A Primer for Process Education

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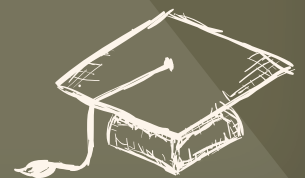
Primer for Process Education
"Sharing 25 years of Practice and Scholarship"

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By providing a logical and methodical approach to revising the structures and processes of our educational systems and institutions, Process Education can play a pivotal role in empowering people to create healthier, more adaptive and sustainable lives, communities, and societies. Our parents believed that we could become whatever we wanted to become and Process Educators agree with them. By adopting this powerful philosophy, education can be about empowering each individual to become a self-grower by continually increasing the capacity of each to, reflect, self-assess and learn.

The authors came to embrace Process Education through a variety of experiences. For Dan, it was his four years at UC Santa Cruz that kindled the desire to increase his learning performance and self-assessment skills which eventually became foundational to his approach to life. It was during the summer after his junior year that he created a life vision that has guided his values, decisions, efforts, education and accomplishments ever since. Wendy refers to the fighting spirit engendered in her by the overwhelming challenges at her first teaching institute. For Wade, his experiences at Andover and Oberlin College along with teaching in the New Horizons program at The Ohio State University as a graduate teaching assistant convinced him that a quality learning environment with attention to student learning were keys to student success and that anyone could succeed if truly given the chance.

With over 100 collective years of practice in higher education, we began collaborating more than 20 years ago, near the inception of Process Education.

Collectively, we believe that:

1) Every student deserves success, and as educators and significant institutional stakeholders, we can provide a set of experiences that empower every student to succeed (i.e., produce Self-growers).

2) Every faculty and staff member, by continual self-development, can increase their contribution to student success (modelers of self-growth).

3) Every institution can increase student success by creating a Learning-to-Learn and Self-growth culture.

We have written this primer to help you start your own journey as a Process Educator. It is designed to help you understand Process Education more fully, connect with other Process Educators, share language and key practices, and explore the breadth and depth of PE scholarship and practice, all of which will enable you to strengthen your empowerment of students.

OVERVIEW OF THE PROCESS EDUCATION PRIMER

This primer is designed to orient faculty, staff, and administrators to the Process Education philosophy and some of the most important discoveries made by Process Educators over its first 25-year history. Every person who adopts the attitudes and practices described in this primer will improve her/his performance as an educator and contribute more effectively in increasing learner success. Specifically, readers will:

1. Conclude that this is the heretofore elusive educational philosophy they had been seeking.

2. Discover how to integrate the philosophies underpinning their approaches to education and life.

3. Motivate (or Enthuse) others by effectively articulating the meaning of Process Education.

4. Obtain 20 takeaways that will improve their performance as an educator.

It is important to emphasize that Process Education is an educational philosophy and not a program or a tool. However scholarship founded on the philosophy has led to published best practices that help to increase the quality of learning, teaching, facilitating, designing, assessing, and mentoring.

As laid out in the table of contents, the primer will clarify what Process Education is, why it is needed, how to implement it, along with evidence-based explanations of how it works.

DESCRIPTION OF PROCESS EDUCATION

Process Education™(PE) can be defined as a **performance-based** philosophy of education which integrates many different educational **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**. (www.pcrest.com/PC/PE)

The PE philosophy is founded on two premises:

1. Every learner can learn to learn better, regardless of his or her current level of achievement; one's potential is not limited by current ability.

2. Educators have a responsibility to "raise the bar" in their profession because learning is enhanced and achieved for all learners when educators help build learning skills, create and improve quality learning environments, design solid coherent curricula, and serve as effective facilitators of learning.

PE requires that learning and facilitation of learning take place within an assessment culture, rather than a culture of evaluation. In the traditional educational model, the focus is upon evaluation—an educator judges a student's efforts and performance against objective criteria with standards. While this evaluation can provide a useful snapshot of performance, it does not encourage the *improvement* of that performance. Through the careful use of assessment, however, students can continually improve the quality of their performance. This is critical, as the goal of PE is to help individuals develop into self-growers. Self-growers are learners who seek to improve their own learning performance; can create their own challenges; serve as leaders and mentors to others; take control of their own destiny, and self-assesses and self-mentor to facilitate their own growth.

Process Education is based upon a foundation of several different educational philosophies and approaches, most of which fall into the general category of constructivism. Constructivism is built upon the cognitive theory of development pioneered by Jean Piaget. One of the core assumptions of constructivism is that learning is an active, contextualized process of constructing rather than acquiring knowledge. This

knowledge is constructed on the basis of personal experiences and the hypotheses that a learner makes about the environment. Piaget is also credited with identifying stages of (largely cognitive) learner development. Subsequent theorists built on or provided alternatives to his ideas. Lev Vygotsky's social developmental theory, for example, focused more heavily on the influence of social interaction in the process of cognitive development. Jerome Bruner also emphasized environmental and experiential factors in his theory of learning. Building on constructivism, his book, *The Process of Education (1960)*, described people as being active in the process of learning, continually structuring and restructuring their environment and recommended approaches such as the "spiral curriculum" and discovery learning.

Educational theorists like Alan Tough and Malcolm Knowles have applied these concepts to adults, using the term *self-directed learning*. Self-directed learning has become increasingly important as our rapidly changing world necessitates life-long learning, extending well beyond any formal classroom. Knowles was an especially strong advocate for the self-directed learner, arguing that proactive learners enter into learning more purposefully and with greater motivation, leading to increased retention (Knowles, 1975).

PRINCIPLES OF PROCESS EDUCATION

1. Every learner can learn to learn better, regardless of current level of achievement; one's potential is not limited by current ability.

2. Although everyone requires help with learning at times, the goal is to become a capable, self-sufficient, lifelong learner.

3. An empowered learner is one who uses learning processes and self-assessment to improve future performance.

4. Educators should assess students regularly by measuring performance, modeling assessment processes, providing timely feedback, and helping students improve their self-assessment skills.

5. Faculty must accept fully the responsibility for facilitating student success.

6. To develop expertise in a discipline, a learner must develop a specific knowledge base in that field, but also acquire generic, lifelong learning skills that relate to all disciplines.

7. In a quality learning environment, facilitators of learning (teachers) focus on improving specific learning skills through timely, appropriate, and constructive interventions.

8. Mentors use specific methodologies that model the steps or activities they expect students to use in achieving their own learning goals.

9. An educational institution can continually improve its effectiveness in producing stronger learning outcomes in several ways. A process educator can continuously improve the concepts, processes, and tools used by doing active observation and research in the classroom by:

   (1) Aligning institutional, course, and program objectives;

   (2) Investing in faculty development, curricular innovation, and design of performance measures;

   (3) Embracing an assessment culture

Today's increasingly experience-based economy needs workers who are proactive, responsible, creative, and collaborative, and who are capable of continuing to learn and adapt to a rapidly changing environment. Evidence from numerous sources reveals that the US educational system is failing to produce graduates who possess these characteristics and is, in fact, falling further and further behind. Governmental and business leaders have joined with the media in warning that both the economic vitality and security of the United States is in jeopardy if significant steps are not taken to reform education (COSEPUP/NAS/NAE/IOM, 2007)[*]. Though the primary focus is often on K-12 education, higher education is also part of the indictment. These warnings are not a surprise to those involved in the educational community; individual educators find themselves routinely caught in multiple currents of social and pedagogical change that swirl around today's classrooms and institutions (Altbach, Reisberg, & Rumbley, 2009). The voices that are pushing, arguing, and pleading for change across the continuum of education are not in harmony, other than in their base agreement that change must happen. There is no overarching model or even singular and coherent description of what that change should be (Technology, 2010).

Accreditation agencies (regional and professional) have been raising the public's expectations that educational programs should increase completion rates as well as demonstrate outcomes that enhance their graduates' success in their professional and personal lives. Ample research exists regarding students' failure to progress in and/or graduate from high school and college (Horton, 2015) and the challenges confronting secondary and post-secondary educational institutions as they strive to increase their completion rates (Kuh, 2006). The volume of research in this area has increased significantly over the last couple of decades as pressures mount through policy changes such as the drive towards performance based funding.

 The response offered by the philosophy of Process Education™ (Burke, Lawrence, El-Sayed, & Apple, 2009) is that nothing short of a multi-layered transformation of education will lead to measurable and observable system-wide success. This requires that stakeholders at all levels engage in coordinated reflection, reinvention, and renewal. The paradigm shift offered by the precepts of Process Education is an effort to put forward a shared vision of how education should work and how improved performance can then be realized on the part of learners, educators, and administrators, if we are to achieve systemic success.

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* The Committee on Science, Engineering, and Public Policy (CLOSEUP), National Academy of Sciences (NAS),National Academy of Engineering (NAE), Institute of Medicine (IOM).

Transforming higher education is not an easy task given the complexities and variations of institutions, the high value placed on independent thought and action, the evolution of extensive bureaucracies, and the myriad processes and practices tied to tradition. The system of education is complex, and attempts at sustainable transformation can fail if one is not aware of all the forces and counter-forces involved. Educational transformation is nothing less than the positive and purposeful transformation of every individual who is involved in education.

As an integral part of its efforts to make credible and accessible the promise of transformed practice through Process Education, Pacific Crest has sponsored and actively engaged in faculty development, dialogue, critique, and scholarship and over the years, these have revealed fourteen essential and interdependent aspects (originally called "dimensions") of educational transformation (Pacific Crest, 2009-10). These are:

1. Challenge – the degree to which increasing the level of difficulty is used in order to grow capacity for learning and performing

2. Cognitive Complexity – the degree to which training and doing are elevated to problem solving and research

3. Control – the locus of power/authority for the learning situation or experience

4. Delivery – the means by which information/ knowledge/ skill is obtained by the learner

5. Design – the purposeful arrangement of the instructional environment, materials, and experiences to support learning

6. Efficacy – the well-founded belief in one's capacity to change and to make a difference

7. Feedback – information about what was observed in a performance or work product

8. Measurement – the process of determining the level of quality of a performance or products

9. Ownership – the degree to which a learner accepts responsibility and accountability for achieving learning outcomes

10. Relationship – the degree of emotional investment an instructor or mentor has in his or her students or mentees

11. Scope of Learning – the contexts across which learning occurs and its application is demonstrated

12. Self-awareness – the degree to which reflective and self-assessment practices are used the individual to foster the growth of his or her learning skills across the cognitive, affective and social domains

13. Social Orientation – the investment, interdependence, and responsibility for learning throughout the community

14. Transparency- the degree to which stakeholders can view individual, team, or collective performances

The Compass of Higher Education (2007) provides a concept map which describes the post-transformation state of education — Process Education in practice.

The interrelated nature of PE is illustrated by the graphic below that demonstrates the different but mutually supportive roles of learners, teachers, and organizations (administrators and staff) in enriched learning environments (Figure 1). The Compass of Higher Education has five aspects: 1) Intellectual Development: If teaching is the quality facilitation of learning at higher levels that increases the construction of knowledge, then increasing quality teaching, learning, thinking and researching will strengthen Intellectual Development. 2) Learner Development: Strengthened knowledge with improved mentoring enhances growth of key transferable skills such as critical thinking, communication and teamwork and increases the effectiveness of Learner Development. 3) Self Development: Individuals learn to self-mentor their own growth through self-assessment and reflection that further enhances Self Development. 4) Professional Development: Individuals who embrace best researched practices in their educational and other professional functions continue growth that inspires expansion into new areas leading to Professional Development. 5) Institutional Development: Empowered teachers and learners can support institutions that must be receptive to change and employ continuous quality improvement to increase Institutional Development. Strong institutions can provide environments that enable more intellectual development to continue the cycle.

Figure 1 Compass of Higher Education
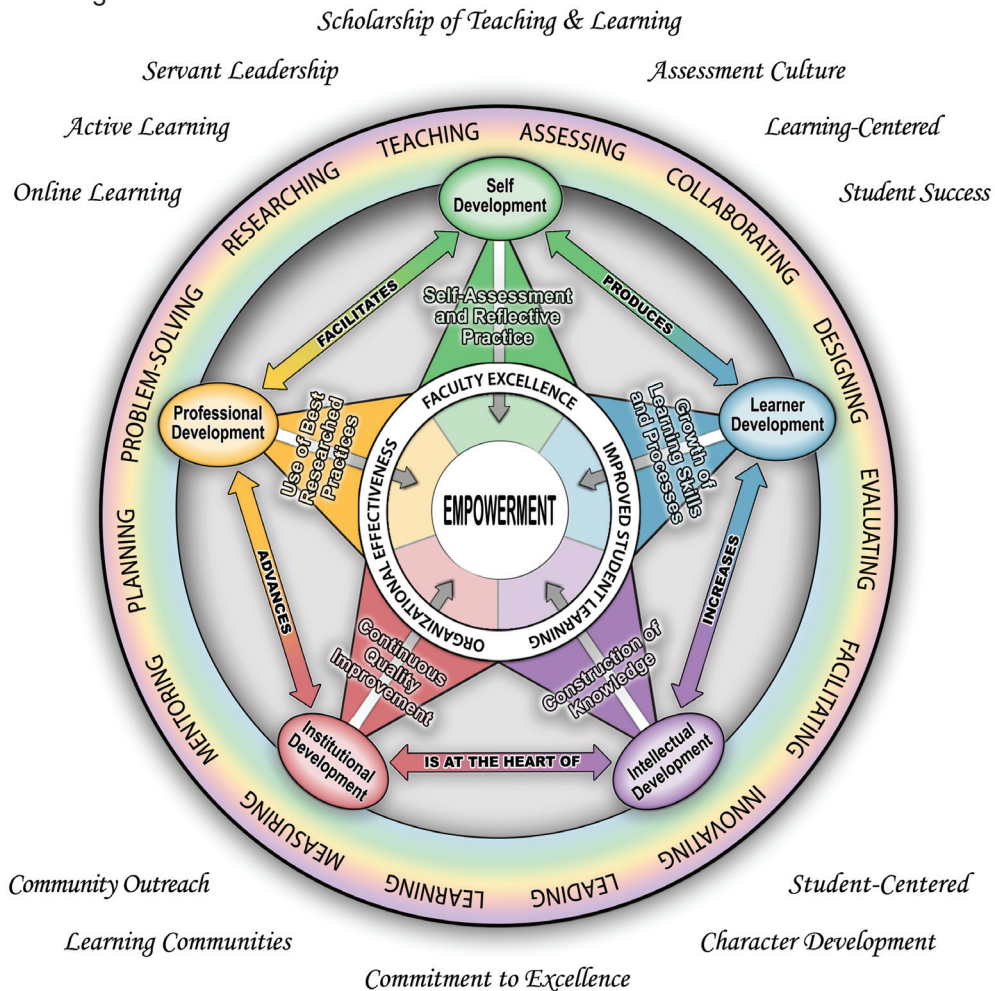
The demographics of the American population are evolving rapidly and due to a variety of factors, more and more college students are considered to be at-risk. At-risk students may be: (a) those who have made poor choices or decisions that impacted negatively on their academics, (b) adult students who return to higher education after an extended absence, (c) students with academic or physical limitations not identified before enrolling in higher education, (d) impacted by socioeconomic factors that serve as barriers to academic success. The skills, knowledge, motivation, and/or academic ability of at-risk students are significantly inferior to those of the 'typical' college student (Maxwell, 1997). Further, at-risk students are likely to demonstrate 'low academic self-concept, unrealistic grade and career expectations, unfocused career objectives, extrinsic motivation, external locus of control, low self-efficacy, inadequate study skills for college success, a belief that learning is memorizing, and a history of passive learning,' among other things (Ender & Wilkie, 2000).

King (2004) categorized at-risk students as falling into four groups: (1) those who are academically underprepared as a result of poor educational experience (poor preparation, low expectations or academic failure); (2) Individuals with risk factors such as neurological, cognitive, health, or psychological factors that can contribute to academic failure (e.g., traumatic brain injury, learning disabilities, chronic illness, psychological problems, or student attitude toward learning); (3) those with experience-familial risk factors including disturbed family functioning, dependent care issues, familial values concerning education, and lack of financial resources; (4) those with social risk factors i.e., conflicting ethnic or cultural values or stressful peer and social interactions. Keeling (2003) adds another group to the at-risk list: the Millennial generation students who graduate high school in the 21st Century, often entering postsecondary institutions lacking educational planning skills.

Table 1 High-Risk Collegiate Factors Impacting Learning (Horton, 2015)

Aimless	Self-Evaluators	Financial Constraints	No Sense of Self-Efficacy
Procrastinates	Fixed Mindset	Lacks Self-Discipline	First Generation College Student
Irresponsible	Teacher Pleaser	Minimal Meta-Cognition	Doesn't Transfer Knowledge
Afraid of Failure	Unchallenged	Non-Team Player	Insecure Public Speaker
Unmotivated	Memorizes	Lacks a Support System	Lacks Mentors

Process Educators are confident that ALL collegiate learners—even those with extensive risk factors—can be transformed into successful students with well-developed learner characteristics. But this has an absolutely inescapable implication. It mean that whether a student fails or succeeds is undeniably an institutional responsibility because students who are failing, or are at risk of failing, could be turned around if Process Education principles were integrated into the cultural practices of the institution. The Transformation of Education is a gauge of the cultural movement towards Process Education and its principles. In fact, risk factors can be mapped into successful learner characteristics as presented in Table 2 aligned with the 14 aspects of the Transformation of Education (T of E). The rest of this primer focuses on how these learner characteristics can be developed when the culture is transformed.

Table 2 Risk Factors Transformed into Key Learner Characteristics

T of E Aspects	Risk Factors	Profile of A Quality Collegiate Learner Success Characteristics	
Challenge	Procrastination Unchallenged	Self-starter Self-challenges	Prioritizes Manages Frustration
Cognitive Complexity	Underprepared Memorizers	Readers Information Processor	Critical Thinkers Problem Solvers
Control	Differential Irresponsible	Goal Setters Validates	Responsible Focused
Delivery	Transcription Head Nodding	Writing to learn Learners	Organized Working Hard
Design	Cramming Can't Transfer	Prepared Engaged	Uses Resources Effectively Generalizers
Efficacy	Fixed Mindset Self-doubters	Self-Grower Self-Efficacious	Being Positive Committed to Success
Feedback	Fear of Failure Self-evaluators	Leverages Failure Seeks Feedback	Self-assessors Listens
Measurement	Minimalist Teacher Pleaser	Clarifies Expectations Self-confident	Financial Management Self-directed
Ownership	Undisciplined Unmotivated	Learner Ownership Plans	Self-motivated Manages Time
Relationship	Lacks Support System No mentor	Connected Assertive	Asks for Help Persisting
Scope of Learning	Lacks Meta-cognition Non-interdisciplinary	Meta-cognition Adapting	Seeks Diversity Wellness
Self-awareness	Aimless 1st Generation	Life Vision Reflection	Self-discipline Methodologies
Social Orientation	Non-Team player Insecure Public Speaker	Team Player Communicator	Public Speaker Collaborative
Transparency	Seeks Affirmation Non-Risk takers	Inquisitive Risk-takers	Open-Minded

A Profile of a Quality Collegiate Learner is a model of the learner characteristics that should be the institutional developmental focus for all students to increase success in college, career, and life. This Profile can help colleges assess an incoming student's learning capacity and target areas that need to be strengthened for academic success as well as be a set of learning and growth outcomes of program and course designs (Apple, Duncan, & Ellis, 2016).

Paradigm Shift How does a failing student become a quality collegiate learner? By shifting from the "what" of education (knowledge and disciplinary skills) to the "how." The how includes BOTH Learning to learn and learning to self-grow.

Research on teaching focuses on how best to design, facilitate, and enhance the ability of experts to share knowledge with learners — teaching educators how to teach effectively. And while much research has focused on learning as the act of constructing knowledge, we don't typically think of learning as an act that is comparable to teaching; while we talk about teaching educators how to teach effectively, there is no talk about teaching learners how to learn effectively. But given the familiar model of learning, we cannot help but see that the act of learning itself can be the focus of learning. That is, just as one can learn to understand, use, and build working expertise with a complex mathematical formula, one can also learn how to learn better. Individuals who consciously work to become better learners are striving to improve their performance as learners.

The components of the Theory of Performance (Elger, 2007) can be used to identify what constitutes the performance of learning to learn. Just to keep things clear, meta-cognitively speaking, this is not a performance of learning focused on learning something in particular, like Spanish verbs, but a performance of learning focused on the act of learning itself. One who engages in this type of parallel processing has a *learning-to-learn mindset*. The Theory of Performance states that learning to learn is affected, both positively and negatively, by five different components of a learner's performance: Identity, Learning Skills, Level of Knowledge, Context (of Performance), and Personal Factors. In addition, we have successfully identified multiple aspects of each of these components, arriving at a superset of thirteen different aspects of learning to learn. Table 3 lists the components and their aspects, including the way in which each aspect influences learning performance.

Table 3 Learning Component Aspects and Their Influence on Learning Performance

Identity as a Learner:		
1	**Learner Efficacy**	Belief in oneself and one's capability
2	**Learner Ownership & Responsibility**	"I am responsible for my own learning."
Knowledge:		
3	**Levels of Learner Knowledge**	Elevating the level of learning
4	**Learning Process Methodology (LPM**	Building awareness of one's own learning process
5	**Forms of Knowledge**	Aligning best learning practices with each type of knowledge
Learning Skills:		
6	**Cognitive**	Elevating thinking skills for processing information, constructing meaning, and applying knowledge
7	**Social**	Building social skills for producing effective team learning
8	**Affective**	Increasing emotional maturity to take risks, accept failures, and persist through to success
Context of Performance:		
9	**Immersion in a High-Quality Learning-to-Learn Experience**	Learning-to-Learn Camp/Course

10	**Cooperative Learning**	Adapting the best learning practices from team members
11	**Active Learning**	Publicly performing the act of learning
Personal Factors:		
12	**Life Challenges**	Transforming past problems into opportunities for growth
13	**Making the Right Choices**	Making a better future

The focus on these 13 components will produce the quality collegiate learner that grows their learning performance that can be described as follows:

Engaged learners are highly motivated and take ownership of their own learning and success. They are well-prepared and actively participate and collaborate within and outside learning experiences by asking questions and sharing insights. They appreciate and embrace increasingly challenging learning opportunities through self-assessment. They effectively manage their time and resources. They are positive and intellectually curious, supporting others in their learning. They apply their learning in new contexts by using higher order thinking to contextualize and generalize their knowledge.

Grounded in human developmental psychology involving self-determination and self-actualization, self-growth draws upon humans' innate curiosity. Initially, Kurt Goldstein (1939) in his theory of "self-actualization," suggested it as the motive to realize one's full potential in life. As an individualistic concept and process, Abraham Maslow (1943) placed an individual's fulfillment of growth needs, or self-actualization, at the top of his five level "hierarchy of needs" pyramid. Psychologist Carl Rogers' (1961) theory of growth potential further suggests consistent incorporation of the "real self" to cultivate a fully functioning person. Rogers noted that every person can achieve his/her goals, wishes, and desires in life through self-actualization in becoming all that one can be. His discussion *On Becoming a Person* (1961), describes four criteria through which one becomes a person: (1) being open to one's own experiences as well as those of others, (2) trust in one's organism, (3) having an internal locus of evaluation, and (4) willingness to be a process. Simply stated, self-growth is a desire to become a better version of oneself every day. A timeless pursuit, self-growth refers to a life-long process to improve one's own performance through formal and informal approaches. These approaches include various tools, techniques, processes, and practices involving self-reflection, assessment, and establishment of a life-vision plan with personal and professional growth goals. Together, these will lead to an improved performance in self-growth. As a sustained commitment to a life-long mindset focused toward self-improvement, self-growth necessitates the incorporation of specific and decisive actions and processes toward desired growth outcomes. Although self-growth is an individualistic concept and process, it requires sensitive listening and collaboration skills in order for self-change to be successful.

At times, self-growth can be a context-driven phenomenon. For example, sometimes a person will set self-growth goals as a "preferred" activity, such as the accomplishment of an academic degree, rather than as a "needed" achievement, such as emotional self-regulation or change in a particular behavior. In general, self-growth is a process that requires an enduring practice compelling numerous steadfast behaviors, actions, and activities. The overall performance of self-growth (Jain, Apple & Ellis, 2015) can be enhanced with the integration of the following components (Table 4).

Table 4 Components of Self-Growth

1.	Having a growth mindset; "I believe I can grow"
2.	Planning; thinking before doing
3.	Developing and updating a life vision
4.	Setting performance criteria and using performance measures
5.	Self-assessing each significant performance
6.	Reflecting to increase self-awareness and meta-cognition
7.	Self-challenging by taking significant risks: pushing oneself outside of one's own comfort zone
8.	Mentoring for self-improvement and the improvement of others
9.	Grit: perseverance, determination, and commitment in spite of personal factors
10.	Creating a culture of self-growth through passion & self-motivation / walking the walk of one's own

Process Education: A Pictorial Overview

PROFESSIONAL LEARNING COMMUNITY — Example: **The Academy of Process Educators**

LEARNING TO LEARN CAMP / RECOVERY COURSE — A five-day intensive experience that models how every student can become a successful collegiate learner through LEARNING HOW TO LEARN and developing a GROWTH mindset.

PROGRAM (multiple courses)

PROGRAM ASSESSMENT — To ensure that quality exceeds standards with systematic feedback to improve quality

PROGRAM DESIGN — Crafted to meet the knowledge, skills, and ways of being for a profile of a professional graduating from the program

COURSE (multiple learning activities)

COURSE ASSESSMENT — To ensure that the targeted outcomes of the course are successfully met and improved

COURSE DESIGN — METHODICAL process for creating a high-quality course so learners achieve identified LEARNING and GROWTH goals

LEARNING ACTIVITY

ACTIVITY ASSESSMENT — To ensure that targeted outcomes are met and improved

ACTIVITY DESIGN — METHODICAL process for constructing LEARNING EXPERIENCES that support THE LEARNING CYCLE so learners can meet the PERFORMANCE CRITERIA

REFLECTION — Process used to increase the awareness a learner has about how/she thinks and learns; a reflective practitioner works to increase metacognitive awareness and strives to understand his/her own behavior, decisions, and thinking

FACILITATION, MENTORING
- Creates a QUALITY LEARNING ENVIRONMENT
- Facilitates learning using LEARNING ACTIVITIES
- Optimizes performance by using facilitation plans
- Supports the LEARNING PROCESS METHODOLOGY
- Improves performance through PROFESSIONAL DEVELOPMENT
- Practice is informed by RESEARCH-BASED BEST PRACTICES

PROFESSIONAL DEVELOPMENT PD — Transformational learning experiences with the goal of improving FACILITATION skills and elevating practice for increased LEARNING and GROWTH both in the classroom and as a professional

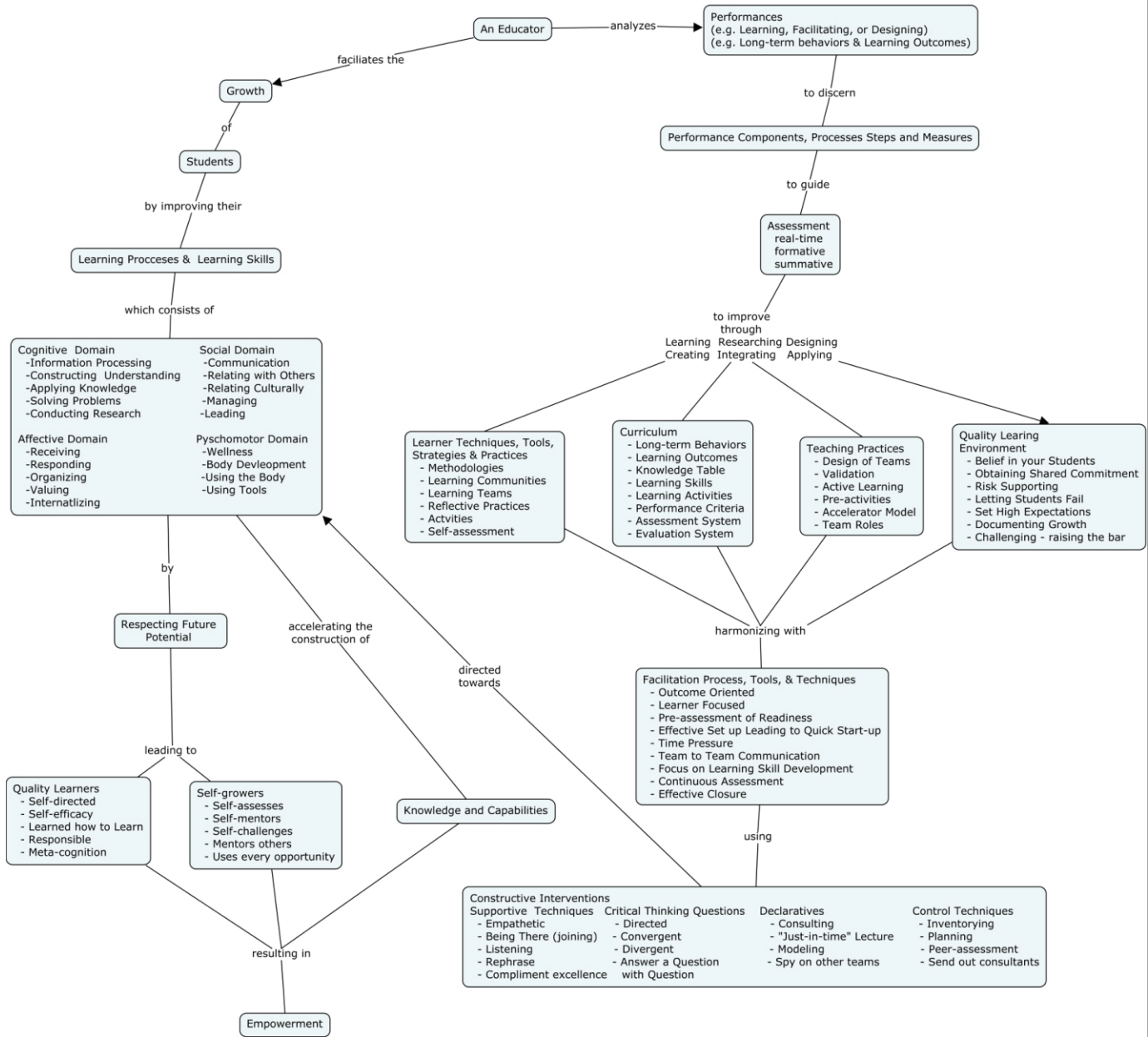**ASSESSMENT & SELF-ASSESSMENT SII**
- Feedback with the goal of improving PERFORMANCE
- Format: Strengths, Areas for Improvement, Insights
- Focusing an ASSESSMENT on one's self (SELF-ASSESSMENT) improves PERFORMANCE and increases GROWTH

ASSESSMENT vs EVALUATION
- ASSESS to improve PERFORMANCE
- EVALUATE to judge or grade PERFORMANCE

GROWTH / SELF-GROWERS — GROWTH is the increase in capacity resulting from quality MENTORING. SELF-GROWERS use SELF-ASSESSMENT to SELF-MENTOR their own GROWTH

LEARNING EXPERIENCES & CURRICULA — Includes Activity Books, Classroom Activities, Learning Systems, and Learning Objects DESIGNED and FACILITATED to implement and support the LEARNING PROCESS METHODOLOGY so learners are able to exceed the stated learning objectives and PERFORMANCE CRITERIA

PERFORMANCE — Any PERFORMANCE (completed PROCESS) can be MEASURED, improved through ASSESSMENT, enhanced through challenge (e.g., by using the ACCELERATOR MODEL), analyzed by its parts:

PERFORMANCE MODEL — PERFORMANCE components: learner *identity*, LEARNING SKILLS used, *knowledge* needed, performance *context*, *personal factors* (individual variables), *fixed factors* (permanent variables)

PERFORMANCE CRITERIA PC — Statements describing the most important aspects of the target PERFORMANCE (what it should look like); they form the basis for PERFORMANCE MEASURES.

PERFORMANCE MEASURES PM — These are based on PERFORMANCE CRITERIA and allow one to gauge (measure) the level of success or quality of a PERFORMANCE. This data forms the basis for high-quality ASSESSMENT and EVALUATION.

COLLABORATION / LEARNING COMMUNITIES — Learning together collaboratively or cooperatively (with team roles) and practicing peer ASSESSMENT, in a classroom, at a LEARNING TO LEARN CAMP / RECOVERY COURSE, or in a PROFESSIONAL LEARNING COMMUNITY

PROCESS EDUCATION PE — Learning is not a product, but a PROCESS with SELF-GROWTH of the learner as the goal

METHODOLOGIES
- The methods, guidelines, and best practices of PROCESS knowledge are described in METHODOLOGIES
- METHODOLOGIES can be used to learn how to do something
- Learners who use METHODOLOGIES increase their PERFORMANCE

LEARNING PROCESS METHODOLOGY "THE LEARNING CYCLE" LPM
- STAGE 1 — Preparing to Learn (learning objectives, PERFORMANCE CRITERIA)
- STAGE 2 — Learning PERFORMANCE (analyzing models, critical thinking, application, and problem solving) using LEARNING SKILLS
- STAGE 3 — ASSESSMENT of learning PERFORMANCE

LEARNING TO LEARN L2L — We can LEARN HOW TO LEARN with the LEARNING PROCESS METHODOLOGY and can use it to increase our learning PERFORMANCE. Learner development is the GROWTH that comes from LEARNING HOW TO LEARN.

FOUNDATIONS OF LEARNING FOL — Both an ACTIVE LEARNING course and CURRICULA introducing the topics shown here to help students LEARN HOW TO LEARN and become SELF-GROWERS

ACCELERATOR MODEL — Informed by LEARNING SKILLS, aspects of the LEARNING PROCESS METHODOLOGY can be tweaked to increase the challenge and thus the learning and GROWTH of learners.

LEARNING SKILLS CLS — Generic and transferable skills that lead directly to improved learning. Classified in the cognitive, social, and affective domains in the Classification of Learning Skills.

PROBLEM SOLVING — PROBLEM SOLVING is how we apply the knowledge we gain by engaging in the LEARNING PROCESS.

QUALITY LEARNING ENVIRONMENT — Produces respect, trust, openness, success and a GROWTH-ORIENTED mindset for everyone

CULTURE OF SUCCESS — Use of the Transformation of Education and Compass of Higher Education as strategic frameworks to foster GROWTH for learners, faculty, staff, and scholarship

COURSE

PROGRAM

Process Education: A Concept Map

Process Map of a Learning to Learn & Self-Growth
Educational Environment
(Implementation of Process Education)

An Educator —analyzes→ Performances
(e.g. Learning, Facilitating, or Designing)
(e.g. Long-term behaviors & Learning Outcomes)

faciliates the

Growth

to discern

of

Performance Components, Processes Steps and Measures

Students

to guide

by improving their

Assessment
real-time
formative
summative

Learning Procceses & Learning Skills

to improve
through
Learning Researching Designing
Creating Integrating Applying

which consists of

Cognitive Domain
-Information Processing
-Constructing Understanding
-Applying Knowledge
-Solving Problems
-Conducting Research

Social Domain
-Communication
-Relating with Others
-Relating Culturally
-Managing
-Leading

Affective Domain
-Receiving
-Responding
-Organizing
-Valuing
-Internatlizing

Pyschomotor Domain
-Wellness
-Body Devleopment
-Using the Body
-Using Tools

Learner Techniques, Tools,
Strategies & Practices
- Methodologies
- Learning Communities
- Learning Teams
- Reflective Practices
- Actvities
- Self-assessment

Curriculum
- Long-term Behaviors
- Learning Outcomes
- Knowledge Table
- Learning Skills
- Learning Activities
- Performance Criteria
- Assessment System
- Evaluation System

Teaching Practices
- Design of Teams
- Validation
- Active Learning
- Pre-activities
- Accelerator Model
- Team Roles

Quality Learing
Environment
- Belief in your Students
- Obtaining Shared Commitment
- Risk Supporting
- Letting Students Fail
- Set High Expectations
- Documenting Growth
- Challenging - raising the bar

by

Respecting Future
Potential

accelerating the
construction of

harmonizing with

directed
towards

Facilitation Process, Tools, & Techniques
- Outcome Oriented
- Learner Focused
- Pre-assessment of Readiness
- Effective Set up Leading to Quick Start-up
- Time Pressure
- Team to Team Communication
- Focus on Learning Skill Development
- Continuous Assessment
- Effective Closure

leading to

Quality Learners
- Self-directed
- Self-efficacy
- Learned how to Learn
- Responsible
- Meta-cognition

Self-growers
- Self-assesses
- Self-mentors
- Self-challenges
- Mentors others
- Uses every opportunity

Knowledge and Capabilities

using

Constructive Interventions
Supportive Techniques   Critical Thinking Questions   Declaratives   Control Techniques
- Empathetic   - Directed   - Consulting   - Inventorying
- Being There (joining)   - Convergent   - "Just-in-time" Lecture - Planning
- Listening   - Divergent   - Modeling   - Peer-assessment
- Rephrase   - Answer a Question   - Spy on other teams   - Send out consultants
- Compliment excellence   with Question

resulting in

Empowerment

METHODOLOGIES

A methodology is a model of the abstract generalization of a specific process created by an expert to assist novices on their way to becoming experts in the performance of that process.

In working with higher education, Pacific Crest initially focused on improving the processes of teaching, learning, design, and assessment (Kramer & Beery, 1990) and soon realized that when it comes to modeling and improving educational processes, methodologies were critical. The first methodology published by Pacific Crest was the Problem Solving Methodology (PSM), published in *Introduction to Problem Solving Using PC:SOLVE* (Apple, 1990); this was aimed at teaching students how to use a methodical process when working to solve problems. The next and probably most far-reaching methodology formally published was the Learning Process Methodology (LPM). It began as "The Learning Process Model," published in *Learning Through Problem Solving* (Apple, Beyerlein & Schlesinger, 1992), and was an intermediate step in the development of the full LPM published in the pre-market edition of *Foundations of Learning* (Pacific Crest, 1995). Here are just a small set of critical Methodologies for faculty published in the *Faculty Guidebook Edition 4* (Beyerlein, Holmes, & Apple, 2007) and for students in *Foundation of Learning Edition 3* (Krumsieg & Baehr, 2000):

Faculty Key Processes

Methodology for Course Design

Methodology for Creating a Quality Learning Environment

Methodology for Designing a Program Assessment System

Elevating Knowledge from Level 1 to Level 3

Facilitation Methodology (Smith & Apple, 2007)

Learning Processes Through Methodologies

Methodology for Program Design

Evaluation Methodology

Learner Key Processes

Learning Process Methodology

Problem Solving Methodology

Reading Methodology

Personal Development Methodology

Writing Methodology

Assessment Methodology

Teamwork Methodology

Information Processing Methodology

LEARNING PROCESS METHODOLOGY

The Learning Process Methodology is a 14-step model of the learning process that is the cornerstone for both learning to learn and Process Education. As such, the Learning Process Methodology is nearly omnipresent, with particularly obvious utility in activity design, facilitation, assessment of learning performance, measurement of levels of learning, and implementation of learning skills within the learning process.

In 1995, the LPM (see Figure 2)also appeared in the *1995 Teaching institute handbook* (Apple) as a way to help faculty understand and improve their skills with respect to design of learning activities, facilitating student learning experiences, and improving student learning through the practice of assessment and mentoring. The LPM was fully integrated into the processes of activity design, assessment, and facilitation, and was linked with the concept of learning skills as presented in *A Classification of Learning Skills for Educational Enhancement and Enrichment* (Apple, 1997).

Figure 2 Learning Process Methodology

Step		Explanation
1	Why	Identify and explain your reasons for learning
2	Orientation	Develop a systematic overview of what is to be learned
3	Prerequisites	Identify necessary skills and background knowledge needed to perform the learning
4	Learning Objectives	Set appropriate goals and objectives for the learning activity
5	Performance Criteria	Determine specific desired outcomes used to measure and gauge performance
6	Vocabulary	Identify and learn key terminology
7	Information	Collect, read, and study appropriate resources
6	Planning	Develop a plan of action to meet the performance criteria
8	Using Models	Study and review examples that assist in meeting the learning objectives and performance criteria
10	Thinking Critically	Pose and answer questions that stimulate thought and promote understanding
11	Transferring/Applying Transfer knowledge to different contexts	Apply knowledge in new situations
12	Problem Solving	Use knowledge in problem-solving situations
13	Self-assessment	Assess use of the learning process and mastery of the material learned
14	Research	Create and develop knowledge that is new and unique

💡 ACTIVE LEARNING

"All genuine learning is active, not passive. It is a process of discovery in which the student is the main agent, not the teacher" M. J. Adler (1982).

The key ideas shared at the first Teaching Institute in 1991 focused on teaching students how to learn (Apple, 1991); this is the definition of *active learning*, according to Bonwell & Eison (1991): the responsibility of learning lies with the learner. The best practice, in this case, is described by the Transformation of Education (Hintze, Beyerlein, Apple & Holmes, 2011) aspect, "delivery," which defines *active learning* as the opposite of "presentation." In usual terms, this takes place in a lecture-style context, in which there is a teacher who dispenses learning, knowledge, information, or wisdom to a student. Because of this traditionally defined context, we are used to thinking of "learning" as the receiving end of "teaching." But in an **active learning** environment, the learner drives the learning process. If the learner is responsible for learning and actively engages in doing so, then instead of "teaching," the educator must shift to a role of supporting the learner and facilitating the process of learning. In the role of facilitator, the focus is on process rather than content (see the **Facilitation** section).

Process Education uses activities to create active learning experiences and these activities are built upon the LPM. While the activity template continues to evolve, its basic structure remains the same: Chapter Level a)

a "why" discussion for chapter content b) orientation of this knowledge area c) problem solving d) validation of learning; Activity Level a) a title b) why c) learning objectives d) performance criteria e) vocabulary f) information (especially methodologies) g) resources h) plan i) model(s) j) critical thinking questions k) exercises and l) self-assessment.

FACILITATION

Facilitation transforms the traditional roles and responsibilities of student and educator such that educators become facilitators of learning experiences where students are learners who take ownership of and responsibility for their learning.

With the focus on active learning starting in the early 1990s, *Education as a Process* (Apple & Hurley-Lawrence, 1994) argued that education could be facilitated as a process with faculty taking the role of "facilitators rather than providers of information." As the interest in and popularity of active learning grew, it became increasingly necessary to redefine *teaching* as the facilitation of learning and *mentoring* as the facilitation of growth. These processes are modeled in the Concept Map of Process Education. As this *Primer for Process Education* explains, *the main goal is to empower students to become lifelong learners, both capable and eager to learn new concepts on their own. Educators become facilitators of the learning process assessing students' performance in real time to help their growth in the use of these processes.*

In *Taking the Helm* (1996), Klopp elaborates on the differences in practice and dynamics between a faculty member as instructor and a faculty member as facilitator. She also speaks directly to the not inconsiderable risk faculty may face when shifting practice from educator (as "sage on the stage") to facilitator (as "guide on the side"):

It is a risk to change the way we teach because that implies that how we have taught in the past needed to be changed for some reason. That, in turn, challenges the worth of many years, even decades, of teaching practices. It also challenges our need for control. Going from a teacher-centered classroom to a student-centered classroom means sharing the "power," sometimes even giving over the power almost completely (as in collaborative learning), and we may be very uncomfortable about losing that control.

While the change in practice is something Process Education has encouraged from the first call to shift ownership of the learning process to the student (Apple, 1991), the extent to which the change could be viewed as a risk was not fully appreciated until the work on The Transformation of Education (Hintze, Beyerlein, Apple, & Holmes, 2011). Through its lens, we see that shifting practice from educator to facilitator goes deeper than merely changing practice or doing things differently, as Klopp so eloquently noted; it may well be at the heart of the way of being for an educator, involving **transforming** no fewer than three aspects of the educational context and dynamic: control, delivery, and ownership (see Table 2).

CREATING A QUALITY LEARNING ENVIRONMENT

A quality learning environment is characterized by respect, trust, openness, high expectations, support for risk-taking, a willingness to challenge performance, continuous assessment, and a growth-oriented mindset for everyone.

Faculty members were reminded of the characteristics they long to see in learners and the kind of environment that tends to foster those characteristics:

Inherent to the problem-solving process are an inquisitive spirit and critical-thinking skills. However, most educational processes do little today to stimulate students to develop an attitude of asking "why?" or encouraging students to explore and experiment. Somewhere along the way, students are losing the

exploring nature they had as children and have become afraid to be wrong. The most desirable type of learning environment for problem solving emphasizes a "process-oriented" approach where self-discovery on the part of the student is paramount. The role of the instructor in this environment is to facilitate student learning through the use of timely critical thinking questions. The objective is to develop students who are able to "process" or evaluate a data base of knowledge rather than render the data base (that was taken from the text to the blackboard) (Apple 1991).

The key characteristics of a learning environment that best foster critical thinking and problem solving includes the ideas that,

- Students need to experiment, explore, test, and seek their own answers with the help of their teammates. Students should be forced to think, but not to the point that they become overwhelmed.

- Frustration is valuable but must be continually monitored; some frustration is good, and provides motivation to find a solution and resolve the frustration.

- Discovery learning works well in tandem with cooperative learning; the students have a pool of thinking and learning skills to draw on in addition to their own, and the effort, excitement, and frustration can be shared.

The characteristics of a Process Education quality learning environment should:

- Build critical thinking skills
- Foster an inquisitive spirit in learners where they ask "Why?," explore, and experiment
- Support risk taking and student willingness to be wrong and make mistakes
- Be process-oriented
- Foster self-discovery
- Facilitate student learning
- Shift responsibility for learning to the learner with facilitators asking critical thinking questions
- Challenge students, with facilitators creating/allowing enough frustration to motivate
- Include cooperative/team learning
- Incorporate problem solving

The Methodology design to create this environment is presented in Figure 3.

Figure 3 Steps in the Methodology for Creating a Quality Learning Environment

1. Establish initial respect.
2. Start with no prejudging.
3. Obtain shared commitment.
4. Foster and support risk-taking.
5. Permit the learner to fail.
6. Set high expectations.
7. Establish clear performance criteria.
8. Implement a quality assessment system.
9. Document performance.
10. Continuously challenge performance.

Assessment is a process used for improving quality; evaluation is a process used for judging quality. An assessment is an analysis of current performance aimed at improving future performances by clarifying the reasons behind current performance strengths, determining potential improvements and implementing action plans for making them, and gaining insights and learning from each performance.

The terms *assessment* and *evaluation* are often used interchangeably and sometimes with variable meanings. To further confuse things, terms such as *formative* and *summative* are often added to both terms. By clearly distinguishing and differentiating the concepts of assessment and evaluation from one another, Pacific Crest eradicated a lot of ambiguity. It declaimed that assessment is a process for *improving* quality and is offered by a mentor whose desire it is to inspire growth while evaluation is a process for *judging* quality with consequences such as promotion and failure (Apple, 1991; see Figure 4).

Figure 4
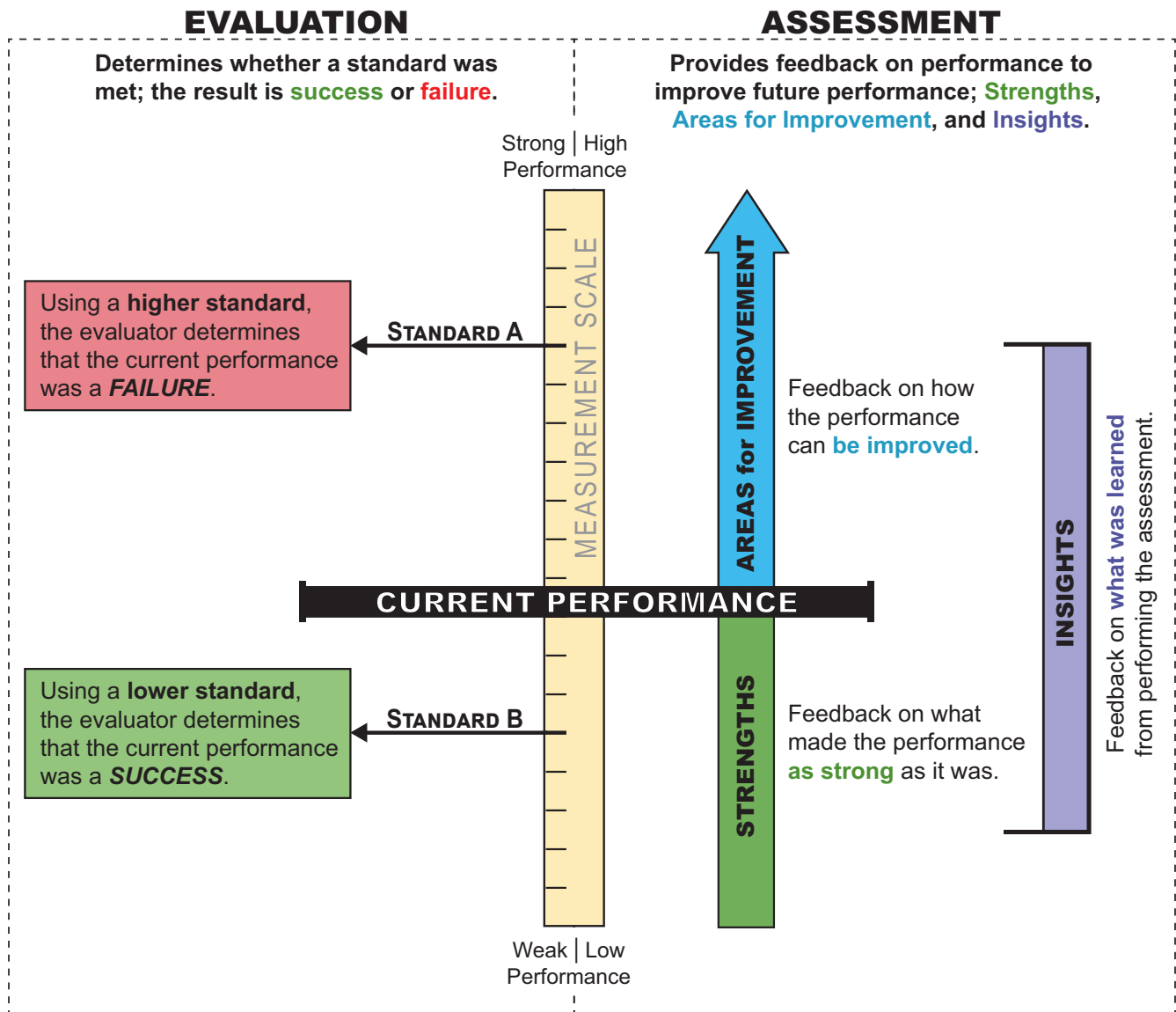
This restored the utility of both terms, increasing the potential for meaningful dialogue or discovery. This strategic delineation helped to uncover some of the affective barriers that keep learners from embracing feedback (in short, because they are used to receiving evaluation and, as a result of that expectation, react defensively) and helped instructors develop more effective ways to frame their improvement- and growth-directed interventions.

The analysis of assessment feedback in the earlier years led to the identification of three critical components of assessment as informed by Process Education: 1. **STRENGTHS**: what makes certain aspects of the experience, performance, or product powerful, and why (and later how) 2. **AREAS FOR IMPROVEMENT**: aspect of the experience, performance or product that might be improved, with recommendations (action plans) on how to do so 3. **INSIGHTS**: what was learned from the experience, performance, producing the product, or from the assessment itself to increase our knowledge about the experience, performances, or product including design, planning, delivery, and execution (lessons learned). *SII-assessment* (**S**trengths, **I**mprovements, and **I**nsights) is the term coined and used in the *Faculty Guidebook* (Wasserman, 2007).

💡 CLASSIFICATION OF LEARNING SKILLS

> *The Classification of Learning Skills contains more than 250 transferable skills organized into cognitive, social, affective, and psychomotor domains. They are called learning skills because as these skills improve, so does learning performance.*

The Classification of Learning Skills for Educational Enrichment and Assessment was initially developed from 1990 - 1997 (Apple, Ellis, & Hintze, 2016). This scholarship was advanced with four years of refinement of the Classification of Learning Skills, as documented in the *Faculty Guidebook* modules *Classification of Learning Skills* (Apple, Beyerlein, Leise, & Baehr, 2007), *Cognitive Domain* (Davis, Beyerlein, Leise, & Apple, 2007), *Social Domain* (Leise, Beyerlein, & Apple, 2007), and *Affective Domain* (Duncan-Hewitt, Leise, & Hall, 2005). These modules present the rules and logic for including a learning skill in the Classification. In the most recent iteration of the Foundations of Learning Course (see also Figure 5): Cognitive domain: 5 process areas, 21 cluster areas, 94 learning skills; Social domain: 5 process areas, 18 cluster areas, 86 learning skills; and Affective domain: 5 process areas, 16 cluster areas, 76 learning skills. Every one of these learning skills can be improved and is important to be included in the learning experience as part of growth and development.

Figure 5 The Current Classification of Learning Skills
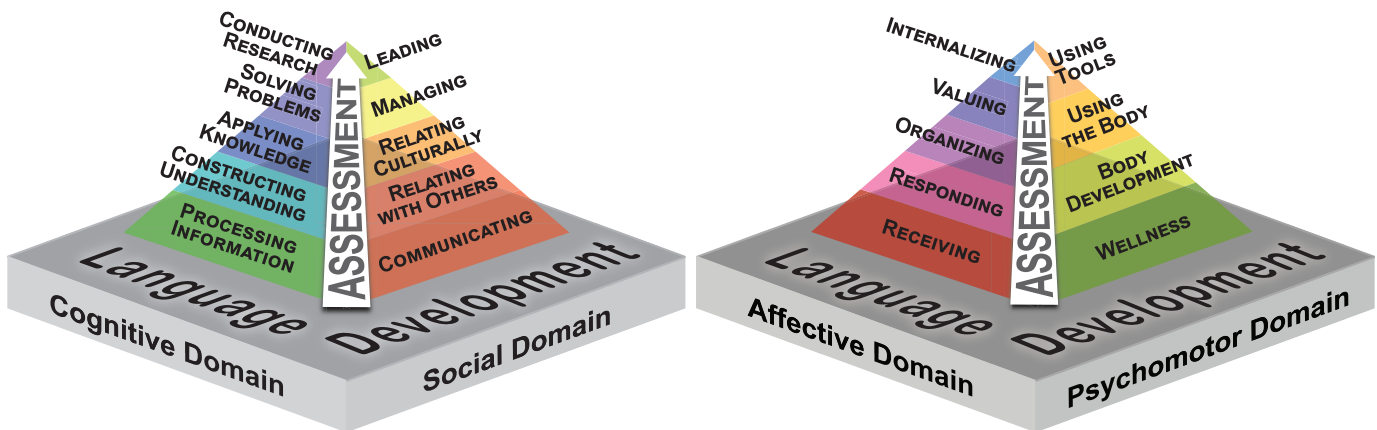
Mentors facilitate learner growth and development by challenging performance through a variety of constructive intervention techniques focused on a set of individual learning skills. Equally as important, a mentor assesses not only performance, but a learner's own self-assessments. This helps the learner become increasingly able to self-mentor, facilitating his or her own growth.

The concept of mentoring as the **facilitation of growth** was first articulated in *Introduction to Problem Solving Using PC:SOLVE* (Apple, 1990) in which the primary focus was helping students improve their ability to solve problems. This definition was expanded in *Learning through Problem Solving* (Apple, Beyerlein & Schlesinger, 1992) to include mentor interventions intended to improve "Skills for Life." In 1995 a concept map of mentoring was developed which framed systematic and purposeful interventions as the means by which learner growth is facilitated (Duncan-Hewitt). Learning to Learn Camps have always recruited faculty members to be coaches (mentors) of learner teams (Pacific Crest, 2015). As described for the Learning to Learn Camp at St. Augustine College, special sessions before and during the camp are organized to train these mentors (Knowles, 1995). The mentoring experiences of the Learning to Learn Camps informed the model of mentoring and led to a strengthened version, published as the Process Map for Process Education and Mentoring (see page 8).

🔆 PERFORMANCE CRITERIA

Performance criteria are the expectations given before a performance that define the characteristics that make up a high quality performance so that performers know their target and can meet or exceed expectations.

A performance is by nature a process rather than a product, so the concept of performance criteria is distinct from the concept of student learning outcomes which tend to focus on products rather than processes. For this reason, performance criteria differ from the types of criteria often set for product assessments or evaluations; performance criteria set expectations for how the performance itself is carried out rather than for its outcome. The definition and implications of performance criteria within the context of Process Education has expanded, especially with the conception and development of performance measures. The first PE performance measure, a rubric for active listening, emerged as a result of a set of performance criteria developed at Kirkwood Community College. As part of the process of developing this measure, a description of the performance itself was created (Figure 6). These performance criteria were then used for the development of the measure.

Figure 6 Description of Listening (Performance)

Listening is the receiving and decoding of messages from others. Listening includes hearing words and sounds and noticing nonverbal signals to ascertain the meaning that others are trying to convey. It also includes the ability to recall what has been presented. The listener identifies their purpose and tries to understand the sender's purpose. Good listening results in effective feedback to the sender.

Ranked Performance Criteria List

1. Concentration: focusing on the message
2. Comprehension: interpreting meaning accurately
3. Perceptive: understanding sender's nonverbals and hidden meaning
4. Motivation: wanting to learn this new material
5. Background knowledge: relating prior information/theories to this context
6. Classifying: organizing current information into existing framework
7. Targeting: sampling key words and phrases
8. Empathy: willingness to understand underlying issues and others' values
9. Paying attention to details: inventorying important specifics
10. Compare and contrast: using prior knowledge to evaluate and differentiate ideas

A performance measure is a rubric, either holistic or analytic, that is designed to measure the level of performance in a well-defined performance area by identifying and integrating the factors that contribute most significantly to the performance.

Measuring performance doesn't improve performance; measurement is a neutral activity. But if we are to improve performance through assessment, being able to measure current performance is critical so that we know what aspects of the performance are already strong and in what ways the performance can be improved. Put very simply, performance criteria describe the performance target and performance measures give a reading of current performance level.

While it is certainly possible to create and use performance measures for highly complex performances such as designing (Cordon, Beyerlein, & Davis, 2007), one of the goals of Process Education is to improve the performance of **learning** which means that we are primarily focused on defining and measuring aspects of learning (Apple & Ellis, 2015). Fortuitously, learning skills — individual skills that, when improved, lead to improved learning — provide the perfect focus for such definition and performance measurement. Each learning skill can be developed from a low level to the level that individuals or teams exhibit when they excel. For example, the learning skill *attending*, defined in the *Classification of Learning Skills* as mindful focusing by a listener (Leise, Beyerlein & Apple, 2007), is essential in any classroom but needs to be more advanced in a graduate seminar setting to excel. In such a situation, additional skills such as filtering information, summarizing, making inferences, formulating questions, and analyzing research are all likely to be integrated with and mutually dependent on the skill of attending in order for a learner to maintain his or her connection with the discourse and content. The need to differentiate levels of performance in learning skills led to a five-level holistic rubric for defining levels of learner development in any learning skill (Figure 7). This rubric was added to each of the cognitive, social, and affective domains of learning skills as they are presented in the *Faculty Guidebook* (Beyerlein, Holmes & Apple, 2007).

Figure 7 Levels of Learner Development in Any Learning Skill

Level 5 **Transformative Use**	The skill is expanded and integrated with other skills so that it can be applied in new contexts that inspire the emulation of others.
Level 4 **Self-Reflective Use**	The skill can be self-improved and adapted to unfamiliar contexts with occasional advice from a mentor.
Level 3 **Consistent Performance**	The skill is routinely called upon and effectively applied in multiple contexts by the user, who consciously directs the effort.
Level 2 **Conscious Use**	The skill can be used proactively by a learner, but its use needs to be constantly encouraged and supported by a mentor.
Level 1 **Non-Conscious Use**	The skill appears on a reactive basis in response to an immediate need, but without awareness of self or others.

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.

A learning activity that is entirely focused on meta-cognition is "Meta-cognition: Thinking about MyThinking,"—Experience 11 of *Learning to Learn: Becoming a Self-Grower* (Apple, Morgan, & Hintze, 2013). This learning experience challenges learners to identify something they have learned (by documenting it with a learning journal worksheet) and then to engage in meta-cognitive exploration of that learning. They use a meta-cognitive 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 meta-cognition is at the level of a post-activity prompt, forms/worksheets/tools integrated into a learning activity, or practices integrated into 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.

������ FOUNDATIONS OF LEARNING COURSE

A Foundations of Learning course teaches first-year students how to learn and become self-growers, instilling in them the characteristics of a collegiate learner who will succeed in any undergraduate program.

The novel idea of teaching students **how to learn** as they enter college arose from the many workshops and discussions that took place during the first annual Problem Solving Across the Curriculum Conference (Kramer & Beery, 1990). With the help of more than 20 faculty members, 21 different learning activities were created and then carefully assembled into *Learning Through Problem Solving* (Apple, Beyerlein & Schlesinger, 1992), a curriculum for incoming first-year students. This curriculum was designed to help students improve their capacity for learning, problem solving, writing (journals and reports), giving presentations, computing, and analyzing (graphs and data). The purpose and features of this course were offered in *A Foundations Course for College Freshmen* (Baehr & Apple, 1994) and the first published implementation of this ideal course was *Foundations of Learning* (pre-market edition)*,* (Pacific Crest, 1995). Based on feedback and assessments gathered during the 1995/1996 academic year, Pacific Crest announced publication of the first edition of *Foundations of Learning* in 1996 (Krumsieg & Baehr). This refined resource provided activities and methodologies to help faculty facilitate students in improving their ability to learn, read, write, work in teams, process information, communicate, assess, manage, and make the transition to college. The learning activities in *Foundations of Learning* were also designed to help students develop transferable learning skills, as set out in the Classification of Learning Skills (Apple, Beyerlein, Leise, & Baehr, 2007), to further ensure their success as collegiate learners.

Problem Solving is a content-independent process of identifying and defining a gap between expectations and perceptions in a given situation, and then developing the means to minimize this gap to satisfy that situation's key stakeholders.

The publication of *Learning Through Problem Solving* (Apple, Beyerlein & Schlesinger, 1992) was a formal result of the collaboration by faculty who had attended the 1990 Problem Solving Across the Curriculum conference. *Learning through Problem Solving* offered the Learning Process Model (a model of the learning process) and the Problem Solving Methodology (a model of the problem solving process). The relationship between these two processes is more than close; they are actually interdependent. The model in Figure 8 was presented in *Education as a Process* (Apple & Hurley-Lawrence, 1994), demonstrating that learning is the process of constructing knowledge **in order to solve given problems**.

Figure 8
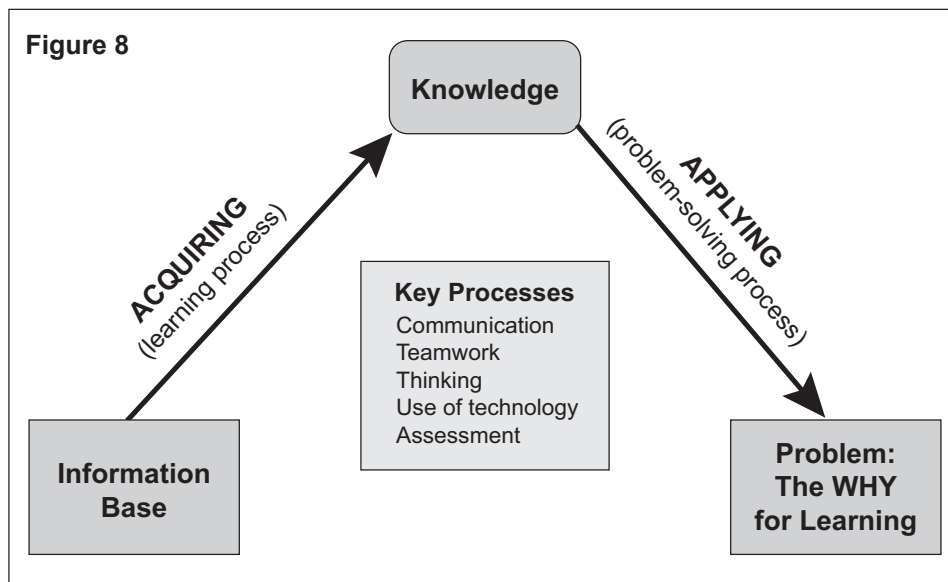
Learning produces transferable knowledge (acquisition process) while problem solving is the sophisticated usage of this knowledge in a specific situation (application process). The critical point is that problem solving, even when accomplished by applying a methodology, is the **application** of knowledge gained through learning. As such, it should not be surprising that the degree or level of knowledge required before a learner can successfully solve problems is "Level III Application" knowledge according to the *Levels of Learner Knowledge* (Bobrowski, 2007). Bobrowski states, this is where,

> *…the learner has the skill to apply and transfer the particular item of knowledge to different situations and contexts, can recognize new contexts and situations to skillfully make use of this knowledge, and has taken the time to generalize the knowledge to determine ways to apply it, testing boundaries and linkages to other information. In other words, a learner with Level III knowledge is able to solve problems.*

It is for this reason that problem solving is Step 12 of the Learning Process Methodology (see the **Learning Process Methodology** section). During the problem-solving step, Leise, Beyerlein, and Apple (2007) suggest that, "To enhance application of knowledge related to the learning objective, challenge yourself to solve more complex types of problems that are closer to those worked on by experts in the field." What if a learner attempts to solve problems without having developed Level III knowledge? As demonstrated in *An Evaluation Engineering and Technology* (Apple, Nygren, Williams, & Litynski 2002), without the requisite level of transferable knowledge, problem solving is elevated to research — a much more difficult challenge.

Learners working in communities or teams expand their knowledge and grow their learning skills through collaborating, cooperating, communicating, peer-assessing, and peer-mentoring.

Cooperative learning is a structured process in which a team masters the learning objectives and meets the performance criteria for a defined activity. In the context of a Process Education learning environment, the learning objectives include both mastery of content *and* the development of certain learning skills from the cognitive, social, affective, and/or psychomotor domains. Cooperative learning should not be confused with *group work* which involves placing students in groups and telling them to work together on a task. Cooperative learning is more structured and comprehensive. It takes into account the following: 1) the organizational structure of the team, 2) accountability for performance (both team and individual), 3) the relationship between the members of the team, 4) the relationship between the facilitator and the team, 5) protocol for evaluation and assessment of performance, and 6) the manner in which the performance of the team and the individuals in it are recognized. Today there are many research centers, programs, and publications devoted to continuing the long and rich history of research, theory, and practice associated with cooperative learning. The Cooperative Learning Center at the University of Minnesota defines Cooperative learning as a relationship in a group of students that requires positive interdependence (a sense of sink or swim together), individual accountability (each of us has to contribute and learn), interpersonal skills (communication, trust, leadership, decision-making, and conflict resolution), face-to-face promotive interaction, and processing (reflecting on how well the team is functioning and how to function even better).

While cooperative learning can take different forms and be implemented in numerous different contexts, it is distinguished by certain characteristics or key elements. These characteristics include:

- intentional team/group formation
- mutual (positive) interdependence
- high-level communication and face-to-face interaction
- inter- and intra-group teaching
- individual accountability and ownership of performance
- a focus on recognizing and developing learning skills
- ongoing reflection and assessment
- a sense of shared community

Volume 8, Issue 1 of the International Journal of Process Education (February 2016) is a special edition, providing an overview of 25 Years of scholarship and practice of Process Education. As the Chief Editor, Kathleen Burke describes,

The wealth of scholarship, learning tools, and best practices that have evolved over this period is immense. Many of the original Academy members contributed to this special edition of the IJPE, helping to trace the evolution of Process Education. The content of the article falls into five key areas: (1) Learner Development, (2) Cultural Transformation, (3) Assessment, (4) Educator Advancement, and (5) Curriculum Design. The practices or significant research that advanced each are shared within that area. These practices and research are presented chronologically so the development and connections can be observed. A special sixth area chronicles the Academy of Process Educators as a case study in a successful professional learning community. An exciting addition to this special edition is online versions of the organizational structures shared in this article: the time line and the pictorial representation of Process Education. These interactive tools allow the user to explore Process Education and its evolution, with links to related publications and scholarship, for ease of exploration, reading, and review.

The special edition can be retrieved at the following location: www.pcrest.com/PC/Reflections/issue27/ijpe. htm

The following table provides the location of additional resources, readings, professional development suggestions, and scholarship about a particular area of Process Education discussed in this Primer.

Topic	Pg	Learning Object - Website	Institutes	Articles
Process Education	5	www.pcrest.com/PC/PE/index.html www.pcrest.com/LO/PE/1.htm pcrest.com/presentation/ (Process Education)	Teaching	• Process Education™: Past, present, and future. • What is special about Process Education? • 25 Years of Process Education
Risk Factors	7	pcrest.com/presentation/ (Risk Factors - Pitfalls on the Path)	Student Success	• Identifying at-risk factors that affect college student success.
Profile of a Collegiate Learner	8	pcrest.com/presentation/ (Rubric for Engaged Learner)	L2L Camp Student Success	• Profile of a quality learner • Key Learner Characteristics for Academic Success • Learning to Learn - Becoming a Self-grower
Learning to Learn - A Paradigm Shift	10	learningtolearncamp.com/ pcrest.com/L2L/ www.pcrest3.com/L2L/L2L_flyer022014.pdf pcrest.com/presentation/ (Learning to Learn camp success)	L2L Camp Teaching Student Success	• Key learner characteristics for academic success • Learning how to learn: improving the performance of learning • Learning to Learn - Becoming a Self-grower
Developing Self-growers	11	pcrest.com/presentation/ (Self-growth Paper)	Teaching Student Success	• Becoming a self-grower • What is self-growth? • Learning to Learn - Becoming a Self-grower
Transformation of Education	12	www.transformation-of-education.com/	Teaching	• The Transformation of Education: 14 Aspects
Compass of Higher Education	13	www.pcrest.com/LO/star_final/1.htm pcrest.com/presentation/ (Compass of Higher Education)	Teaching	• Work in progress: Process Education: Improving performance across domains
PE Pictorial	14	www.processeducation.org/ijpe/25/image/	Teaching	• 25 Years of Process Education • Faculty Guidebook
Methodologies	16	www.pcrest.com/LO/CD/index.htm	Course Design Activity Design	• Learning processes through methodologies • Methodology for Creating Methodologies • Faculty Guidebook (set of 20 methodologies)
LPM	16	www.pcrest.com/LO/LPM/index.htm	Teaching Institute Activity Design	• Foundations of Learning Edition 4 • Designing Process-Oriented Guided-Inquiry Activities • Assessing Learning Activities
Active Learning	17	www.pcrest.com/LO/learning_outcomes/1.htm	L2L Camp Teaching Activity Design	• Instructor's Guide to Process-Oriented Guided-Inquiry Learning • Active learning: Creating excitement in the classroom • Transforming Large Introductory Classes into Active Learning Environments
Facilitation	18	www.pcrest3.com/L2L/P1.pdf www.pcrest3.com/llc/secure/resources.htm (Facilitator's Manual)	Facilitator Advanced Teaching	• Overview of a Quality Facilitator • Facilitation Methodology • Creating a Facilitation Plan

Topic	Pg	Learning Object - Website	Institutes	Articles
Create a Quality Learning Environment	18	pcrest.com/presentation/ (do you believe in me?)	Teaching Assessment Facilitator	• Methodology for Creating a Quality Learning Environment • Conditions for challenging learner performance • Setting High Expectations
Assessment vs. Evaluation - SII - Self-assessment	20	www.pcrest2.com/LO/assessment/index.htm www.pcrest.com/LO/SII/1.htm www.pcrest.com/LO/PA/0.htm	Assessment Program Assessment	• Keys to improving academic assessment • Differentiating Assessment from Evaluation as Continuous Improvement Tools • Distinctions between assessment and evaluation.
Classification of Learning Skills	21	www.pcrest.com/LO/CLS/1.htm pcrest.com/presentation/ (Classification of Learning Skills)	Teaching	• Classification of Learning Skills • Cognitive Domain • Social Domain • Affective Domain
Mentoring	21	www.webpages.uidaho.edu/ele/Scholars/Results/Publications/other/NSF_evaluation_report.doc	Mentor Student Success	• Mentoring institute handbook. • Mentoring handbook • Enriched Learning Environment Project
Performance Criteria	22	www.pcrest.com/ LO/criteria www.pcrest2.com/LO/performance/index.htm	Course Design PAS	• Writing performance criteria for a course • Writing performance criteria for a program • Writing performance criteria for individuals and teams
Performance Measures	22	www.pcrest3.com/L2L/resources/analytic_rubric_CL2016_distributed.pdf	Performance Measures	• Designing and implementing performance measures handbook • Fundamentals of rubrics • Measuring writing as a representation of disciplinary knowledge.
Reflection	23	www.pcrest2.com/toolbox/	Assessment L2L Camp Teaching	• A comparative analysis of reflection and self-assessment • Learning to learn: Becoming a self-grower (ch 11) • Student Success Toolbox
Foundations of Learning	23	pcrest2.com/fol/ www.pcrest3.com/FOLIR/ www.pcrest2.com/fol4/index.htm	L2L Camp Teaching	• Designing a foundations course • Course design for foundations of learning (4th ed.) • Foundations of learning (4th ed.)
Problem Solving	24	www.pcrest.com/qps/	Problem Solving Advanced Teaching	• Process Education Best Practices for Teaching Open-Ended Problem Solving in a Project Context • An evaluation system that distinguishes among levels of learning in engineering and technology • Quantitative reasoning and problem solving
Cooperative Learning	25	www.pcrest.com/LO/teamroles/index.htm	Teaching L2L Camp	• A handbook on cooperative learning • Team role markers • Designing teams and assigning roles
Scholarship on Process Education	27	www.pcrest.com/PC/Reflections/issue27/ijpe.htm www.pcrest2.com/LO/fgb/index.htm	Research Institute (SOTL)	• 25 Years of Process Education - IJPE • Faculty Guidebook • Teaching Institute Handbook

Active learning

A mode of learning which puts learners in situations where they are asked to take responsibility for their own learning, thus becoming highly engaged in the construction of knowledge

Activity

The core unit of instructional design which organizes a unit of time, in or out of class, to address a subset of course learning outcomes

Assessment/Assessing

A process of determining the quality of a performance, work product, or skill and giving feedback that documents progress (strengths) and suggests ways to improve future performance (areas for improvement) in ways that will help the performer improve his or her future performance

> **Assessor:** The person who is giving the assessment feedback

> **Assessee:** The person whose performance, work product, or learning skill(s) is being assessed

> **Formative Assessment:** Assessment given during the course of a performance or course to help the assessee to prepare better for a final or summative evaluation.

> **Summative Assessment:** Assessment given at the completion of a performance, or work product. Feedback is given to help the performer improve in future efforts, but this also includes a final determination of the quality of the performance, work product.

Assessment culture

A set of predominating group or organization attitudes and behaviors leading to the habit of continuous improvement

Classification of Learning Skills (for Educational Enrichment and Assessment)

An organizational scheme for instructional design and facilitation that helps educators and learners isolate transferable learning skills that apply to multiple disciplines and which are needed for successful performance in work and in life

Construction of knowledge

A process by which a learner makes sense of new information by integrating it with what he or she already knows so that all of the information fits into a usable framework. Sometimes this also involves bringing old information together in new ways, or modifying what is already known to more easily accommodate the new information. Knowledge construction can also mean creating new ideas that lead to new knowledge.

Constructive intervention

A timely interruption of the learning or work process by a facilitator with questions or actions intended to improve students' learning skills. The purpose is to help students build skills, not to provide answers

Critical thinking

A process for actively exploring situations by asking relevant questions that elevate understanding in order to better decide what to believe or what to do

Cultural practices

Accepting the definition of "culture" as "the way of life, especially the general customs and beliefs, of a particular group of people at a particular time" (Cambridge English Dictionary) , cultural practices are then the preferred (or generally accepted) manifestations of that culture. Practices can be seen to both define a culture and to identify an individual manifesting them as belonging to that culture.

Enriched learning environment

An alignment of physical space, learning tools and other resources, curricula, cultural and social processes, facilitation, and assessment practices that, combined, motivate, sustain, and enrich the learning process to produce both high quality learning and personal growth

Discovery learning

A form of inquiry-based learning where learners gain new information and understanding through exploration of problems, models, and situations. Guided discovery learning is discovery learning that uses a facilitator or curriculum designed to guide the learner through their discovery process. "I would urge now in the spirit of an hypothesis that emphasis upon discovery in learning has precisely the effect upon the learner of leading him to be a constructionist, to organize what he is encountering in a manner not only designed to discover regularity and relatedness, but also to avoid the kind of information drift that fails to keep account of the uses to which information might have to be put. It is, if you will, a necessary condition for learning the variety of techniques of problem solving, of transforming information for better use, indeed for learning how to go about the task of learning. Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily viable in problem solving" (Bruner, 1961).

Domain

A sphere of functioning performance—cognitive, social, or affective (within the Classification of Learning Skills)

Empowerment

Capability resulting from one's ability, willingness, and confidence to act. Availability of support and resources also play a role. An empowered person is in control of a situation, not controlled by the situation

Evaluation/Evaluating

A process for determining the quality of a performance that takes a retrospective look at a given process, program, or individual, and based upon pre-established standards, decides its utility, its value, or its applicability

> **Evaluatee:** The person whose performance or work product is judged against a set of standards established outside of the person's control

> **Evaluator:** The person who renders or reports a judgment (conclusion) concerning the performance or work product of an evaluate against a set of prescribed standards

Facilitation/Facilitating

Actions taken to help others learn or perform. In a learner-centered paradigm, facilitation takes the place of *teaching*, stressing the centrality of the learner's work in the learning process

Forms of knowledge

Knowledge identified and classified under five types (see below) to help those who design curricula by clarifying all of the content that learners need to master

Concepts: A generalized idea about something or a classification label

Processes: Sequences of steps, events, or activities that, over time, result in changes or products

Tools: Any devices, instruments, or resources that aid in accomplishing a task

Contexts: Understanding relevant concepts, processes, and tools for a particular situation that contribute to successful performance

Way of Being: The thoughts, attitudes, behaviors, and use of language characteristic within a culture, discipline, or knowledge area

General skills

Skills (core abilities) that institutions want all of their students to have mastered by the time they graduate; these are at the heart of general education courses

Growth/Development

Positive developmental change resulting from identifying, developing, and internalizing skills and strategies that allow learners to reach higher levels of performance in one or more domains

Guided-inquiry learning

Learning through exploration and discovery facilitated by an instructor who provides students with resources and a guide to follow (contains objectives, performance criteria, and a plan that often includes carefully designed critical thinking questions)

Information processing

The most basic level of learning skills in the cognitive domain. Information processing includes the skill clusters of collecting, generating, organizing, and retrieving data and validating information

Insight

The identification of new and significant discoveries/ understandings that were gained by studying a performance. Insights include an explanation of why a discovery/new understanding is important or significant and how it might be applied to other situations.

Knowledge

The lowest level in Bloom's taxonomy of educational objectives: that is, the awareness or possession of information about facts, ideas, skills, truths, and principles

Learning outcomes

Clear and precise articulations of what learners are expected to be able to do or achieve by the end of a learning experience. Types of learning outcomes include:

Competencies: The collection of knowledge, skills, and attitudes needed to perform a specific task effectively and efficiently at a defined level of performance

Movements: Documented growth in a transferable process or learning skill

Experiences: Interactions, emotions, responsibilities, and shared memories that clarify one's position in relation to oneself, a community, or discipline

Learning outcomes (continued)

> **Accomplishments:** Significant work products or performances that transcend normal class requirements and are externally valued or affirmed by an outside expert or client

> **Integrated Performance:** The synthesis of prior knowledge, skills, processes, and attitudes with current learning needs to address a difficult challenge within a strict time frame and set of performance expectations

Learning Process Methodology (LPM)

A sequence of steps for learners that makes explicit the working habits of expert learners

Learning skills

Skills employed in the process of learning, embedded in a learner's behavioral repertoire, and transferable across disciplines and contexts, which enable him or her to improve mastery of subject matter. They are essential for constructing knowledge because they "modulate" or influence what learners can achieve at any level. These skills, once identified, can be consciously improved and refined, increasing the rate and effectiveness of learning

Learning styles

Automatic, habitual patterns of learning or processing preferences which are based on habituation of routines and which are acquired over a learner's entire lifetime

Learning-to-Learn Camp

An intensive 5-day introductory learning experience designed to equip students with the learning skills they will need to succeed in a higher-education setting. Students "learn how to learn" by developing cognitive, social, affective, and academic skills. Through both success and failure in a mentored community setting they gain confidence in their ability to perform in college as well as accept responsibility for their own learning

Levels of Learner Knowledge

Categorization of educational objectives to represent the increasing complexity in the way learners formulate, connect, and present their thoughts (information, conceptual understanding, application, working expertise, and research)

Measurement/Measuring

The process of monitoring and documenting a performance or a product against a scale

Millennial generation

Individuals in the millennial generation are those who were between **16** and **36** years old in 2016 (born between the years 1980 and 2000).

Mentoring

Guiding another person in efforts to improve

Metacognition

Mindfulness of one's own thinking and learning processes, leading to increased self-awareness and self-control

Paradigm shift

A change of thinking, letting go of one philosophical or theoretical framework or perspective, and adopting a new one

Performance

The means by which one produces valued results

Performance Criteria

Clear and explicit description of a performance which allows all involved (performer, assessor, evaluator, etc.) to have a mutually understood set of expectations by which performance may be measured, assessed, and/or evaluated

Process Education

A performance-based philosophy of education which integrates many different educational 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

Problem-Solving

A process whereby a "best" outcome is determined for some situation, subject to certain constraints, by finding, creating, or developing solutions to a question, matter, situation, issue, or person that is perplexing or difficult to deal with

Reflection

A thought or opinion resulting from careful, unfocused consideration

Self-Assessment

Assessing one's own progress and performance by thinking critically about it for the purpose of growth

Self-directed learning

"In its broadest meaning, 'self-directed learning' describes a process by which individuals take the initiative, with our without the assistance of others, in diagnosing their learning needs, formulating learning goals, identify human and material resources for learning, choosing and implement appropriate learning strategies, and evaluating learning outcomes." (Knowles, 1975)

Self-Grower (Self-Growth)

Having developed strong performance/learning skills, self-growers continually use strong self-assessment skills to improve future performance

SII Method (of assessment reporting)

A method of recording and reporting assessment findings which includes a description of the strengths of the performance (including why these are strengths), the areas in which the performance may be improved (including how to implement improvement), and insights for application in other settings.

Spiral curriculum

A curriculum that returns to ideas, skills, and tools over and over again, each time at a more sophisticated level. "A curriculum as it develops should revisit this basic ideas repeatedly, building upon them until the student has grasped the full formal apparatus that goes with them" (Bruner, 1960).

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