

What Is Special about Process Education?

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Abstract

Reflective practice, “the capacity to reflect on action so as to engage in a process of continuous learning” (Schön, 1983), is an important part of a continuous improvement process. As a part of our own reflective practice, the authors read two widely regarded books on teaching; compared these books, using mixed methods techniques, to the principles of Process Education; discovered some interesting things; had many intriguing conversations; and came to the conclusion that Process Education is special. The authors hope that the approach taken in this paper, that “examining practice ... leads to developmental insight” (Bolton, 2010), will stimulate interesting discussions, and encourage others to explore the many tools of Process Education, as well as those presented in our two comparison readings: What the Best College Teachers Do (Bain, 2004), and How Learning Works: Seven Research-Based Principles for Smart Teaching (Ambrose, Bridges, DiPietro, Lovett, Norman, & Mayer, 2010). Enjoy!

Introduction

Process Education is a philosophy of education that focuses on ways to create quality learning environments in which students can become lifelong learners. In this paper the authors will strive to answer the question: what is so special about Process Education? The authors will compare principles from Process Education with ideas from other philosophies of education presented in the books *What the Best College Teachers Do* (Bain, 2004), and *How Learning Works: Seven Research-Based Principles for Smart Teaching* (Ambrose, Bridges, DiPietro, Lovett, Norman, & Mayer, 2010).

Process Education 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.processeducation.org). Two key principles of Process Education are: (1) Every learner can learn to learn better, and (2) The goal is to become a self-sufficient life-long learner.

In *What the Best College Teachers Do*, Ken Bain and colleagues looked for answers to six questions related to the habits and practices of the best college teachers. These questions addressed what the teachers know about learning theories, how they prepare to teach, and how they conduct class. Some questions were related to students: what do teachers expect of their students, how do they treat them, and how do they evaluate students?

How Learning Works presents seven research-based principles as a way to “bridge learning research and teaching practice” (*How Learning Works*, p. 1). The

principles include the following observations. Students' prior knowledge and how they organize knowledge can influence how they learn and apply what they know. Students' motivation affects how and to what extent they learn. To develop mastery, they need to practice, and practice combined with feedback can enhance students' learning. The social, emotional, and intellectual climate of the course can impact learning. Finally, students must learn to monitor and adjust their approaches to learning to become self-directed learners.

These two books were chosen for comparison for multiple reasons. First, *What the Best College Teachers Do* is a well-known and popular book. Second, *How Learning Works* is research-based and offers specific principles that can be used in the classroom. Finally, comparing Process Education to these sources, which may be familiar to many educators, can help introduce its methods to more people.

When comparing the underlying teaching practices of these three philosophies, the authors note that each of them has a slightly different focus. *What the Best College Teachers Do* focuses on the teachers and what they do. *How Learning Works* has a learner focus: what should be done to help the learner learn better? Process Education has a more global focus: on the teacher, learner, and the institution. Yet, even with these different foci, there are common themes among the three approaches.

In this paper the authors plan to describe what is so special about Process Education by accomplishing the following steps. First, the authors use techniques from mixed (qualitative and quantitative) methods to identify themes of the three philosophies (Lincoln, 1985). These themes

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help to identify common and uncommon ideas among the three approaches: how are they similar and what makes each of them stand out? In particular, these ideas will be used to highlight the uniqueness and value of Process Education. The paper will conclude with a list of tips and first steps for implementation of changes in teaching and first steps in Process Education.

Methodology

The characteristics and features of each of the three philosophies were independently extracted from references (Creswell, 1998, 2002) by each of the authors. These two lists were compared and discussed in order to reach a consensus description of *How Learning Works*, of Process Education, and of *What Best College Teachers Do*. The description of what is important to each philosophy is available in Appendix A.

The descriptions and lists of features were aggregated and collected into themes, similar themes were combined, and descriptions of each theme were developed (see Table 1). It is important to note that terminology is sometimes used in specific (and often atypical) ways, meaning that *common* usage of a term may be in conflict with the *specific* meaning intended by the authors of the three sources. In addition, authors of one of the references sometimes co-opt words and assign them meanings that may be contrary to common usage. Examples of this phenomenon include:

- **Develop and Improve:** While common use of these terms allows them to be synonyms, in this paper, *develop* is used as a mile marker on a path, meaning the current stage of development (intellectual or skill). On the other hand, *improve* is used to refer to the process of moving along the path – all persons, even those classified as experts, can improve.
- **Assess and Evaluate:** Often used interchangeably, in this paper *evaluation* implies judgment (often for the purpose of assigning a grade); whereas, *assessment* is used in the formative sense – identifying areas, and opportunities or strategies, for improvement.

Where possible, the authors have used a generic definition in describing each theme, rather than any phrasing that might be preferred by a particular philosophy.

Once the twenty-five themes were identified, they were grouped into five categories. Themes in the first category, **Attitudes and Practices**, are things that faculty do to help students learn. Themes in the second category, **Student Habits**, are things that students should do to help themselves learn. **Faculty Habits of Mind** are practices and customs of faculty. **Student and Faculty Processes** are things that both students and faculty do or should do.

Themes in the final category, **Overarching Themes**, are themes that span all or at least several categories. The twenty-five themes, arranged into these five categories are presented in Table 1.

Many of the themes were included because even only minimal knowledge of the source indicated that the theme was significant to that source. For example, the seven principles for smart teaching from *How Learning Works* could be identified by looking at the chapter titles. Or, a quick read of the first chapter of *What the Best College Teachers Do*, illuminates the classroom and student treatment as important themes. Similarly, the authors' familiarity with Process Education helped them to identify the significance of themes such as assessment and evaluation.

How Learning Works: Course climate, organization, motivation, mastery, practice, prior knowledge, self-directed learner

Process Education: Challenge, expectations, self-directed learner, facilitation, assessment, evaluation, improvement, reflection, institution, learning skills, measurement

What the Best College Teachers Do: Challenge, classroom, expectations, belief, engagement, learning theories, student treatment, metacognition

This initial list of themes was developed by gathering features from each of the three sources independently, yet when the authors looked deeper, they found many of the themes in one or both of the other sources.

It should be noted that this paper is not an attempt to validate the importance of any one of the themes to effective educational practice, which has been done with numerous studies in the educational research literature. Rather it is an attempt to illustrate the commonalities among these philosophies, and a demonstration that all can coexist in the teaching practices a reader may choose to adopt.

A word search was used to measure the importance of a theme in a given philosophy. Realizing that some of the hits will be false positives, the following approach was used in an attempt to capture the best possible measure:

1. Phraseology of each philosophy was included in each of the searches.
2. Alternate forms of each word were included (such as *motivate* and *motivation*).
3. The Kindle™ version and search tool were used for both *What the Best College Teachers Do* and *How Learning Works*.

Table 1 Each Theme with a Description

Attitudes and Practices: What Faculty Do to Help Students Learn	
Challenge	<i>Targeting an appropriate level of challenge can enhance learning. A quality learning environment requires clear and high expectations, and risk-taking. Faculty challenge assumptions and they have challenging, yet realistic positive expectations.</i>
Climate	<i>A supportive environment can motivate student learning and can energize student learning and skill development. Students can try, fail, receive feedback, and try again. Trust in the classroom makes students comfortable to ask questions.</i>
Classroom	<i>Shaping intellectual, social, and emotional aspects of the classroom can help students develop intellectual, social, and emotional skills. In the classroom, faculty simplify and clarify complex topics; they get students' attention and keep it.</i>
Expectations	<i>It is important to set and communicate clear and high expectations. It also is important to model those skills students are expected to master.</i>
Organization	<i>Students' learning is affected by how they connect pieces of knowledge, form accurate organized knowledge structures, and retrieve/apply knowledge effectively. Knowledge is constructed, not received; and mental models change slowly.</i>
Student Habits: What Students Do to Help Themselves Learn	
Motivation	<i>Motivation determines, directs, and sustains what students learn. Faculty use assessment to help students achieve learning goals and a mastery orientation.</i>
Mastery	<i>Students develop mastery if they acquire, practice combining and integrating, and learn to apply knowledge and skills. The goal is fluency and automaticity for both specific knowledge and also for generic, lifelong learning.</i>
Practice	<i>Learning can be enhanced through sufficient practice that focuses on a specific goal or criterion, targets an appropriate level of challenge, and is designed to achieve mastery. Practice involving activities in and outside of class helps students develop better understanding of the material.</i>
Prior Knowledge	<i>Prior knowledge, beliefs, and attitudes influence filtering and interpreting of information. Prior knowledge can be activated or must be overcome. Students try to fit new knowledge into existing paradigms and eventually develop new paradigms.</i>
Self-Directed Learner	<i>Students become self-directed learners through metacognition and monitoring and by controlling their own learning though assessing, evaluating, and planning. The goal is for students to become capable, self-sufficient lifelong learners.</i>
Faculty Habits of Mind: Practices and Customs of Faculty	
Belief	<i>Every learner can learn to learn better. Faculty have faith in a student's ability to achieve, and expect that students will be successful in achieving desired learning outcomes.</i>
Engagement	<i>Students are influenced by social and emotional experiences. Classroom climate can energize student learning. Student buy-in helps faculty engage students in the process, by getting students' attention and keeping it.</i>
Facilitation	<i>While using facilitation it is important to model assessment processes, timely feedback should be provided, and students should be helped to improve their self-assessment skills. Faculty facilitate classroom interactions by asking questions and getting students to talk.</i>
Learning Theories	<i>Learning is a developmental process, both for knowledge and for learning skills. Faculty have a developmental/constructivist view of human learning.</i>
Student Treatment	<i>Faculty treat students with fairness, compassion, and concern. The perception of a supportive environment can motivate student learning.</i>

Student and Faculty Processes: Things that Both Faculty and Students Do	
Assessment	<i>Assessment (whether by students, peers, or faculty) focuses on improvement, not judgment, and is a process that can improve any level of performance. Timely and frequent feedback on targeted performance can enhance learning.</i>
Development	<i>Student development is a response to intellectual, social, or emotional challenges that catalyze students' growth. Regardless of the stage of development, interventions can lead to learning and skill development, helping move students to the next stage.</i>
Evaluation	<i>Feedback can enhance learning. Rubrics and peer review can be used for evaluation. Students can evaluate their own strengths and weaknesses. Evaluation can motivate future growth (both in knowledge and skills), and can be used to determine grades.</i>
Improvement	<i>A variety of methods can help any student develop a better understanding of the material. This improved understanding can lead to an improvement in knowledge and skills, and can move students to a higher stage of development.</i>
Reflection	<i>Reflection is a personal process that can deepen one's understanding of self and can lead to significant discoveries or insights. Self-directed learners reflect on past experiences and events and adjust their strategies and approaches in new situations.</i>
Overarching Themes: Themes that Span Multiple Categories	
Connections	<i>Many principles of education are at work in real, quality learning situations and often are functionally inseparable.</i>
Institution	<i>An educational institution can continually improve its effectiveness in producing learning outcomes by aligning institutional, course, and program objectives; investing in faculty development; and embracing an assessment culture.</i>
Learning Skills	<i>Students enter with knowledge, skills, and abilities. They develop mastery by acquiring, integrating, and then learning when and how to apply both new and old knowledge and skills.</i>
Metacognition	<i>Students become self-directed learners through metacognition. Reflection is a method for thinking about one's thinking. A primary goal is to help students improve this process.</i>
Measurement	<i>Rubrics can be used to identify growth or progress. Establishing a quality-learning environment requires a process of measuring and documenting progress and growth.</i>

4. The electronic edition of *The Faculty Guidebook* and the built-in search tool were used to represent the teachings of Process Education.
5. The “rating” of a theme is defined as the average count of all words for the given theme (see the table in Appendix A).

The results of this word count analysis (see Appendix B) were processed in an effort to distinguish the *importance* of a particular theme to a given philosophy. Since the average count was approximately 45 across all themes and all philosophies (once the outlier of 344 under “classroom” was eliminated), and the standard deviation was approximately 30; themes with average counts in the range of 30 to 60 were rated as important to a philosophy (marked in the table below with a ✓). Those average counts falling outside the important category, but within the range of 15 to 85 were rated as less important or very important

(and marked with ✓- for less important or ✓+ for very important). Average counts less than 15 were regarded as an indication that the theme is *relatively unimportant* to the philosophy (these cells were left blank). Finally, average counts above 85 were rated as *central* to the philosophy (and marked with a ☺). Initially, cells with ratings above 75 were considered for the *central* rating; however, those between 75 and 85 were not significantly higher than other ratings in the same theme. It should be noted that a low word count also could be the result of choosing a word search choice that overlooks the phrasing of a particular philosophy. Likewise, a high word count could be the result of including a word search choice that has a large number of false positives. The results of the word count analysis in symbolic form are displayed in Table 2.

Alternatively, the results of the word count analysis (Appendix B) can be viewed in the form of word clouds.

Table 2 Themes, a brief description, and their importance within each theory

Theme	Description	How Learning Works	Process Education	What the Best College Teachers Do
Attitudes and Practices: What Faculty Do to Help Students Learn				
Challenge	<i>Challenge students by setting high expectations</i>	✓+	✓+	✓+
Climate	<i>Culture and climate within the classroom</i>	✓	✓ -	✓+
Classroom	<i>Faculty classroom practices</i>	✓+	✓+	😊
Expectations	<i>Objectives faculty want students to achieve</i>	✓+	✓+	✓
Organization	<i>Organization of knowledge</i>	😊	✓	
Student Habits: What Students Do to Help Themselves Learn				
Motivation	<i>Motivation to encourage student learning</i>	✓ -	✓ -	✓ -
Mastery	<i>Goal is fluency and automaticity for knowledge</i>	✓+	✓+	✓ -
Practice	<i>Learning can be enhanced with targeted practice</i>	✓	✓	✓ -
Prior Knowledge	<i>Prior knowledge of students</i>	😊	😊	✓ -
Self-Directed Learner	<i>Goal is self-sufficient lifelong learners</i>	✓+	✓	✓ -
Faculty Habits of Mind: Practices and Customs of Faculty				
Belief	<i>Faculty belief in students' ability to achieve</i>	✓	✓ -	✓ -
Engagement	<i>Faculty foster student engagement in class</i>		✓ -	
Facilitation	<i>Faculty facilitate classroom interactions</i>	✓ -	✓	
Learning Theory	<i>Faculty knowledge of learning theories</i>	✓+	😊	✓
Student Treatment	<i>How faculty treat students</i>		✓ -	✓ -
Student and Faculty Processes: Things that Both Faculty and Students Do				
Assessment	<i>Assessment of self, peer, or other</i>	✓	😊	✓ -
Development	<i>Development is the current stage</i>	✓+	✓ +	✓
Evaluation	<i>Evaluation of self, peer, or other</i>		😊	✓
Improvement	<i>Improvement is change, move to another stage</i>		😊	
Reflection	<i>Process to better understand self</i>	✓ -	✓ +	✓
Overarching Themes: Themes that Span Multiple Categories				
Connection	<i>Connections or interconnectedness</i>	✓	✓ -	
Institution	<i>Institutions can continually improve</i>		✓	✓
Learning Skills	<i>Cognitive, social, affective, etc.</i>	✓	😊	
Metacognition	<i>Metacognition: thinking about one's thinking</i>		✓ +	
Measurement	<i>Method of identifying growth</i>	✓	✓	

Wordle™ was used to generate word clouds from the word count results for each of the three approaches. Since word clouds give more prominence to words that occur more frequently, they can be used to gain insight into the importance each theme to the philosophy.

It is worth noting that one should not compare relative word sizes across Wordles. If the word in one Wordle is half the size of the word in another Wordle, this does not imply that the word count for the word in the first source is half the word count in the second source.

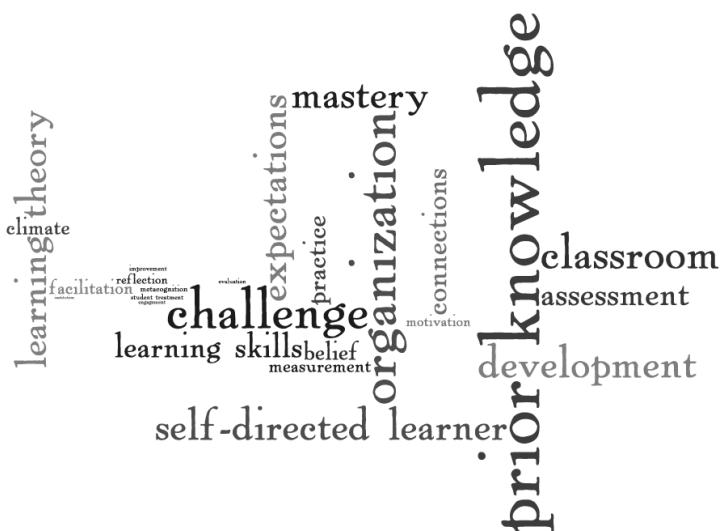


Figure 1 How Learning Works Wordle

While clearly *Prior Knowledge* is central to How Learning Works, a number of other themes are nearly as important. *Challenge*, *climate*, and *reflection* also are important in *How Learning Works*.



Figure 2 Process Education Wordle

As in Table 2, it can be seen in Figure 2 that *learning skills* and *assessment* are central to the teachings of Process Education; nevertheless, many other themes also are very important.



Figure 3 What Best College Teachers Do
Wordle

It should be noted that the word *classroom* was artificially compressed for *What the Best College Teachers Do* (to be comparable to the highest word count from the other two approaches ~½ of the actual word count for this theme) in order to highlight the themes with secondary importance – the *classroom* is of central importance in *What the Best College Teachers Do*. It is also apparent that *challenge*, *climate*, and *reflection* are important.

Common Ideas

One theme stands out in that it has the same rating ($\checkmark +$) for all three philosophies. Establishing a *challenging* environment by setting high expectations is a very important theme in all three. In addition, *classroom* practices, what faculty members do in the classroom, is very important ($\checkmark +$) to two of the philosophies, and central (\odot) to the third. In addition to these, *expectations* (objectives faculty want students to achieve); faculty knowledge of *learning theories*; and *development* have no below average rating. While it is not surprising that the educational philosophies would share these themes, it is surprising that they do not all share more in common. That said, it should be noted that there are very few blank cells in Table 2; and blank does not mean that the word count result was zero – only one cell had a rating of zero (see Appendix B).

Counts shown in Appendix B imply that *climate* within the classroom is twice as important in *What the Best College Teachers Do* as in the other two philosophies. Similarly, counts for *practice* and *development* in *What the Best College Teachers Do* are less than half of the counts in the other two philosophies. Finally, the count for *reflection* in *How Learning Works* is less than half of the count for *What the Best College Teachers Do*, and less than one third of the count for Process Education.

Many themes are present in all philosophies, but the results of the rating process imply that they are definitely more important in one and less important in another. For example:

- faculty knowledge of *learning theories* is central to Process Education; very important to *How Learning Works*; and important to *What the Best College Teachers Do*
- *reflection* is very important to *Process Education*; important to *What the Best College Teachers Do*; and less important to *How Learning Works*

Uncommon Ideas

Three themes are important to one of the three philosophies, while they are absent or virtually absent in one or both of the other. These themes focus on *improvement* in Process Education, *measurement* in Process Education and *How Learning Works*, and *institutional issues* in Process Education and *What the Best College Teachers Do*. In Process Education, one of the key principles is that every learner can learn to learn better, and the purposes of learning processes and assessment are to improve future performance. While *improvement* is mentioned in the other two approaches, it is not one of the key issues. Recall that the common use of a word may differ from the meaning

implied by one of the philosophies. *Measurement* is part of *How Learning Works* and Process Education, although not a key idea; however it is absent from *What the Best College Teachers Do* (there were no hits at all).

Other themes, while not absent from the other approaches, dominate one philosophy. The first example is faculty classroom practices in *What the Best College Teachers Do*. There are multiple chapters about this topic including how they prepare to teach and how they conduct class. In *How Learning Works* prior knowledge of students is an important theme since it is one of the seven principles. Prior knowledge was also rated highly in Process Education. Organization of knowledge dominated *How Learning Works*, as one of the seven principles, yet it was not very present in the other two philosophies.

Of the themes that dominate one philosophy, many are found in Process Education. *Assessment* and *evaluation* are very present in Process Education, partly due to the distinction made between the two ideas. Assessment is a method used to lead to improvement in performance while evaluation is a judgment of a performance using given criteria. Many of the hits for evaluation may be due to the fact that it is frequently mentioned to emphasize that the use of evaluation should be minimized while the use of assessment is maximized. Process Education uses the Classification of Learning Skills, which were developed over a long period of time and are frequently referenced in the *Faculty Guidebook*. Improvement is a key idea in Process Education since that is the goal of many Process Education practices and can be accomplished by using assessment principles. *Metacognition*, while briefly mentioned in the other philosophies, is more present in Process Education. It is used in self-assessment and is a key habit of a self-directed learner.

First Steps

After describing the common and uncommon ideas among the three philosophies, the authors do want to highlight that Process Education is special. Why? The authors want to encourage readers to consider implementing Process Education practices in their classrooms, but the authors also want to stress that adopting Process Education does not mean abandoning what you currently do, and that using Process Education does not mean you cannot also use other teaching philosophies. Included in this section are tips for implementing changes in your teaching, first steps for implementing Process Education in your classroom, and methods for deciding whether the changes are working.

Reading a list of twenty-five themes and their significance in three different sources could be somewhat overwhelm-

ing, at least initially. It is important to keep in mind that you do not want to make too many changes at once, and you want to allow a sufficient amount of implementation time after each change before deciding whether or not the change has been effective. One place to begin is to see Appendix C for some examples of first steps from each of the three sources.

Tips for Implementing Changes in Your Teaching

Included below are three tips to help you successfully implement some of these first steps in your classroom. Regardless of where you plan to begin, you should keep these tips in mind.

- Start slowly: focus on one course or one theme at a time
- Commit to making a change either in terms of number of activities or length of time
- Find a mentor: a mentor will not only help you but will also hold you accountable

First, you should start slowly (Bonwell & Eison, 1991; Johnson, Johnson, & Smith, 1991). Pick just one theme or activity to incorporate into one course. Once you feel confident that the change has been effective, you can choose another to implement. To balance with this tip, you should also commit to making a change (Burke & Reitzes, 1991; P. Smith, personal communication, January 4, 2013). In advance, decide on a number of activities to implement or a length of time to try new ideas, and commit to that decision. You need to allow enough time for change to happen. Third, a mentor can be extremely helpful during this process (Guest, 2000 cited in Shresha, May, Edirisingha, Burke, & Linsey, 2009; Boice, 2000). One benefit of having a mentor is that he or she can share experiences that have worked, offer advice and guidance for additional things to try, and give encouragement when you feel frustrated or discouraged. Another benefit is that a mentor can hold you accountable, checking to see that you are following through with the changes that you have planned. Keep in mind that a mentor does not need to be someone at your institution; someone you meet at a conference could serve as a good mentor to you.

The previous list of tips is general and can be helpful when making any change in your classroom. The next three tips are more specific to Process Education.

- Attend the annual Process Education conference
- Read about Process Education
- Attend a Pacific Crest Institute

By attending the annual Process Education conference, you have an opportunity to meet other members of the Process

Education community and to hear about current activities. This is an ideal place to find a mentor. You can read more about Process Education in both the *International Journal of Process Education* (IJPE) and the *Faculty Guidebook*. The IJPE is a peer-reviewed journal that publishes articles about Process Education. The *Faculty Guidebook* is a book that contains modules (no more than four pages in length) which can serve as a resource for a wide variety of topics related to Process Education. Finally, Pacific Crest institutes focus on key educational processes such as teaching, instructional design, student success, technology, assessment, and institutional effectiveness.

First Steps for Implementing Process Education in the Classroom

As can be seen in Table 2, many of the twenty-five themes are significant within the Process Education philosophy. While it is a specific theme in the table, the idea of having a constant goal of improvement is pervasive throughout Process Education, whether the improvement is in a student, a faculty member, a course, or an institution. Three themes within Process Education that are helpful in leading towards improvement and are therefore good places to take first steps within your classroom are:

- Quality Learning Environments
- Assessment
- Reflection

Both quality learning environments and assessment have their own chapters in the *Faculty Guidebook* and lists of ten principles, as compared to other topics that have only a module or two devoted to them. Quality learning environments, as described in the *Faculty Guidebook*, share many aspects with the natural critical learning environment that Bain (2004) describes in his book. In Process Education, assessment is distinct from evaluation, with a strong emphasis placed on assessment. When doing assessment, you want to consistently use the same method. After you use a method 2-3 times, there is low overhead since the students know the process. You want them to focus on the feedback, not on the tool they are using. Reflection is an important process that can help someone learn from experiences (Dewey, 1933; Desjarlais & Smith, 2011). It is a metacognitive strategy which can improve learning. It can be very helpful for students to take time to reflect on what they are doing.

These three areas are good places to begin implementing Process Education in your classroom, not only because of their significance within the philosophy, but also because there are quick and easy things that can be done to implement them in the short-term while also having long-

term benefits from their inclusion in your classroom. You can read more about these in the *Faculty Guidebook* (FGB), but here are some first steps you can do to implement each within your classroom.

Quality Learning Environment

- Establish initial respect without prejudging (FGB 3.1.4): The first day of class is an ideal time to begin this process. First, arrange the classroom to have an environment that encourages small group discussions. You can ask students about their ideal learning environment and then discuss how to implement this in the course. Giving a candid introduction can help students relate to you.
- Getting student buy-in (FGB 3.1.5): It is difficult to establish a quality learning environment without having students buy into the process. To promote student buy-in, encourage the students to take ownership of the learning process: students can help to develop course objectives or design a project they will complete. Another way is to develop trust with the students that will allow risk-taking behavior.
- Obtaining shared commitment (FGB 3.1.6): To help learning to occur, it is important for both faculty and students to be committed to working toward course goals. To encourage commitment, ask students to generate what their expectations are and then discuss them; the students and faculty then agree on a list of expectations for students for the course. Then, repeat with expectations of faculty. To maintain this shared commitment, faculty should hold students accountable and students should hold faculty accountable.

Assessment

- Use the SII Method for Assessment: For a given performance (homework, paper, presentation, etc.) identify **Strengths**: high quality elements of the performance and specify *why* they were strengths; identify **Areas for Improvement**: changes that could be made to improve the performance in the future and specify *how* to implement the changes; and identify **Insights**: new discoveries or understandings that were gained related to the performance and specify *why* they are significant.
- Mid-semester assessment: have the students do an SII on the course and/or the instructor, then choose some of the areas for improvement and make some changes. This is an important step in the assessment process since this is how the improvement happens. Also, the students will see that you are listening and that you care about what they have to say.

- Peer assessments: for certain assignments have the students do an SII on another student's work. Then the students can address some the areas for improvement that were suggested and when they submit the assignment to you, it is a higher quality assignment and this higher quality did not involve you taking time to give them feedback. The students will need to get past the idea that they are grading someone else's work to focus on the feedback and learning that can take place.

Reflection

- Reflection on what students have learned: Take a topic that you have recently discussed and ask the students to reflect on this topic. You can give them some guiding questions to lead them to write about their understanding of the topic, where they struggled, and what parts of the development of their understanding could be used in future situations in which they are presented with a new topic to learn. Reflecting on learning experiences can increase the learning that happens, and helps learners identify gaps where learning still needs to occur.
- Reflection after an exam: Ask students to analyze their studying and test-taking behavior to better understand their performance on an exam. They can use “the five whys” technique (Ohno, 1988) to find the root cause of a mistake, and then develop an avoidance strategy to avoid making similar mistakes in the future.
- Mid-semester or end-of-course reflection: Mid-semester reflections can include SII on their performance, reflection on problem-solving strategies used in the course, or certain components of the course that are relevant to their future careers. End-of-course reflections can focus on how their initial impressions have changed during the semester, how elements of the course did (or did not) help them to feel prepared for their future careers, or what advice they would give to students planning to take the course in the future.

Some examples of further reading for Process Education include particular chapters or modules within the *Faculty Guidebook* (FGB) or *International Journal of Process Education* (IJPE) papers. There are specific modules listed in Appendix C that align with the twenty-five themes, but the list included here are things to read that give you an overview or provide a larger context for Process Education that would help with multiple themes.

- The FGB chapter on Establishing Quality Learning Environments includes modules giving an overview and methodology for establishing learning environ-

ments, how to get student buy-in, setting high expectations, and letting students fail so that they can succeed.

- The FGB chapter on Assessment as a Foundation for Growth includes modules giving an overview and methodology for assessment and the SII method for assessment.
- The IJPE paper *Process Education: Past, Present and Future* provides an overview and history of Process Education, including ten PE principles.
- The IJPE paper *A Comparative Analysis of Reflection and Self-Assessment* distinguishes between the two processes and provides tips for doing each.

How Do You Know Whether It Is Working (Or Not)?

You have spent time choosing a theme, reading some chapters or modules, and you have included new activities or classroom procedures within your course. Now, how do you decide whether or not the changes you made have been worthwhile? Two questions to ask are:

- Do the students like the changes?
- Do students perform better (e.g., on exam questions) than before?

Asking whether the students like the changes is more than just about finding whether they are happy or about hearing more complaints from students. If the students like the changes, they are more likely to be engaged in the course, and student engagement is one of the twenty-five themes discussed in this paper. Looking at Table 2, it is not a theme that is emphasized in any of the three sources, but the authors would argue it is difficult to have meaningful and consequential activities in a class if the students are not engaged.

How do you find out if the students like the changes? Ask them. Prepare a short survey or ask them to do an SII assessment of the course based on the changes you made. These should be written and anonymous, so that students are comfortable being honest and other students' comments are less likely to influence their comments (as might happen if the comments were shared verbally in class). If you plan to ask for their feedback throughout the semester, you might ask the students to put a code name on their surveys (such as Mickey Mouse or Wonder Woman) so that you may match responses and follow changes in opinions over the course of the semester. The students are still anonymous, but you can look at the responses from Wonder Woman on the first day, at mid-semester, and on the last day, to see how that student's responses have evolved over the course of the semester.

A second way to measure the impact of the changes is to look at student performance on exams. If you are making these changes in a course that you have taught for multiple semesters, you at least have a sense of where students tend either to struggle or to perform well, and perhaps you have data from exams such as means, medians, and standard deviations. You can give similar exam questions and see whether the performance is better than it has been in the past.

If the answers to either of these questions are yes, then you should keep the changes you have made. If the students don't like the changes, but they are performing better on exams, then you may want to keep the changes and discuss with the students why you are keeping the changes. If the students like the changes but they are not performing better on exams, then you need to decide whether the favorable attitudes of students and increased student engagement make the changes worth keeping, even though exam performance did not improve. Perhaps there are minor modifications you might make to the classroom procedures or activities that could lead to improvement on exams. But, if the answers to both of the questions are no, then perhaps you should try implementing different changes.

These are informal ways to measure the effects of the changes you have made in terms of activities or classroom procedures, but if you would like more rigorous methods, there are many sources available for classroom assessment. *Classroom Assessment Techniques* by Thomas A. Angelo and K. Patricia Cross (1993) contains many techniques for assessment. If you would like to have a more formal project within your classroom, two helpful sources are *Inquiry into the College Classroom* (Savory, Burnett & Goodburn, 2007) and *Engaging in the Scholarship of Teaching and Learning* (Bishop-Clark & Dietz-Uhler, 2012).

Final Concluding Remarks

The primary goal of this paper is to emphasize that Process Education is special. Several things stand out about the results in the Process Education column in Table 2. First, no *theme* is "blank, i.e., relatively unimportant" —this is particularly striking in the group of overarching themes. Second, the number of *themes* represented as ✓+ (very important) and ☺ (central) is 13 (more than 50%), compared to 9 and 3 for either *How Learning Works*, or *What the Best College Teachers Do*. Finally, perhaps not surprisingly, in the category of *themes* labeled **Student and Faculty Processes**, all five themes are ✓+ (very important) or ☺ (central), compared to one and zero for *How Learning Works* or *What the Best College Teachers Do*.

Also notice that the focus of each philosophy is somewhat different. *What the Best College Teachers Do* focuses on the teachers and what they do. *How Learning Works* has a learner focus: what should be done to help the learner learn better? Process Education has a more global focus, on the teacher, learner, and the institution. The results presented in this paper indicate that Process Education is the most comprehensive with respect to the twenty-five themes identified, and not surprisingly, places the most emphasis on student and faculty processes.

However, there are some larger ideas to keep in mind: First, adopting practices from Process Education does not mean abandoning what you currently do; it may even enhance your current practices. Second, using Process Education does not mean that you cannot use other teaching philosophies or approaches. Third, it is important to make a significant commitment to making a change before starting the journey. You need to maintain a change for a long enough time to give it a chance to work and long enough for it to become a habit. In addition, you will also need to assess the change to determine whether it is achieving the desired (or better) results. If it is not working, you should abandon the practice and try something different (fortunately, there are many alternatives). Finally,

it is important to have a community in which to share your ideas as well as get feedback and support from others who share common interests in teaching and learning.

One can divide the people reading this paper into two audiences: those who are currently familiar with Process Education and the PE community and those who are not. For the first audience, this paper can provide ways to discuss with colleagues the connections between Process Education and two well-known and well-regarded books. These connections and overlapping themes can provide reasons to try Process Education methods in one's classroom and teaching. Process Education also makes accessible additional tools for classroom teachers. For those who are not familiar with Process Education, this paper provides an introduction to this philosophy of education and a rationale for implementing practices from Process Education. For both audiences, this paper not only provides a practical guide to steps for improving teaching and learning, but it also provides source material for those steps. Do you want to make a change to your classroom and in your teaching practices? If so, this paper can provide a starting point for your adventure. Process Education is unique in that it focuses on the belief that ALL can improve, no matter where they start.

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Appendix A — Features of Educational Models

How Learning Works

Learning is a developmental process
Students enter with knowledge, skills, abilities; and social and emotional experiences
#2 influences what they value, how they perceive themselves and others, AND how they will engage in the learning process
All seven principles are at work in real learning situations and are functionally inseparable

How does students' prior knowledge affect their learning?

Students come with knowledge, beliefs, and attitudes
Prior knowledge, beliefs, and attitudes influence filtering of information
Prior knowledge, beliefs, and attitudes influence interpretation of information
Prior knowledge can be robust and accurate and activated at the appropriate time
Prior knowledge can be inert, insufficient, inaccurate, or activated inappropriately
Prior knowledge can provide a strong foundation for building new knowledge
Prior knowledge can impede new learning

How does the way students organize knowledge affect their learning?

Students connect pieces of knowledge
Form accurate knowledge structures
Form meaningfully organized knowledge structures
> Retrieve knowledge effectively
> Apply knowledge effectively

What factors motivate student learning?

Motivation determines, directs, and sustains what students learn
Find positive value in a learning goal or activity
Expect success in achieving a desired learning outcome (student or faculty?)
Perceive support from their environment

How do students develop mastery?

Acquire component knowledge and skills
Practice combining and integrating knowledge and skills
Learn when and how to apply knowledge and skills (GOAL = Develop fluency and automaticity)

What kinds of practice and feedback enhance learning?

Focus on a specific goal or criterion
Target an appropriate level of challenge
Sufficient practice to achieve mastery
Feedback on targeted performance
Timely and frequent feedback

Why do student development and course climate matter for student learning?

Student development is a response to intellectual, social, or emotional challenges that catalyze students' growth
Intellectual development: a student's trajectory from simplistic to more sophisticated ways of thinking (duality of right vs. wrong, multiplicity of opinions, relativism, commitment); this takes time
Social identity development: many models describe similar trajectories which culminate with the establishment of a positive social identity as a member of a specific group (naïve, acceptance, resistance, immersion, disintegration, redefinition, internalization)
Energize student learning by shaping classroom climate
Shape intellectual, SOCIAL & EMOTIONAL aspects of classroom to develop intellectual SOCIAL & EMOTIONAL skills

How do students become self-directed learners?

Metacognition
Students monitor and control their learning
Assess tasks at hand
Evaluate their own strengths and weaknesses
Plan an appropriate approach
Apply strategies and monitor performance
Reflect on and adjust one's approach
Beliefs about intelligence and learning

Appendices

Student self-assessment
Rubrics
Learning objectives
Reader response/peer review

Process Education

Every learner can learn to learn better	Social domain: communicating, relating with others, relating culturally, managing, leading
The goal is to become a capable, self-sufficient, lifelong learner	Affective domain: receiving, responding, organizing, valuing, internalizing
Learning processes to improve future performance	Psychomotor domain: wellness, body development, using the body, using tools
Self-assessment to improve future performance	Reflection is a personal process that can deepen one's understanding of self and can lead to significant discoveries or insights
Educators should assess students regularly	Self-assessment is a process that involves establishing strengths, improvements, and insights based on predetermined performance criteria
Measuring accomplishments	Quality Learning Environment
Modeling assessment processes	Establish a high degree of trust and respect
Providing timely feedback	Get student buy-in very early in the process
Helping students improve their self-assessment skills	Challenge students by setting clear and high expectations
Faculty must fully accept the responsibility for facilitating student success	Encourage risk-taking
A learner must develop a specific knowledge base in that field	Seek student feedback regularly by using assessment on a consistent and timely basis
A learner must acquire generic, lifelong learning skills that relate to all disciplines	Measure and document progress and growth
Teachers focus on improving specific learning skills through timely, appropriate, and constructive interventions	Create a collaborative learning space
Mentors model what they expect students to use in achieving their own learning goals	Create a balance between structure and flexibility
An educational institution can continually improve its effectiveness in producing learning outcomes	
Aligning institutional, course, and program objectives	
Investing in faculty development, curricular innovation, and design of performance measures	
Embracing an assessment culture	
Continuously improve by doing active observation in the classroom	
Continuously improve by doing research in the classroom	
Assessment focuses on improvement, not judgment	
Assessment focuses on performance, not the performer	
Assessment is a process that can improve any level of performance	
Assessment requires analyses of observations based on agreed-upon criteria	
Assessment feedback is accepted only when there is mutual trust and respect	
Assessment is effective only when the assessee uses the feedback	
Classification of Learning Skills	
Cognitive domain: processing information, constructing understanding, applying knowledge, solving problems, conducting research	

What The Best College Teachers Do

Faculty know their disciplines well	Faculty take responsibility for helping students become better, self-conscious learners
Faculty are active and accomplished scholars, artists, or scientists	Faculty seek ways to give students the opportunity to struggle with thoughts without facing assessment of their efforts
Faculty have a keen sense of the history of their disciplines (including the controversies) and that understanding helps them reflect deeply on the nature of thinking within their fields	Provide learners with feedback; do not simply judge their efforts
Faculty think about their own thinking (metacognition)	Faculty stress the importance of students being able to judge the quality of their own work as a key aspect of learning
Faculty have conceptions of human learning	Faculty explore how students develop intellectually
Realize where people are likely to face difficulties developing their own comprehension	Faculty expect students to understand their own learning
Simplify and clarify complex topics: tell stories and raise provocative questions	Faculty create a natural critical learning environment
Students try to fit new knowledge into existing paradigms and eventually come up with NEW paradigms	Faculty create an environment where students can try, fail, receive feedback, and try again
Faculty believe that knowledge is constructed, not received	Faculty look for and appreciate the individual value of each student
Mental models change slowly	Faculty have great faith in a student's ability to achieve
Questions are crucial	Faculty have challenging, yet realistic positive expectations of students
Caring is crucial	Provide a "promising syllabus" which sets standards that represent authentic goals
Faculty have developed a series of attitudes, conceptions, and practices that clearly reflect some key insights that have emerged from the scholarship on motivation	Faculty get students' attention and keep it
Faculty try to avoid extrinsic motivators and to foster intrinsic ones, moving students towards learning goals and a mastery orientation	Faculty seek commitments
Faculty give students as much control over their own education as possible	Faculty help students learn outside of class
Faculty display a strong interest in students' learning and a faith in their abilities	Faculty engage students in disciplinary thinking
Faculty generally avoid using grades to persuade students to study; instead they invoke the subject, the questions it raises, and the promises it makes to any learner	Faculty create diverse learning experiences
Faculty are aware of three categories of learners; those motivated by deep learning, competition, or fear of failure; they realize that if they tailored their appeals to individuals, they could influence how their students approached learning	Faculty have an ability to get students to talk
Developmental view of learning (received, subjective, procedural, commitment, separate, and connected knowers)	Faculty foster a feeling of investment in students
Faculty plan backwards (begin with the result they hope to foster)	Faculty foster trust in the class
Faculty plan ways to challenge assumptions	Faculty make students comfortable to ask questions
Use a variety of methods to help any student, regardless of current ability, to develop a better understanding of the material	Faculty believe students can learn, until proven otherwise
Faculty emphasize the constructed and continuously revised nature of knowledge	Faculty believe everyone can contribute
	Faculty treat students with fairness, compassion, and concern
	Faculty focus on stimulating student involvement and attention
	Faculty engage students
	Evaluation (OF TEACHERS) and assessment (OF STUDENTS) stress learning rather than performance
	Faculty help students understand and use criteria by which they will be judged
	Primary goal is to help students learn to think about their own thinking
	Faculty take a learning-based approach

Appendix B — Word Count Analysis

A word search was used to measure the importance of a theme in a given philosophy. Alternate forms of each word were included (such as *motivate* and *motivation*). The “rating” of a theme is defined as the average count of all words for the given theme.

Theme		HLW	PE	WBCTD
Attitudes and Practices: What Faculty Do to Help Students Learn		68.6	54.6	104.4
Challenge	<i>Challenge students by setting high expectations</i>	83	79	62
Climate	<i>Culture and climate within the classroom</i>	34	24	69
Classroom	<i>Faculty classroom practices</i>	71	62	344
Expectations	<i>Objectives faculty want students to achieve</i>	64	72	42
Organization	<i>Organization of knowledge</i>	91	36	5
Student Habits: What Students Do to Help Themselves Learn		63.4	56.6	19.4
Motivation	<i>Motivation to encourage student learning</i>	23	24	15
Mastery	<i>Goal is fluency and automaticity for knowledge</i>	66	70	22
Practice	<i>Learning can be enhanced with targeted practice</i>	44	45	18
Prior Knowledge	<i>Prior knowledge of students</i>	119	88	20
Self-Directed Learner	<i>Goal is self-sufficient lifelong learners</i>	65	56	22
Faculty Habits of Mind: Practices and Customs of Faculty		29.6	44.2	16.6
Belief	<i>Faculty belief in students' ability to achieve</i>	37	18	17
Engagement	<i>Faculty foster student engagement in class</i>	9	28	2
Facilitation	<i>Faculty facilitate classroom interactions</i>	29	56	10
Learning Theory	<i>Faculty knowledge of learning theories</i>	62	99	32
Student Treatment	<i>How faculty treat students</i>	11	20	22
Student and Faculty Processes: Things that Both Faculty and Students Do		32.2	103.0	32.2
Assessment	<i>Assessment of self, peer, or other</i>	54	156	29
Development	<i>Development is the current stage</i>	66	69	31
Evaluation	<i>Evaluation of self, peer, or other</i>	10	105	40
Improvement	<i>Improvement is change, move to another stage</i>	11	113	5
Reflection	<i>Process to better understand self</i>	20	72	56
Overarching Themes: Themes that Span Multiple Categories		29.6	62.0	14.6
Connection	<i>Connections or interconnectedness</i>	48	16	8
Institution	<i>Institutions can continually improve</i>	7	50	49
Learning Skills	<i>Cognitive, social, affective, etc.</i>	50	141	12
Metacognition	<i>Metacognition: thinking about one's thinking</i>	13	66	4
Measurement	<i>Method of identifying growth</i>	30	37	0

HLW = *How Learning Works: Seven Research-Based Principles for Smart Teaching*

PE = Process Education

WBCTD = *What the Best College Teachers Do*

Appendix C — First Steps

This appendix includes a list of first steps for the twenty-five themes discussed in the paper. The first steps are organized by the three sources. Each cell contains a first step and a source for further reading. Note *FGB* = *Faculty Guidebook*.

Faculty Attitudes and Practices that Influence Their Teaching

Challenge = Targeting an appropriate level of challenge can enhance learning. A quality learning environment requires clear and high expectations, and risk-taking. Faculty challenge assumptions and they have challenging, yet realistic positive expectations.

How Learning Works	Process Education	What the Best College Teachers Do
Include learning objectives in syllabus, handouts, and assignments. Appendix D	Set level of challenge that exceeds cognitive skills but not enough to cause anxiety or frustration. FGB: The Accelerator Model	Create an “expectation of failure”: existing mental models lead to faulty expectations, causing students to think about beliefs. Chapter 2

Climate = A supportive environment can motivate student learning, and then can energize student learning and skill development. Students can try, fail, receive feedback, and try again. Trust in the classroom makes students comfortable to ask questions.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> Establish and reinforce ground rules for interaction Model inclusive language, behavior, and attitudes. Chapter 6	Establish a high degree of trust and respect FGB: Overview and Methodology for Quality Learning Environments	<ul style="list-style-type: none"> Start with the students rather than the discipline Create ... environment in which students can try, fail, receive feedback, and try again Chapter 3 & Chapter 5

Classroom = Shaping intellectual, social, and emotional aspects of the classroom can help students develop intellectual, social, and emotional skills. In the classroom, faculty simplify and clarify complex topics; they get students' attention and keep it.

How Learning Works	Process Education	What the Best College Teachers Do
	<ul style="list-style-type: none"> Create a collaborative learning space Get student buy-in early FGB: Overview and Methodology for Quality Learning Environments	Create a collaborative environment to challenge and support students Chapter 4

Expectation = It is important to set and communicate clear and high expectations. It also is important to model those skills you expect students to master.

How Learning Works	Process Education	What the Best College Teachers Do
Articulate course goals clearly to students Chapter 3	Set high expectations which focus on learning outcomes FGB: High Expectations and Learning Outcomes	Set high standards and convey trust in students' abilities Chapter 4

Organization = Students' learning is affected by how they connect pieces of knowledge, form accurate organized knowledge structures, and retrieve/apply knowledge effectively. Knowledge is constructed, not received; and mental models change slowly.

How Learning Works	Process Education	What the Best College Teachers Do
Create and use concept maps Chapter 2	Discuss Bloom's taxonomy and the importance of moving up the levels FGB: Bloom's Taxonomy and Elevating from Level 1 to 3	Ask questions to help students construct knowledge Chapter 2

Student Habits that Influence Their Learning

Motivation = Motivation determines, directs, and sustains what students learn. Faculty use assessment to move students from learning goals and a mastery orientation.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> • Connect the material to students' interests • Provide real-world tasks Chapter 3	Expect success and use intrinsic motivators FGB: Process Education and Motivation	Foster intrinsic motivators such as learning goals and mastery learning Chapter 2

Mastery = Students develop mastery if they acquire knowledge and skills, practice combining and integrating them, and learn to apply them. The goal is fluency and automaticity for both specific knowledge and also for generic, lifelong learning.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> • Discuss conditions of applicability • Ask students to generalize to larger principles Chapter 4	Take a classroom activity and modify it to increase its complexity and level on Bloom's taxonomy FGB: Developing Working Expertise	<ul style="list-style-type: none"> • Create diverse learning experiences • Start with the simple (familiar) and move toward more complex (& unknown) Chapter 5

Practice = Learning can be enhanced through sufficient practice that focuses on a specific goal or criterion, targets an appropriate level of challenge, and is designed to achieve mastery. Activities in and outside of class develop a better understanding.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> • Build scaffolding into assignments • Set expectations for practice Chapter 5		Give students authentic tasks that will arouse curiosity, challenge... assumptions... Chapter 3

Prior Knowledge = Prior knowledge, beliefs, and attitudes influence filtering and interpreting of information. Prior knowledge can be activated or must be overcome. Students try to fit new knowledge into existing paradigms and eventually develop new paradigms.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> • Administer diagnostic assessment • Assign concept map activities Chapter 1 & Appendix B	Ask questions prior to class discussions to assess students' preparedness for learning FGB: Elevating Level 1 to 3	Make deliberate and carefully measured efforts to confront mental models Chapter 3 & Chapter 5

Self-Directed Learner = Students become self-directed learners through metacognition and monitoring and controlling their own learning though assessing, evaluating, and planning. The goal is to become capable, self-sufficient lifelong learners.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> • Provide performance criteria with assignments • Provide opportunities for self-assessment Chapter 7	Provide students with self-validation techniques to help them assess what they know FGB: Self-Validation of One's Learning	<ul style="list-style-type: none"> • Give comprehensive exams • Ask students to self-assess • Communicate in a way that keeps students thinking Chapter 3 & Chapter 7

Faculty Habits of Mind that Influence Their Teaching

Belief = Every learner can learn to learn better. Faculty have faith in a student's ability to achieve, and expect that students will be successful in achieving desired learning outcomes.

How Learning Works	Process Education	What the Best College Teachers Do
Provide early opportunities for success Chapter 6	Believe in students' ability to learn, and expect success FGB: Motivation & Adult Learning Theories	Convey trust in students' abilities to meet high standards Chapter 4

Engage = Students are influenced by social and emotional experiences. Classroom climate can energize student learning. Student buy-in helps faculty engage students in the process – getting students' attention and keeping it.

How Learning Works	Process Education	What the Best College Teachers Do
• Set high but attainable standards • Articulate expectations Chapter 3	Do cooperative learning activities and get student buy-in FGB: Cooperative Learning and Getting Student Buy-In	Promote intellectual excitement and curiosity; openness; faculty share personal experiences Chapter 4 & Chapter 6

Facilitation = It is important to model assessment processes, provide timely feedback, and help students improve their self-assessment skills. Faculty facilitate classroom interactions by asking questions and getting students to talk.

How Learning Works	Process Education	What the Best College Teachers Do
Give students opportunities to apply skills or knowledge in diverse contexts Chapter 4	Take one class session and turn it into a facilitation session FGB: Overview of Facilitation and Creating a Facilitation Plan	Listen to student conceptions and ask questions to help students see their own mistakes Chapter 2

Learning Theories = Learning is a developmental process, both for knowledge and for learning skills. Faculty have a developmental/constructivist view of human learning.

How Learning Works	Process Education	What the Best College Teachers Do
• Learning is a process • Learning involves change • Learning is not done to anyone Introduction	Read about andragogy and adult learning theories FGB: Adult Learning Theories in Process Education	Understand what it means to learn and how best to foster that achievement Chapter 1

Student Treatment = Faculty treat students with fairness, compassion, and concern. The perception of a supportive environment can motivate student learning.

How Learning Works	Process Education	What the Best College Teachers Do
• Make uncertainty safe • Reduce anonymity • Practice inclusivity Chapter 6	Establish initial respect and start with no prejudging FGB: Methodology for Quality Learning Environments	Look for and appreciate the individual value of each student; show caring for students Chapter 4

Student and Faculty Process that Influence Teaching and Learning

Assessment = Assessment (whether by students, peers, or faculty) focuses on improvement, not judgment, and is a process that can improve any level of performance. Timely and frequent feedback on targeted performance can enhance learning.

How Learning Works	Process Education	What the Best College Teachers Do
Constructive feedback identifies strengths, weaknesses, and suggestions for future action. Chapter 3	Use the SII method of assessment throughout the semester (for peer, course, or instructor assessment) FGB: Distinctions between Assessment and Evaluation, and SII Method of Assessment	Create an environment in which students can try, fail, receive feedback, and try again Chapter 3 & Chapter 7

Development = Student development is a response to intellectual, social, or emotional challenges that catalyze students' growth. Regardless of the stage of development, interventions can lead to learning and skill development -- helping move students to the next stage.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> Incorporate evidence into performance and grading criteria Use multiple and diverse examples Chapter 6	Use the Personal Development Methodology to develop a plan for change and growth FGB: Personal Development Methodology	Provide authentic tasks that will arouse curiosity, and challenge students to rethink their assumptions and examine their mental models of reality Chapter 3

Evaluation = Feedback can enhance learning. Rubrics and peer review can be used for evaluation. Students can evaluate their own strengths and weaknesses. Evaluation can motivate future growth (both in knowledge and skills), and can be used for grades.

How Learning Works	Process Education	What the Best College Teachers Do
Identify particular aspects of a performance that need to be improved Chapter 5	Distinguish between assessment and evaluation and determine appropriate times for each FGB: Overview of Evaluation, and Distinctions between Assessment and Evaluation	Stress learning rather than performance: identify what evidence can show that learning took place Chapter 7

Improvement = A variety of methods can help any student develop a better understanding of the material. This improved understanding can lead to an improvement in knowledge and skills, and can move students to a higher stage of development.

How Learning Works	Process Education	What the Best College Teachers Do
Use comparisons to help students identify meaningful features, and transfer knowledge Chapter 4	Assessment is a process for improving quality, so use assessment techniques, such as SII FGB: Overview of Assessment, and SII Method of Assessment	<ul style="list-style-type: none"> Use evidence and reason to answer questions Emphasize learning rather than performance Chapter 3 & Chapter 7

Reflection = Reflection is a personal process that can deepen one's understanding of self and can lead to significant discoveries or insights. Self-directed learners reflect on past experiences and events and adjust their strategy and approach in new situations.

How Learning Works	Process Education	What the Best College Teachers Do
Reflect on adequacy of preparation time for exam Appendix A & Appendix F	Use reflection activities IJPE (2011) A Comparative Analysis of Reflection and Self-Assessment	How will students best understand the nature, progress, and quality of their learning Chapter 3

Overarching Themes that Influence Teaching and Learning

Connections = Many principles of education are at work in real quality learning situations, and are often functionally inseparable.

How Learning Works	Process Education	What the Best College Teachers Do
Make connections among concepts explicit Chapter 2 & Appendix B		

Institution = An educational institution can continually improve its effectiveness in producing learning outcomes by aligning institutional, course, and program objectives; investing in faculty development; and embracing an assessment culture.

How Learning Works	Process Education	What the Best College Teachers Do
	Explore ways to become involved in institutional effectiveness FGB: New Faculty Roles for Institutional Effectiveness, and Assessment Culture	Engage students in disciplinary thinking Chapter 5

Learning Skills = Students enter with knowledge, skills, and abilities. They develop mastery by acquiring and then learning when and how to apply knowledge and skills.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> Ask students to justify their reasoning Provide multiple opportunities to use accurate knowledge Chapter 1	Use the Learning Process Methodology to add value to a learning activity FGB: Classification of Learning Skills, and Learning Process Methodology	<ul style="list-style-type: none"> Address conflicting problems Help students construct the intellectual challenge (of an existing mental model) Chapter 3

Metacognition = Students become self-directed learners through metacognition. Reflection is a method for thinking about one's thinking. A primary goal is to help students learn to think about their own thinking.

How Learning Works	Process Education	What the Best College Teachers Do
<ul style="list-style-type: none"> Model your metacognitive process Be more explicit than necessary Chapter 7	Help students learn how to learn through reflection, self-assessment, and mentoring FGB: Overviews of Learning Theory and Assessment; SII Method of Assessment	Challenge students to rethink their assumptions and examine their mental models of reality Chapter 3

Measurement = Rubrics can be used to identify growth or progress. Establishing a quality-learning environment requires a process of measuring and documenting progress and growth.

How Learning Works	Process Education	What the Best College Teachers Do
Use rubrics to explicitly set performance expectations Appendix C	Use rubrics to measure knowledge and growth FGB: Fundamentals of Rubrics, and Differentiating Knowledge from Growth	Ask what evidence is needed to collect to measure progress and development Chapter 7

