limited by current ability.
7	Although everyone requires help with learning at times, the goal is to become a capable, self-sufficient, life-long learner.
8	An empowered learner is one who uses learning processes and self-assessment to improve future performance.
9	To develop expertise in a discipline, a learner must develop a specific knowledge base in that field, but must also acquire generic, life-long learning skills that relate to all disciplines.
10	An educational institution can continually improve its effectiveness in producing stronger learning outcomes in several ways: By aligning institutional, course, and program objectives; By investing in faculty development, curricular innovation, and design of performance measures; By embracing an assessment culture.

Figure 3 Scholarship Focused on Implementing Process Education

Reforming the Teaching of Entry Level Math in the Electronic Age (Pierce & Wright, 1995)

Taking the Helm — Targeting Student Learning at Kirkwood Community College (Klopp, 1996)

A Process Education Approach to Teaching Computer Science (Smith, 1996)

A Focus on Process Improves Problem-Based Learning in Large Classes (Duncan-Hewitt, 1996)

Improving the Teaching/Learning Process in General Chemistry (Hanson & Wolfskill, 1998)

A Process Approach for Improving Student Performance in Learning Mathematics (Atnip & Apple, 1999)

Process Education and Continuous Quality Improvement at Western Michigan University (Williams, Litynski & Apple, 2001)

Process Education and the *Faculty Guidebook*

By the year 2000, the individuals practicing and supporting Process Education began to evolve into a community of research-based PE practitioners. The first formal gathering of this group took place at Elmhurst College in June, 2004. An important outcome of their collaboration was the inception of the *Faculty Guidebook* (Beyerlein, Holmes & Apple, 2007). The *Faculty Guidebook* consists of more than 150 modules, the content of which ranges from exploring the potential impact of Process Education on the world and culture of higher education systems to concise how-to instructions and tips. *Faculty Guidebook* modules directly concerned with the philosophy of Process Education include those listed in Figure 4.

The International Journal of Process Education

In 2007, this community of practitioners was officially named "the Academy of Process Educators" at a conference hosted by the University of the District of Columbia (see also the **Academy of Process Educators** section). One of the central goals of the Academy was to produce a journal focusing on Process Education; since 2009, the Academy has produced seven volumes of the *International Journal of Process Education (IJPE)*. While

every article in the *IJPE* is concerned with some aspect of Process Education, articles of particular note with respect to the theory and practice of Process Education include those listed in Figure 5.

The year 2016 represents the 25th anniversary of Process Education. We have come a long way since that first teaching institute in 1991, with its goal of building confidence in using "process education." This anniversary will be celebrated at the annual Process Educator's Conference at Grand Valley State University, with a host of workshops, symposia, and sessions to be held, each offering collaborative interaction and structured dialogue, so that PE practitioners can continue to construct theories and schema that are concise, accurate, explanatory, defensible, and powerful (Process Education Conference, 2016).

Figure 4 *Faculty Guidebook* Modules Focused on Process Education

*Introduction to Process Education (*Beyerlein, Schlesinger & Apple, 2007)
Knowledge Table for Process Education (Schlesinger & Apple, 2007)
Classification of Learning Skills (Apple, Beyerlein, Leise & Baehr, 2007)
Process Education as a Motivation and Self-regulation System (Leise, 2007b)
Framework for Implementing Process Education (Duncan-Hewitt, 2007a)
Becoming a Self-Grower (Leise, 2007a)
Role of Process Education in Fulfilling the Changing Roles in Higher Education (Duncan-Hewitt, 2007b)
Learning Processes through the Use of Methodologies (Leise & Beyerlein, 2007)
Moving Towards an Assessment Culture (Utschig, 2007)
Annual Professional Growth Plan (Hurd, 2007)

Figure 5 *IJPE* Articles Focused on Process Education (Academy of Process Educators, 2016)

Process Education: Past, Present, and Future (Burke, El-Sayed & Apple, 2009)
Process Education and Constructive Alignment: The Challenge of Student Assessment Online (Lawrence & Snyder, 2009)
Process Education Best Practices for Teaching Open-Ended Problem Solving in a Project Context (Morgan & Williams, 2010)
The Transformation of Education: 14 Aspects (Hintze, Beyerlein, Apple & Holmes 2011)
Enhancing a First-Year Success Course through Process Education (Jones & Kilgore, 2012)
What is Special About Process Education? (Desjarlais & Morgan, 2013)
Online Professional Development for Process Educators (Beyerlein, Burke, Mutisya, & Cordon 2014)
Learning to Learn Camps: Their History and Development (Apple, Ellis, & Hintze 2015)
Learning How to Learn: Improving the Performance of Learning (Apple & Ellis 2015)
What is Self-Growth? (Jain, Apple, & Ellis 2015)

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