5

Issues over Invention Pedagogies

In contrast to other fields of scholarship that separate basic research from its application, research on rhetorical invention in the 1960s and 1970s was motivated by the desire to address the problems students faced with selecting subjects, framing a thesis, and getting ideas and arguments to support their theses. This close pedagogy/theory relationship in the field of Rhetoric and Composition was described by Lauer in "Dappled Discipline" and "Cross-Disciplinarity in Rhetorical Scholarship?" This chapter describes instructional approaches to teaching invention from the mid 1960s to the present. and then relates them to five issues that have circulated around invention pedagogy both historically and recently: 1) the relative importance of four formative factors in the development of a writer's inventional powers; 2) the merits of different inventional strategies; 3) the social nature of invention; 4) the character of invention as interpretive or productive; and 5) the role of rhetoric in either constructing or conveying knowledge. Each of these issues is explained below.

Issues

The Relative Importance of Four Formative Factors

One of the longstanding issues in rhetorical education since the Greeks continues today in discussions of composition instruction: What is most important in helping students to investigate their subjects and get ideas? Is it relying on their natural ability? Is it examples and models of invention the instructor provides for imitation? Is it extensive

practice through many assignments? Is it strategies the teacher offers to guide invention? Each of these factors described briefly below has played a role in teaching invention. The natural ability pedagogy, what some today call romantic pedagogy, avoids teaching strategies or giving direct instruction on invention but instead provides students with congenial settings and suggestions for subjects that interest them and offers feedback on completed texts or drafts. The teacher tries to set motivating assignments, leaving students to rely on their native talent to produce a piece of writing, and then responds to a specific text. In imitation pedagogies, teachers provide students with readings and examples, either as stimuli for ideas or as models of inventing activity. The popularity of the Reader in composition courses testifies to the ubiquity of this pedagogy. In practice pedagogies, teachers engage students in frequent, sometimes daily, writing, including exploratory activity as a way to develop their abilities. Many of these writings are exercises; a few are done in genuine contexts. In art pedagogies, teachers provide students with strategies for invention and give guidance throughout the composing process. Eras of discourse instruction have been marked by an emphasis on one or the other of these broad teaching approaches as Chapter 3 illustrates. Sometimes today, as in prior periods, instructors integrate all four pedagogies. Richard Young discussed the relative merits of two of these pedagogies in "Arts, Crafts, Gifts, and Knacks and the Teaching of Writing," contrasting what he called the New Romanticism and the New Classicism. In his view the New Romanticists consider composing as free of deliberate control, the act of writing as a mysterious growth, and the imagination as primary. The New Classicists emphasize heuristic procedures, a generic conception of the composing process through which rhetorical knowledge can be carried from one situation to the other, and rational control of some processes that can be taught. Lauer also examined this issue in "Instructional Issues: Toward an Integration," arguing for the value of including elements of all four of these approaches to teaching composition. As invention pedagogies are discussed in this chapter, they will be related to these four approaches.

The Merits of Different Inventional Strategies

A second issue in teaching invention centers on two questions: Which acts of invention can be guided by strategies? Which strategies are most effective? One way of thinking about these questions is to com-

pare strategies on a continuum. As defined in Chapter 2, inventional strategies are heuristic procedures and hence can be positioned on a continuum that ranges from almost algorithmic (rule-governed and highly formulaic) to almost aleatory (trial and error). We can, therefore, differentiate those that are more highly structured from those that have little structure. Algorithms, rule-governed formulas leading to right answers, can stifle inventional creative efforts. Aleatory procedures offer little guidance to students. Because all inventional strategies offer some direction to writers, they will fall somewhere on the continuum. This chapter, then, positions inventional guides on this continuum.

Several lists of these guides have been published. In 1979, David Harrington, Philip Keith, Charles Kneupper, Janice Tripp, and William Woods compiled "A Critical Survey of Resources for Teaching Rhetorical Invention," which annotated an extensive list of inventional practices in textbooks, categorized under the headings of "Neo-Classical Invention, Pre-Writing School, Tagmemic Invention and Linguistic Theory, Burke's Dramatistic Method, and Resources in Speech Communication." In 1993, Vicki Byard examined a range of heuristics procedures in "Considering Heuristics as Symbolic Acts: Their Relevance to Epistemic Rhetoric." Several textbooks and handbooks include catalogs of these invention strategies: e.g., *The St. Martin's Guide to Writing*, *Writing with a Purpose*, *Four Worlds of Writing: Inquiry and Action in Context*, and *Writing: A College Handbook*.

The Social Nature of Invention

In the last two decades, instructors have become interested in a third issue: whether invention is social or individual. Does a writer engage in invention in a solitary fashion, mentally gathering ideas, or is invention essentially a social act? As recounted earlier, Karen LeFevre argued for the social nature of invention, categorizing it into three types: internal dialogue, collaborative, and collective. She described internal dialogue as dialectic with another self, including internalized constructs influenced by social forces and other people, collaborative invention as the interaction of people, and collective invention as a supra-individual entity like institutions, societal prohibitions, and cultural expectations. The inventional approaches presented below will be interrogated as to whether they encourage, admit of, or preclude the social in any of its manifestations.

Invention as Interpretive or Productive

A fourth issue springs from the question of whether students should be engaged in interpreting texts or investigating questions and subjects. Some advocate that students should use inventional guides to read and critique texts, both written discourse and cultural productions. Others engage students in using heuristic procedures to generate ideas, insights, subject matter, or arguments. Still others give students guidance in both hermeneutic and heuristic acts. (See Chapter 4 for more on this issue.) This chapter will investigate which purposes of invention each pedagogy foregrounds.

Rhetoric as Constructing or Conveying Knowledge

 As Chapter 3 has shown, this issue also has a long history. The present chapter will ask two question of each pedagogy: Is this pedagogy designed to help writers to create new knowledge (epistemic) and reach new insights and judgments? Or is its purpose to help writers find and deploy existing information and lines of argument to support theses or judgments already known?

Issues over Inventional Pedagogies

The rest of the chapter provides an account of inventional pedagogies that have been devised for teaching composition since the 1960s. As in Chapter 4, these approaches will be introduced chronologically and examined within the light of the above issues.

Prewriting Pedagogy

One of the first proposals for teaching invention in writing courses was the work of Gordon Rohman and Albert Wlecke, who introduced the concept of prewriting. They advocated several approaches to prewriting: keeping a journal to discover personal contexts and a point of urgency, engaging in meditation to transform an event into a personal experience, and creating analogies to generate and organize aspects of the subject. Each of these invention activities was proposed to help students reach self-actualization through writing. While such actualization included new understanding of one's self, the pedagogy did not stress an epistemic purpose. These strategies lean

toward the aleatory side of the heuristic continuum because each can be practiced with minimal direction and can be done in any order, although the journal's purpose was to find subjects for writing investigation while the analogy played both a generative and organizing role. The pedagogy underscores the importance of enhancing natural ability with some guidance and emphasizes the "self," (ignoring invention as a social act, imitation, and interpretation). This approach initiated a widespread use of the journal in classrooms and informed textbooks, such as Rise Axelrod and Charles Cooper's *The St. Martin's Guide,* Clinton Burhan's *The Would-Be Writer*, Joseph Trimmer and James McCrimmon's *Writing with a Purpose*, Michael Paull and Jack Kligerman's *Invention: A Course in Pre-Writing and Composition*, and Donald Stewart's *The Authentic Voice*.

Pedagogy for Classical Invention

As Chapter 3 illustrated, during the Greek and Roman periods, strategies were taught to help rhetors initiate discourse (*stasis, status*); explore for lines of argument (common topics); gather subject matter and create ethical and emotional appeals (special topics); and develop frames of reasoning (enthymemes and examples). During the early part of the twentieth century, some vestiges of the common topics remained in textbooks (e.g., definition, cause and effect), but they functioned as discrete methods of development of an essay not as a *set* of inventional guides (Lauer, "Invention"). Composition theorists since the 1960s have created strategies and textbooks based on these classical heuristics as illustrated below.

   Textbooks. In 1959, Francis Connelly's *A Rhetoric Case Book* introduced some classical topics to be used as a heuristic set for examining and developing a subject. In 1965, Edward Corbett's *Classical Rhetoric for the Modern Student* modernized several classical strategies. He proposed *status* to help students decide on a thesis by defining their subject as a question of fact, definition, or quality. He garnered a selection of classical topics to guide students' explorations (e.g., definition, comparison, circumstance, and testimony). He showed students how to use rational appeals (the syllogism and example) and appeals to emotion in order to support a thesis, and he also provided readings and examples of these strategies as models for imitation. Thus, Corbett's text emphasized art and imitation, and directed inventional activity in a flexible order, positioning itself at the center of the heuris-

tic continuum. Invention was presented as largely non-epistemic (i.e., to support a thesis).

Following Corbett's lead, a number of later composition texts featured *status,* the topics, and the appeals of classical rhetoric, including sets of classical topics as either investigative guides, catalogs of arguments, or methods of developing types of discourse. Winifred Horner, in *Rhetoric in the Classical Tradition*, introduced the three questions from *status* (fact, essence, and quality) as a strategy for exploring the student's subject. Her text also gave students advice on establishing their credibility, appealing to their audience, and finding good reasons. The book also proposed topics of definition, classification, comparison and contrast, and cause and effect that were designed to help students find ideas. Sharon Crowley and Debra Hawhee, in *Ancient Rhetorics for Contemporary Students,* included *stasis* (asking the right questions about rhetorical situations) by focusing on Hermagoras's four questions: conjecture, definition, quality, and procedure. Crowley and Hawhee also provided common topics (the sophistic topics, Aristotle's common topics, and "formal" topics), ethical, pathetic and extrinsic proofs, and types of reasoning. Assigning a different purpose for invention, Frank D'Angelo's *Composition in the Classical Tradition* is based on the *progymnasmata*, "a graded, cumulative sequence of writing tasks, [. . .] within an explicit rhetorical framework" (xiii). He positioned invention topics to develop the types of discourse that were part of this tradition (e.g., Refutation, The Commonplace, Praising and Blaming, and The Thesis), listing, defining, and illustrating these topics. John Hagaman argued for the value of the *progymnasmata* in teaching rhetorical invention as a way of integrating free and structured inquiry. He described the *progymnasmata* as "general heuristics that train students to view their subjects from multiple perspectives" (25), guiding them through patterns of thinking.

Collections of Essays. Several collections of essays also presented accounts of using classical inventional practices (e.g., Robert Connors, Lisa Ede, and Andrea Lunsford's *Essays on Classical Rhetoric and Modern Discourse*; Rosalind Gabin's *Discourse Studies in Honor of James Kinneavy*; Jean Moss's *Rhetoric and Praxis;* Kathleen Welch's *The Contemporary Reception of Classical Rhetoric;* Marie Secor and Davida Charney's *Constructing Rhetorical Education;* Neil Nakadate, Roger Cherry and Stephen Witte's *A Rhetoric of Doing;* and James Murphy's *The Rhetorical Tradition and Modern Writing*.

Specific Pedagogies: The Enthymeme. A number of scholars suggested the enthymeme for teaching invention. In 1991, John Gage articulated a general theory of the enthymeme for advanced composition. Asserting that argumentation is the process by which people come to knowledge, he referred to the enthymeme as "an architectonic rhetorical structure valuable in the invention process" (167). He illustrated how the enthymeme could be a heuristic. It could serve as a guide to help students think through the kinds of questions they are trying to answer and offer them a stance toward these questions, a strategy for approaching that stance, and a way of investigating the assumptions they share with their audience. Also with an epistemic purpose, Barbara Emmel developed a pedagogy of the enthymeme, describing it as "a rich set of relationships with the potential of being expressed in a multitude of ways" (132). She discussed processes through which the enthymeme could be used in the classroom: discovering and shaping claims (the realization of intention) and discovering relationships among claims (the realization of function). She also proposed dialogue to familiarize students with the enthymeme as a heuristic. Jeffrey Walker, countering the prevailing notion that the enthymeme is a shortened rhetorical syllogism, argued for a view of the enthymeme that entails "the inference-making of the heart" and the "strategic intentionality of 'forming plans,' including 'kairotic inventiveness'" and style (49). Referring to Anaximenes and Isocrates, he pointed out that between them we might derive a reasonably full picture of the

> sophistic, non-Aristotelian notion of the enthymeme that is pervasive in the Hellenistic rhetorical tradition: the enthymeme is a strategic, kairotic, argumentational turn that exploits a cluster of emotively charged, value-laden oppositions made available (usually) by an exetastic buildup, in order to generate in its audience a passional identification with or adherence to a particular stance, and that (ideally) will strike the audience as an 'abrupt' and decisive flash of insight. (53)

He noted that what continues to mark the enthymeme today is a "stylistically intensified argumentative turn that serves not only to draw conclusions but also, and decisively, to foreground stance and motivate identification with that stance" (55). He concluded that enthymematic

skill is crucial for rhetoric and dependent on all other skills or means of persuasion, including knowledge of the "topoi of a discursive field," "various discourse-level gambits, schemes, and strategies," the ability to analyze and adjust to the rhetorical situation, and a "fluent command of the stylistic resources of the language" (62). He concluded that "a trained excellence in enthymeming requires what Isocrates would call an extensive 'discourse education' that cultivates not only advanced literacy but also *phronesis* (judgment and intelligence) and *sophia* (wisdom, skill) through critical argumentative engagement with the argumentation of others in many discursive genres" (62).

Specific Pedagogies: Topics. Others pointed out the contemporary benefits of the topics. In 1987, Carolyn Miller bemoaned the loss of the special topics in pedagogy, which emphasize the "diversity and complexity of rhetorical practice" (65), in favor of the common topics. She proposed that we teach the special topics drawn from specific disciplines. Walter Jost, drawing on the work of Cicero and Wayne Booth, suggested turning to the "special topics—ideas, terms, distinctions, value propositions in all fields, literary works, histories, the civil law, 'all antiquity' *not as determinate and fixed facts and truths*, but as more or less negotiable, interpretable possibilities for argument" (8). He pointed out that for Booth the rhetorical topics are means for building community within and among specialties, training students to function as generalists who can connect fields by addressing issues within larger ethical and political contexts (13). Eugene Garver argued that a theory of writing should include a structure that gives thinking a direction without predetermining results. He proposed the topics as complex sets that could direct thought, discover the unknown, argue a case, or locate clichés (commonplaces). He also discussed the value of *stasis* in classifying issues in order to respond precisely to assignments and in determining the point at issue as a direction.

How do these classical strategies relate to the issues discussed above? Because these inventional guides are based on ones that had been used for centuries, they embody the collective aspect of invention as social. Students are not left alone to figure out how to begin, to explore, or to develop arguments. The use of *status*, however, varies in its epistemic power. Those that suggest *status* as a way of forming a thesis, exploring a subject, finding ways to persuade the audience, framing arguments, or marshalling subject matter generally advise it as a way to communicate and develop the known. Those that suggest it as a way of defining

a question for investigation in a context emphasize its epistemic poten-
tial. Most of the treatments of topics, *status*, and the enthymeme are
proposed for a heuristic purpose—to help students produce a text—
not interpret one. Because each strategy has a set of flexible moves or
directives, it can be positioned in the center of the continuum from
aleatory to algorithmic. In terms of the pedagogies for teaching such
inventional strategies, the textbooks deploy a combination of instruc-
tion in invention (art), use of examples (although not often of the acts
of invention themselves), and practice through assignments.

Tagmemic Inventional Instruction

In 1965, tagmemic rhetoricians, Richard Young and Alton Becker
provided the first modern set of heuristic strategies to guide students
throughout the writing process: for invention, audience, arrangement,
and style. In 1970, Young, Becker, and Kenneth Pike published *Rhet-
oric: Discovery and Change*, which detailed inventional strategies to
guide writing as a process of inquiry: for framing questions to pursue,
for exploring, and for stating and verifying emerging judgments and
new understandings. They characterized these strategies as epistemo-
logical heuristics to help students construct new knowledge and to
reach new insights. The first strategy helps students make explicit a
problematic situation and pose a well-framed question to direct their
inquiry by classifying their unknown as a fact, a process, or a relation-
ship. A second heuristic procedure helps them to explore their subject
using multiple perspectives: viewing their subject as a particle, wave,
and field, and investigating its contrastive features, range of variation,
and distribution. A third heuristic strategy guides students in verify-
ing their emerging insights by testing them for correspondence with
their experience, consistency with their own image, usefulness, and
simplicity. Because these strategies offer flexible directives and rely on
intuition, they can be positioned centrally on the continuum of heuris-
tic procedures. Even though the textbook foregrounds an art of inven-
tion, it also insists upon the natural abilities of intuition, incubation,
and the imagination. Readings in the text act as models of the inquiry
process as well as texts for analysis and imitation. Finally, the textbook
engages students in writing as a process of inquiry numerous times,
thus encouraging practice based on students' own questions. Although
the text does not foreground the social, it does not preclude it. As a
heuristic, it embodies perspectives active in the culture.

This pedagogy has been researched, critiqued, and used in a number of textbooks. In 1973, Lee Odell, in "Piaget, Problem Solving and Freshman Composition," examined the role of dissonance in initiating writing, arguing that according to Piaget all creative processes and analytic thought stem from a sense of dissonance or disequilibrium. Odell described a course engaging students in the process of posing and resolving dissonance. In a 1980 *CCC* article, Charles Kneupper critiqued the terminology and apparent redundancy of tagmemic heuristics and offered his own revised version with six directives instead of nine. (See also critiques by Kinney and Wells in Chapter 2). Studies of tagmemic rhetoric were done by a number of researchers, including Lee Odell ("Discovery Procedures"), Richard Young and Frank Koen, Catherine Lamb, Nancyanne Rabianski, George Hillocks ("Inquiry"), and Sandra Katz. Textbooks have offered versions of the tagmemic exploratory heuristic (e.g., Rise Axelrod and Charles Cooper's *The St. Martin's Guide,* William Irmscher's *The Holt Guide to English*, Janice Lauer et al.'s *Four Worlds of Writing,* Joseph Trimmer and James McCrimmon's *Writing with a Purpose*, Dean Memering and Frank O'Hare's *The Writer's Work*, Tilly Warnock's *Writing Is Critical Action*, Joseph Williams's, *The New English*, and W. Ross Winterowd's *The Contemporary Writer*).

Freewriting

In 1973, Peter Elbow's *Writing Without Teachers*, introduced the concept of freewriting as an inventional practice. Freewriting consists of writing continuously for 10, 15, or 20 minutes without evaluating or editing what is produced. Elbow argued that this practice helps a writer find subjects, clear the mind, bring out voice, and reach a center of gravity. In his discussion of the process of writing as "cooking," he recommended interacting with others about one's writing, encouraging conflicts or contradictions in one's thinking, moving back and forth between ideas and words, and constructing metaphors, comparisons, and examples. In an appendix essay, he introduced the doubting and believing game, explaining that the activity of truth seeking could be analyzed into two essential processes—doubting and believing. The doubting game entailed assessing competing ideas by subjecting them to rigorous doubt. The believing game involved assessing competing ideas by refraining from doubting or searching for shortcomings, trying to see these ideas as true (147-91). Elbow advanced other inven-

tional practices in subsequent books. In 1981, in *Writing with Power*, Elbow described "looping," which entails freewriting followed by selecting, organizing, and revising parts of what was produced in the freewriting (59-77). In 1986, in *Embracing Contraries*, he explained that through writing he taught two kinds of thinking: 1) first-order thinking, which is intuitive, creative, and control free; and 2) second-order thinking, which is conscious, directed, and controlled. He also offered a revised version of his original thoughts on the doubting and believing games, claiming that: "Methodological doubt is only half of what we need. [. . .] but thinking is not trustworthy unless it also includes methodological belief: the equally systematic, disciplined, and conscious attempt to *believe* everything no matter how unlikely or repellent it might seem" (257). He went on to explain that because they are methods, "they help us see what we would miss if we only used our minds naturally or spontaneously" (25). He described methodological doubt as individual, entailing rhetorical propositions, while methodological belief involved the rhetoric of experience (264). Writing, he contended, is a movement from disciplined belief to disciplined doubt (286). The last part of his essay was devoted to suggestions for believing both in the absence of good reasons and on the basis of evidence (270-84).

The freewriting pedagogy has an aleatory cast to it, while the doubting and believing games stress the value of methodology. Elbow's pedagogy also relies strongly on natural ability and frequent practice. Because during invention he encouraged writers to interact with others, some of his heuristics have a collective social character to them.

In 1977, Joseph Brown, Jean Colburn, Peter Elbow and others compiled *Free Writing! A Group Approach.* In 1980, Thomas Hilgers published "Training College Students in the Use of Prewriting and Problem-Solving." In 1991, Pat Belanoff, Peter Elbow, and Sheryl Fontaine edited a collection of essays on freewriting entitled *Nothing Begins with N: New Investigations of Freewriting*, that included essays by Elbow, Pat Belanoff, Sheridan Blau, Diana George and Art Young, Richard Haswell, and Ken Macrorie. These essays explored subjects such as a phenomenology of freewriting, freewriting's connection to organization, critical thinking, writing across the curriculum, individual psychological and physical health, and the relationship between freewriting and ideas of theorists such as Berthoff, Emig, and Britton. Elbow also wrote a number of essays related to his pedagogy including "In

Defense of Private Writing: Consequences for Theory and Research."
In addition, researchers have tested freewriting's effectiveness, studies
which are noted in Hillocks's meta-analysis (the results of these studies
are discussed later). The practice of freewriting has been included in a
number of textbooks, including Joseph Trimmer and James McCrim-
mon's *Writing with a Purpose* and handbooks like Andrea Lunsford
and Robert Connors's *The St, Martin's Handbook*.

Burkean Invention

Kenneth Burke's Pentad (discussed in Chapter 4) has been used as
an invention strategy in composition pedagogy. In 1977, Philip Keith
described a set of Burkean terms as dialectical exercises through
which students could develop an argument: Etymology, Thesis as
Dialectic, the Complex in the Simple, Expansion of Circumference,
and Translation. In 1979, he again discussed the use of Burke's Pentad
in teaching, stating that Burkean invention interested him because
of its athleticism in discourse, maintaining that it helped the writer
control and develop strategies of stance and reference. He also exam-
ined the Pentad against the backdrop of Burke's notion of dialectic. In
1978, Joseph Comprone indicated how Burke's theories could become
a heuristic for teaching writing as a process. Prewriting activities could
concentrate on agent and scene as the text evolved toward purpose.
The notion of terministic screen could be turned on the audience;
action could entail asking what is happening as far as readers are con-
cerned. Comprone also discussed Burke's dramatism as a way of teach-
ing writing.

As a flexible yet directive strategy, the Pentad stands centrally in
the continuum of heuristic procedures. Burke himself, as mentioned
above, agreed that the Pentad could be used for producing as well
as interpreting texts. He also argued that as a guide the Pentad is a
grammar of basic human motives, engaging the writer in investigating
broadly acknowledged dimensions of action and thus possessing the
collective feature of social invention. The Pentad has been included
as a heuristic procedure in many textbooks such as Rise Axelrod and
Charles Cooper's *The St. Martin's Guide,* William Irmsher's *The Holt
Guide to English*, Tilly Warnock's *Writing Is Critical Action*, and W.
Ross Winterowd's *Rhetoric and Writing* and *The Contemporary Writer*.
Most of the textbooks that include it in their catalogs of planning only
explain it. A few show the heuristic in action, offering examples.

One text that does apply and extend the pentad in a wide variety of contexts for writing and interpretation, with stress on its epistemic function, is David Blakesley's *The Elements of Dramatism*. In this book, Blakesley described dramatism, of which the pentad is but one aspect, as "an analytical method of rhetorical invention" (189) The pentad is "a philosophical grammar [. . .] capable of generating an infinite variety of equations or meaningful relationships, just as the grammar of a language enables us to generate an infinite variety of sentences. In its capacity for generating that variety, the pentad functions much like an Aristotelian general topic" (8). The purpose of dramatism is" not to dispose of ambiguity, but to study and clarify the resources of ambiguity." Aligning dramatism and rhetoric, Blakesley explained,

> it becomes possible to extend the definition of rhetoric from "the art of finding the available means of persuasion" to "the art of elaborating and exploiting ambiguity to foster identification." We elaborate ambiguity in the interest of identifying the margin of overlap midway between identification and division. We exploit ambiguity by reifying particular meaning, hoping that we have found a meaning somewhere in the middle that can be used to persuade others or foster their identification. From this perspective, rhetoric is a multipurpose art of both producing knowledge in social situations and applying that knowledge discretely and strategically to teach, delight, and persuade. (189)

The Elements of Dramatism provides extended examples of how the pentad (and dramatism) can keep us alert to ambiguity in the symbolic action of texts, films, social movements, and other situations, as well as to ways the pentad can help writers multiply perspectives as they construct arguments and take stances.

Larson's Heuristics

In 1968, Richard Larson developed "A Plan for Teaching Rhetorical Invention" that featured over 200 questions categorized into 1) Topics That Invite Comments: Single Items, Single Completed Events or Parts of an Ongoing Process, Abstract Concepts, Collections of Items, and Groups of Completed Events, including Process; and 2) Topics

with Comments Already Attached: Propositions and Questions. He stated that the task of invention is to help students "see what is of interest and value in their experiences, to enable them to recognize when something they see or read or feel warrants a response from them, [. . . and] to stimulate active inquiry into what is happening around them" (146). He pointed out that students could use these questions alone or working in small groups. After the students finish applying the questions, he advised that they evaluate what they had generated by comparing their subjects to another one, determining whether or not they liked the subject, and by detecting conflicts or inconsistencies. This heuristic leans toward the algorithmic side of the continuum, becoming less portable with its numerous questions. Because Larson indicated that the strategy could be used alone or with others, it has a social dimension. The discussion accompanying it suggested that its purpose was to find subject matter to develop papers.

The Double-Entry Notebook, The Uses of Chaos, and Shaping

In 1981, Ann Berthoff, in *The Making of Meaning: Metaphors, Models, and Maxims for Writing Teachers*, outlined the method of the double-entry notebook as a guide to critical reading and to encourage habits of reflective questioning, observation (students looking and looking again), shaping, and abstracting both discursively and non-discursively. One side of the notebook would hold reading notes, quotations, and images and on the other side would be notes about these notes, summaries, formulations, and editorial suggestions. She explained that the format provided a way for students to conduct a "continuous audit of meaning" (45). She also encouraged observation as visual thinking and shaping or forming in two modes of abstraction: the discursive mode (successive generalizations) and the presentational mode (direct, intensive insight). In order to help students rediscover "the power of language to generate the sources of meaning" (70), she proposed learning to write by "learning the uses of chaos," contending that meanings are made "out of a chaos of images, half-truths, remembrances, syntactic fragments, from the mysterious and the unformed" (70). In *forming, thinking, writing*, Berthoff offered students assisted invitations to explore the composing process. These included observing and interpreting the observations, as well as a set of exercises: 1) Getting Started: listing, classifying, and determining presuppositions; 2) Forming Concepts: making statements, generating, and interpret-

ing; and 3) Developing Concepts: naming the classes and articulating relationships. For all of these inventional acts, she provided copious examples and exercises. She also elaborated on her inventional strategies in many articles, including "Abstraction as a Speculative Instrument," "Dialectical Notebooks and the Audit of Meaning," "From Dialogue to Dialectic to Dialogue," and "Learning the Uses of Chaos." Her inventional heuristics call into play an interaction among natural abilities, art, imitation, and practice, giving flexible direction to students. The exercises largely engage students in working individually.

Journals

Following Rohman's introduction of the journal as part of the writing process in 1964, many types of journals have been used for different inventional purposes. In *Gender and the Journal*, Cinthia Gannett described the diary and the daybook used by Donald Murray. She also addressed different uses of the journal for writing across the curriculum, including Toby Fulwiler's academic journal as a critical writing tool. Fulwiler, in "The Personal Connection: Journal Writing Across the Curriculum," listed such journal functions as helping students to make connections, summarize material, and do problem solving (18-24). In Fulwiler's collection of essays, *The Journal Book,* contributors offered both theoretical and pedagogical discussions of using the journal in different disciplines. These essays also advanced the idea of journals as not only personal but social writing. Whether the journal had an epistemic character or not depends on its purpose.

Inquiry Strategies

In 1982, George Hillocks in "Inquiry and the Composing Process: Theory and Research" maintained that invention should focus on immediate concrete data. He described inventional strategies as consciously adapted procedures such as observation, description, generalization, and the generation of hypotheses. His argumentative strategies included analyzing scenarios to generate theses, deciding on relevant information, and predicting opposing arguments and dispatching them. To guide the development of definitions, he proposed such guides as setting criteria for a range of target concepts and differentiating them from others, giving examples of the concept, and creating contrastive examples. Because of their flexible yet systematic character,

these inquiry strategies can be positioned centrally on the heuristic continuum. Hillocks described their purpose as epistemic and their operation as often social. In addition, they foreground art, imitation, and practice.

Discussing a somewhat different conception of inquiry in 1982, Lauer argued that the purpose of writing as a process of inquiry is to seek insights and new understandings. Such a process is initiated by raising questions about subjects and experiences that puzzle writers in real contexts and then exploring these questions using heuristic guides to stimulate multiple perspectives. Teaching writing as a process of inquiry, she asserted, entails helping students to initiate their writing not with theses but with questions or dissonances, to use heuristics to explore, and then to frame emerging insights into focuses. She pointed out that this conception of writing might entail helping students overcome a number of obstacles: their fear of going beyond the known, their comfortable biases that preclude investigation, and their tendency to succumb to an overdose of common sense that deters them from investigating anything beyond immediate concerns (see Bernard Lonergan's *Insight*). In *Four Worlds of Writing*, Janice Lauer, et al. constructed inventional heuristics to guide students working alone or in groups to engage in writing as a process of inquiry, helping them to frame guiding questions based on their own compelling puzzlements in genuine writing contexts; assisting them in taking different perspectives on their questions, in exploring ideas extensively, imaginatively, and critically; and in encouraging them to construct focuses that represent their new understandings. These heuristics for inquiry are intended to have an epistemic function, helping students to create new knowledge and reach new insights in their everyday experience, public contexts, academic courses, and workplaces, which would require a range of genres. Thus, this inventional pedagogy involves art, models, practice, and natural ability, and falls centrally on the heuristic continuum.

Another form of inquiry is teaching writing as a reflective practice, which was discussed by Kathleen Yancey in *Reflection in the Writing Classroom.* Yancey defined reflection as "processes by which we know what we have accomplished and by which we articulate accomplished products of these processes" (6). She put forward that this method is dialectical, bringing multiple perspectives into play in order to produce insight. Writers look forward to goals and backward to where

they have been. Reflection entails for Yancey a process of developing and achieving specific goals and strategies to reach these goals and determining whether the goals have been met.

Problem-Solving Strategies

In 1977, Linda Flower and John Hayes published an early article on their emerging cognitive problem-solving model (see Chapter 4), identifying a number of heuristic procedures consonant with that model: 1) playing the writer's thoughts (turning off the editor and brainstorming, staging scenarios, playing out analogies, and resting and incubating); 2) pushing ideas (finding cue words, stating a key point in a nutshell, organizing ideas by using tree diagrams, testing against an editor); 3) setting up goals; 4) finding operators (setting direction as part of plans); 5) constructing an audience; 6) anticipating roadblocks; 7) using rhetorical strategies; and 8) testing on live readers. Some of these strategies informed the composing process in Flower's *Problem-Solving Strategies for Writers*. Later in Flower's socio-cognitive theory, *The Construction of Negotiated Meaning*, she presented collaborative planning as a social heuristic to engage students in exploring the problems they faced. In *Learning to Rival*, she, Elenore Long, and Lorraine Higgins presented another heuristic strategy called rival hypothesis thinking or "rivaling," which they defined as a "literate practice in which people explore open questions through an analysis of multiple perspectives and evidence" (4). They studied how students learned to rival in order to deal with culturally charged open questions. The planning activities they observed were "deeply embedded in complex patterns of hierarchy and power" (16). Flower explained that rival hypothesis thinking was characterized by three features: 1) a bold attitude toward inquiry that tolerated uncertainty and open questions; 2) a set of strategies for inquiry that helped the writer seek out alternative voices and interpretations and to generate strong rival hypotheses; and 3) a constructive process that tried to build a consensual conclusion (30).

Students can use these problem-solving heuristics either to reach new solutions to problems or to find ideas and material to convince readers. Because in their early model Flower and Hayes stressed the recursive and embedded nature of the composing process, their strategies can be positioned centrally on the heuristic continuum, although this model does not make explicit an epistemic function. In the earlier

work there was also little mention of the social character of the strategies, but nothing in their nature prevents them from being used that way. Their later work stressed the social contexts and characteristics of invention.

Invention in Writing Across the Curriculum

In 1984, Anne Gere's *Roots in the Sawdust: Writing to Learn Across the Disciplines* differentiated between writing to learn and writing to show learning. Among the purposes of writing to learn, Gere cited getting the course material right (Britton), creating webs of meaning (Vygotsky), moving from concrete to formal operations (including cause-and-effect relationships), comprehending propositional statements, discriminating between observations and inferences, drawing inferences from evidence, visualizing outcomes, and drawing analogies. She pointed out that this kind of learning entails finding knowledge as well as assimilating it.

Many textbooks in writing across the curriculum (WAC) have given inventional advice and sometimes strategies for invention. In 1981, an early proponent of WAC, Elaine Maimon, with a number of co-authors in different disciplines, published the textbook *Writing in the Arts and Sciences*, which presented inventional strategies, such as problem-solving, private writing, freewriting, the journal, brainstorming, lists, treeing, analogies, tagmemic invention, Burke's Pentad, and seeing and diagramming. A collection of essays edited by Maimon, Barbara Nodine, and Finbarr O'Connor provided models for discussing thinking and reasoning from interdisciplinary perspectives, including such topics as thinking, formal operations, reflective judgment, dialectical thinking, informal logic, and meaning making. In *Language Connections: Writing and Reading across the Curriculum*, edited by Toby Fulwiler and Art Young, several researchers described how students used journals to learn a wide range of subject matter. Later WAC textbooks continued to discuss invention, often under the term "inquiry." In *Researching and Writing across the Curriculum*, Christine Hult discussed the inquiry processes in science, technology, social science, and the humanities, describing practices such as observation and hypothesis formulation. In *Research and Writing in the Disciplines*, Donald Zimmerman and Dawn Rodrigues presented task analysis and generation of ideas about a topic using freewriting, brainstorming, patterned notes, and tree diagrams. They also explained

how to define a problem and develop research questions. Judy Kirscht, Rhonda Levine, and John Reiff advocated teaching the rhetoric of inquiry, which they argued can link composing to learning and writing in the disciplines so that writing instruction becomes a way not only to "interact with declarative knowledge, but also to develop procedural knowledge concerning the field—to learn *how* knowledge has been constructed as well as *what* that knowledge is" (374). Lloyd Wilson explained the relationship between teaching writing and features of legal reasoning, including the adversarial system, the burden of proof, and case law reasoning. John Warnock, addressing lawyers and law students, advised that a good plan entails having a clear sense of what they want "writing to DO, for whom, and how. One study of professional writers showed them spending over 60% of their writing time in planning, and thinking by means of writing that *preceded* drafting" (10).

Scholars have also critiqued aspects of teaching invention in WAC. In "Rhetorical Invention: The Diaspora," Lauer pointed out that the focus of many WAC courses has been on writing to learn the material in a field rather than to create new knowledge in a discipline. She cited Judith Langer and Lee Odell, who underscored this point. Langer lamented that many teachers in different disciplines focus on content, not on higher-level intellectual skills (71). In contrast, in several classes in biology, history, and literature that Langer visited, teachers were starting to introduce invention, stressing active questioning and interpretation (72), questioning the independence of method and observation, and considering the most appropriate methods of inquiry (73). Langer noted, however, that when teachers tried to introduce students to the process of science, they did not give students any procedural knowledge to apply such methods themselves (75). Odell concurred, pointing out roadblocks to teaching inventional strategies: teachers may have so internalized their thinking strategies that they can't make them explicit, or they may prefer to discuss the content of their disciplines rather than the analytic strategies needed to generate or reflect on that content (97). Donna LeCourt noted another problem facing inventional instruction across the curriculum—that teaching knowledge-making practices may "serve to reinforce the ways of thinking and status of a particular knowledge" (392). LeCourt contended that WAC's goal was usually to initiate students into a "certain way of thinking valued by the discipline" (393), causing "the discourse to ap-

pear natural and pragmatic, and thus ideologically free" (395). Arguing against such critiques, Charles Bazerman contended: "Rhetorical criticism, especially if it is carried out with broad sweeps of condemnation, makes disciplines purveyors of hegemonic univocality rather than the locales of heteroglossic contention that they are" ("From Cultural Criticism" 63). He argued for a rhetorical analysis that "makes visible the complexity of participation by many people to maintain the large projects of the disciplines" ("From Cultural Criticism" 64). Further he explained that discourse studies of this kind can build "the intellectionual foundations for courses that enable students to enter into disciplines as empowered speakers rather than as conventional followers of accepted practice" ("From Cultural Criticism" 67).

Online Inventional Practices

As the computer became a commonplace writing technology, instructors began to offer online heuristics. One of the first to develop inventional software was Hugh Burns, who in 1979 wrote and programmed three computer-assisted instruction strategies derived from Aristotle's topics, Burke's Pentad, and the Tagmemic matrix, an inventional tool that later would be developed by the Daedalus Group. These programs systematically prompted students to ask questions, clarify heuristic perspectives, answer questions, store responses, seek additional insights, and attend to their purpose. Burns discussed this software in subsequent essays in 1980, 1983, and 1984. Other early invention software included: Schwartz's "ORGANIZE," "SEEN," and "PREWRITE," Ruth von Blum and Michael Cohen's "WANDAH," William Wresch's "Writer's Helper," Jay Bolter, Michael Joyce, and John Smith's "STORYSPACE,"and Cynthia Selfe's "Wordsworth." In 1982, Helen Schwartz catalogued available computer programs into four areas, including tutorials that helped students to explore their topics using prompts. She also published a textbook, *Interactive Writing: Composing with a Word Processor*. In 1984, in "Computer Assisted Invention: Its Place and Potential," Dawn and Raymond Rodrigues discussed the advantages of having teachers present when students use these guides. They also pointed out several values of computer-based invention: providing individualizing instruction in invention, supporting the recursive use of activities in writing, and accommodating differences in student writing styles. They offered another inventional guide, "Creative Problem Solver," as a supplemental tutoring system

that engaged students in dialogue. Also in 1984, Frederick White and Mary Ann Aschauer examined the connections between the word processor and the habits of mind deployed in invention.

Taking stock of the prior work on computer-assisted invention, in 1986 Diane Langston contrasted "old paradigm" computer aids for invention with "new paradigm" ones. She described the old paradigm aids as attempting to transfer paper-based strategies for invention to the computer and critiqued the question-asking and systematic heuristics as well as other programs. She outlined criteria for a "new paradigm" of computer-assisted heuristics. A new paradigm would permit different heuristics to interact as well as produce new strategies. It would also include domain-specific heuristics. Third, it would provide heuristics that could be modified by both teachers and students. Finally, it would stay on the leading edge of technology. In Michael Spitzer's 1989 review of prewriting software and writing programs, he cited the work of James Strickland, who compared structured and unstructured heuristics like freewriting and showed how these early programs could assist invention. He also identified other software programs: Ruth Von Blum, Michael Cohen, and Lisa Gerard's "HBJ Writer," Fred Kemp's "Idealog," and Strickland's own "Invent." Strickland also in "Prewriting and Computing" showed how these early programs assisted with invention. In 1990, Carol Cyganowski offered suggestions for creating a collaborative pedagogy for invention using word processing. Cynthia Selfe in "The Electronic Pen" studied how students adapt prewriting to their use of word processing technology. Thomas Barker refuted the argument that there is no need for invention in technical writing, mentioning the use of collaborative writing, task analysis, usability testing, audience analysis, format paths, argumentation forms, fact finding, on-site observations, and sampling procedures.

In 1991, Wallis May Andersen published a review of computerized invention strategies that included rubrics or template files and outliners that offer hierarchic structures for prompts and responses and the capability to collapse and expand the levels. She also discussed hypertext software that featured text and graphics useful for brainstorming ("STORYSPACE") and software that allowed users to deploy various heuristics ("HBJ Writer," Writer's Helper," "Brainstorms," and "ORGANIZE"). In 1992, James Strickland provided an annotated bibliography of software for writers that included such programs for invention as "Fine Lines," "Daedalus Invent," "ORGANIZE," "Rhi-

zome Project," "STORYSPACE," "Success with Writing," "Thought-line," and "Writer's Helper." In "Structuring Argumentation in a So-cial Constructivist Framework," David Kaufer and Cheryl Geisler de-scribed their "Warrant" project, which identified data structures of written argument and aided in the reading and writing of argument. The project shifted invention strategies to argumentation as a social task, engaging students in analyzing characteristics of their discourse community. Kaufer and Geisler also gave students strategies to trans-form information from others' texts into discourse, to provide a char-acterization of a socially constructed argument, to describe teaching strategies for such arguments, and to identify computer software that facilitates this pedagogy.

Visual Rhetoric and Invention

Technology that could alter text and integrate images heightened in-terest in visual rhetoric. Previously, Gabrielle Rico had advocated visu-al invention practices, based on brain hemisphere research, including clustering and blocking. Linda Flower and John Hayes also identified planning modalities for writing that included charts, networks, maps, and tree building ("Images, Plans, and Prose"). In 1989, Ron Fortune pointed out how computers stimulate visual and verbal thought pro-cesses. Citing Arnheim's classic work on visual thinking as intuitive cognition, he illustrated the use of visual thinking in the prewriting and planning stages of a student. Patricia Sullivan studied the visual mark-ers for navigating texts and argued that in published documents both words and images contribute to meaning, pointing out that through technology writers must learn how to "take control of the page" (44). Stephen Bernhardt and B. F. Barton and M. S. Barton made other contributions to the discussion about the rhetoric of visual texts and the means for teaching visuals. Anne Wysocki demonstrated how the visual elements of texts construct meaning, countering the word/image distinction and critiquing arguments about hypertext and visual texts. In *Opening Spaces: Writing Technologies and Critical Research Practices*, Patricia Sullivan and James Porter proposed postmodern mapping as a heuristic. Overall, those doing work on visual rhetoric have paid more attention to analyzing the features of visual texts than to studying and teaching heuristics for creating such texts.

Feminist Inventional Practices

Composition theorists have advocated feminist practices for teaching invention. These practices include keeping journals (e.g., Cinthia Gannett) collaborative planning (e.g., Lunsford and Ede, *Singular Texts*, and Flower, *Construction*); dialoguing, interviewing, using the believing game as connected learning (Hays, *Intellectual Parenting*); and generating experimental writing (Bridwell-Bowles, "Discourse and Diversity"). Kathleen Parvin described the connections between teacher action theory, feminist critical theory, and liberatory writing pedagogy. Karyn Hollis proposed using feminist theory in writing workshops ("Feminism"). Several collections of essays have described gendered strategies and ways of writing (e.g., Joanne Addison and Sharon James McGee's *Feminist Empirical Research: Emerging Perspectives on Qualitative and Teacher Research;* Cynthia Caywood and Gillian Overing's *Teaching Writing*: *Pedagogy, Gender and Equity;* Elizabeth Flynn and Patrocinio Schweickart's *Gender and Reading: Essays on Readers, Texts, and Contexts;* Francine Frank and Paula Treichler's *Language, Gender, and Professional Writing*; and Kristine Blair and Pamela Takayoshi's *Feminist Cyberspaces: Mapping Gendered Academic Spaces*).

Pedagogies of Deconstruction, Cultural Studies, and Postmodernism

In the late twentieth century, several systems of thought influenced the teaching of composition. This section points out a number of pedagogical implications of these developments for invention. Compositionists have devised courses to engage students in reconsidering their positions as writers, their concepts of readers, their analyses of immediate situations and larger cultural contexts, and their deployment of inventional strategies.

   Deconstruction Pedagogies. In 1989, Sharon Crowley outlined a deconstructive pedagogy. This pedagogy posited the writer as audience; viewed writing as continuous, dynamic, and collaborative; and engaged students in social and political issues. Crowley argued that a deconstructive pedagogy redirects the notion of genre to its suitability to the rhetorical situation and incorporates the needs of audience into the writing process. This view of pedagogy has a number of implications. Among them, it suggests that inventional acts should be located

in specific rhetorical situations and that writers and readers may need to interact during invention.

Cultural Studies Pedagogies. In 1987, Ira Shor advocated a Freire-an approach to teaching composition that stressed problem-posing through dialogic teaching and problematizing all subjects of study in students' cultures (105-6). Donald Lazere in "Teaching the Political Conflicts" asserted that the primary aim of teaching should be to broaden the ideological scope of students' critical thinking, reading, and writing capacities in order to empower them to make their own judgments on ideological positions (195). He offered an inventional scheme for guiding the preliminary stages of researching and writing a term paper, including exploring 1) political semantics: using definition, connotation, and denotation to study racism and sexism; 2) psychological blocks to perceiving bias: examining culturally conditioned assumptions, closed-mindedness, prejudice, stereotyping, authoritarianism, absolutism, and inability to recognize ambiguity, irony, and relativity of point of view; and 3) modes of biased and deceptive rhetoric: studying the possible causes for bias, understanding the distinct patterns of rhetoric in different ideologies, and locating and evaluating partisan sources. In "Invention, Critical Thinking, and the Analysis of Political Rhetoric," Lazere argued that the ability to analyze public discourse is crucial in helping students to engage in public rhetoric. He also offered invention strategies for constructing public arguments.

In "Composition and Cultural Studies," Berlin described inventional practices in a composition course that focused on cultural studies. He advocated combining the methods of semiotic analysis with social epistemic rhetoric in order to analyze cultural codes. His heuristics were designed to help students study the relationship of signifying practices to structuring subjectivities such as race, class, and gender. These strategies included locating binary opposites inscribed in texts and analyzing culturally specific patterns, such as the Cinderella story. He claimed that this pedagogy makes teachers and students equal learners and empowers students to become agents of social change. In a 1992 essay, he described other heuristic procedures to help his students engage in cultural critique. Students begin by locating points of resistance in their experience and negotiating the cultural codes they encounter. In texts (print, film, television) related to these experiences, students locate key terms and position them in binary opposites. They next place these terms in narratives related to the text, situating the

narratives within economic, political, and cultural formations (26-31). After using these heuristics to analyze texts, students deploy them to analyze their personal experiences, locating points of dissonance for further investigation.

Others who have written about cultural studies pedagogy include Richard Penticoff and Linda Brodkey, who described the difficulties in teaching writing about difference, and John Trimbur, who discussed the contribution of cultural studies to composition ("Cultural Studies"). Essays on other cultural studies pedagogies for teaching invention can be found in such collections as *Cultural Studies in the English Classroom,* edited by James Berlin and Michael Vivion; *Composition and Resistance*, edited by C. Mark Hurlbert and Michael Blitz; *The Politics of Writing Instruction: Postsecondary*, edited by Richard Bullock, John Trimbur, and Charles Schuster; and *Contending with Words*, edited by Patrica Harkin and John Schilb. Textbooks that feature heuristics for cultural critique include John Trimbur's *A Call to Action*, James Heffernan, John Lincoln, and Janet Atwill's *Writing: A College Handbook*, and Lauer et al.'s *Four Worlds of Writing: Inquiry and Action in Context*.

Postmodernism Pedagogies. Postmodernist thought has also impacted the teaching of invention. In 1991, Victor Vitanza described a counterpedagogy that desires to escape what he called the "pedagogical imperative" (161). He spoke about sophistic counterstrategies that are discontinuous, random, and filled with fragmented thoughts and digressions. In this pedagogy, argument is reconceived as *dissoi paralogoi* (165), and processes of invention are paralogic and counterinductive with the goal of innovation. In 1989, Thomas Kent also discussed a paralogic post-process pedagogy that is dialogic, collaborative, and hermeneutic. Countering some of Kent's ideas in 2000, Bruce McComiskey, in *Teaching Writing as a Social Process*, developed a social-process pedagogy that included a heuristic aimed at guiding students to analyze the cycle of cultural production, contextual distribution, and critical consumption. Discussing the postmodern character of this heuristic, he explained that the real work of production is the creation of desire in consumers and the creation of social values that "manifest themselves in institutional practices and cultural artifacts" (21). Discussing the post-process movement, he argued that his social-process pedagogy extends rather than rejects existing conceptions of the composing process. McComiskey illustrated how students could

construct their own postmodern subject positions in the "aporia be-
tween identity and difference" (70). Discussing his students' position
papers about culture, he showed how they negotiate the middleground
between competing texts and construct the semiotic significance of
their own experiences. He recommended dual writing assignments: a
critical essay on the competing discourses in an institution and a pro-
posal offering resolutions to the problems identified in the first essay.
He pointed out that the two types of writing drew on students' ac-
tive reading strategies and their rhetorical heuristics. In 2002, Thomas
Rickert argued for a pedagogy that entails post-oedipal forms of sub-
jectivity, deploying "strategies that circumvent, forestall, or resist the
replication of authoritarian or proto-violent modes of control" (307).
Such a subjectivity, he maintained, is conducive to a "post-pedagogy
of the 'act'," demanding "the new, the unthought, the un-accomodat-
able" (313), decentering stable subjects and allowing a subject to trans-
gress social norms (313-14). This pedagogy, he claimed, is an "exhor-
tation to dare, to invent, to create, to risk" (314), not a set of codifiable
strategies but a valuing of unorthodox work.

   In 2002, Debra Jacobs responded to postmodern critiques of the
writing process. She argued that "dismissing process theories and ped-
agogies by conflating all of them with expressivism, or by pointing
out limitations of other strands of process as they were conceptualized
during, say, the 1970s or mid-1980s [. . .] can limit instructional prac-
tices aimed at intervening in students' ethical development" (664). She
claimed that teaching writing as a process helps teachers to engage stu-
dents in critical inquiry. In(ter)ventional acts of critical inquiry "foster
affective engagement, challenge existing *doxa,* and contribute to new
understanding" (670). They entail "interventions over time that dis-
rupt the quotidian stream of consciousness, [including] inquiry into
ways of reading processes and products (and their means of produc-
tion)" (670). She further maintained that "deliberate discursive action
will not occur if there are no inventional practices to help students
align their lived experiences with what they read" (672). She conclud-
ed by saying that "in(ter)ventional practices foreground writing as a
process and disrupt the 'flows' of power and control in the writing
classroom" (673). See also Helen Foster's response to postmodern cri-
tiques of the writing process.

Evaluations of Inventional Pedagogies

Chapter 4 discussed various criteria for evaluating theories of heuristics. This chapter presents other criteria for assessing the pedagogical merits of inventional practices.

In 1984, George Hillocks published the first meta-analysis of experimental studies of writing pedagogy. This new statistical method enabled researchers to calculate the effectiveness of different pedagogies as tested in many studies and thus draw broader conclusions. Hillocks analyzed the relative effects of three "focuses" related to teaching invention: the use of models, writing as inquiry, and freewriting. He also assessed the effectiveness of three "modes" of instruction in composition classes: presentational (lecturing), natural process (using no guiding strategies), and environmental (using strategies in context). His results showed that each of these focuses and modes had some positive impact on students' writing as judged by holistic evaluations, but their *levels* of effectiveness (effect size) differed. (An effect size can range from –3.00 to 0 to +3.00. An effect size of about .20 to .50 is important; anything above .50 is a major difference.) Teaching writing as inquiry had the greatest impact (effect size: .57). The other two had some impact: the use of models (effect size: .21) and freewriting (effect size: .16). All three modes of writing also had some beneficial influence: the environmental mode (effect size: .44), the natural process mode (effect size .18), and the presentational mode (effect size: .02).

In *Research on Written Composition*, Hillocks elaborated on this research, reviewing a number of studies on different aspects of invention: the assignment conditions, freewriting, heuristics, and inquiry. In the first group, two studies (Kock, 1972, and Anderson, Bereiter, and Smart, 1980) demonstrated that students who did free associating before writing wrote better essays than those who did not (174-75). He cited six studies of freewriting in which the experimental group achieved significant gains: Alloway, et al., (1979); Olson and DiStefano (1980); Wagner, Zemelman, and Malone-Trout (1981); Hilgers (1981); and Cummings (1981). Thirteen studies of freewriting showed no significant difference between experimental and control groups (178). For teaching heuristics, Hillocks cited four studies in which students using the tagmemic heuristic had a range of gains in investigative acts and abilities: Young and Koen (1973), Odell (1974), Lamberg (1974), and Burns and Culp (1980).

In 1985, Lester Faigley, Roger Cherry, David Jolliffe, and Anna Skinner, in *Assessing Writers' Knowledge and Processes of Composing*, compiled an account of research on aspects of invention that included 1) the time spent on planning; 2) the strategies involved in planning (e.g., creating goals, generating content, organizing, analyzing the rhetorical situation); and 3) instruction on planning. They argued for the importance of descriptive writing assessment, outlining the steps involved in the development of Performative Assessment writing tasks and scoring rubrics. They also reviewed methodologies for assessing these processes of composing, including observation and microethnography, verbal reports in cognitive research, and text analysis. Discussing how process instruments show changes in students' composing strategies, they examined a close-reading approach and a continuum approach. Other evaluation instruments for invention include Mary Murray's "Insight Scale and Questionnaire," Judith Langer's ""Measure of Topic-Specific Knowledge," and Judith Bechtel's "Verbal Reasoning Subtest of the DAT."

David Perkins, in *The Mind's Best Work*, provided suggestions for the effective use of heuristics. He suggested that they should be employed along with field knowledge and taught, illustrated, practiced, and individually adapted. In 1985, Nickerson, Perkins, and Smith in *The Teaching of Thinking* reviewed the current literature on instruction in improving various kinds of thinking using conceptual models and understanding, such as learning, classifying, and deductive and inductive reasoning. They evaluated pedagogies in the areas of problem-solving, creativity, and metacognition, assessed the effectiveness of instruction in heuristics in different fields, and described language and symbol-manipulation approaches to teaching thinking. Jeanne Simpson narrated her efforts to develop an evolving set of criteria for heuristic procedures and argued for the importance of a meta-theory for introducing students to invention strategies. In 1990, Richard Fulkerson elaborated a set of questions to be asked when adopting an approach to teaching writing, including invention: What axiology does the approach adhere to (i.e., what does it consider good writing)? What procedural view does it hold (i.e., how do or should writers write)? What pedagogical practices does it advocate (e.g., workshops, models, rhetorical, strategies)? What epistemological position does the approach maintain (i.e., the relationship between writing and knowledge)? (410-11).

In 1994, Young and Yameng Liu edited a collection of landmark essays on rhetorical invention in writing

Chapter Synopsis

This chapter's initial section described five broad issues about teaching invention. The first revolved around the relative merits of four pedagogies in developing inventional powers: reliance on a person's natural abilities, teaching strategies for invention and guiding their use, engaging students in practicing invention, or offering students models and examples for imitation. The second issue centered on the relative effectiveness of different heuristics from structured to somewhat unstructured heuristic procedures. The third issue concerned whether invention was considered as individual or social. The fourth issue stemmed from whether invention was a hermeneutical or heuristic act. The fifth issue dealt with whether or not inventional strategies had an epistemic purpose.

The chapter then presented a chronological account of the following inventional strategies or practices: prewriting and journals, classical rhetoric; tagmemic rhetoric; Burkean invention; the double-entry notebook; freewriting; Larson's heuristic; inquiry strategies; problem-solving heuristics; strategies for writing across the curriculum, computers and composition, and visual rhetoric; and strategies based on deconstruction, cultural studies, postmodernism, and feminist studies. As the pedagogies were characterized, they were examined in the light of the above issues. The chapter closed with a discussion of evaluative studies and essays suggesting criteria for inventional pedagogies.