

The complexity of educating children requires educators who are knowledgeable, skillful and flexible. Reflection augments the repertoire and flexibility of educators. However, not all practitioners function at the same level of reflection.

Models of Reflective Thinking

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Reflective thinking is defined as a way of thinking about educational matters that involves the ability to frame problems, make rational choices, assess intended and unintended consequences and to assume responsibility for those choices. The complexity of educating children requires educators who are knowledgeable, skillful and flexible (Clift, Houston, & Pugach, 1990). Reflection augments the repertoire and flexibility of educators. Through the reflective process, educators also develop effective teaching habits (Dewey, 1933; Schön, 1987, 1991; Sparks-Langer, Colton, Pasch, & Starko, 1991).

To provide practitioners with insight into the reflective process, this article outlines models of reflective thinking which have been initiated since the turn of the century. Common to each model is a process through which reflection takes place. (1) Reflection is brought about by a problem. (2) The problem creates a need to access past experiences, knowledge and skills for resolution. (3) The experimentation which follows uses possible interventions which are monitored for success. (4) If successful, the experience and intervention is accommodated into the existing schema of the individual. If unsuccessful, renewed attempts for equilibrium are made (Piaget, 1975).

The reflective practitioner continuously cycles through the reflective process. Routine tasks are challenged, non-routine tasks are assimilated producing a shift in the gestalt or paradigm of the practitioner. Constant challenge, open-minded decision making, and the use of pre-established value systems and judgments stemming from external and internal sources raise the reflective level of practitioners (Clift et al., 1990).

Reflective thinking becomes a state of mind. However, not all practitioners function at the same level of reflection. Nor do individual practitioners function consistently at the same level. Models of reflective thinking delineate various levels of reflection of which technical, contextual and dialectical are the most common (Van Manen, 1977; Grimmer, MacKinnon, Erickson, & Riecken, 1990). Practitioners function at a technical level when foci is meeting outcomes, learning skills and content, and

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reaching simple competencies without regard for context. Often preservice and novice practitioners function at the technical level due to limited schema other than personal past experience on which to draw interventions.

Practitioners reflect at a contextual level when alternative practices are sought relative to knowledge and value commitments. Content is related to context and students' needs. Problems are analyzed and clarified on the basis of educative principles. Many experienced practitioners function at a contextual level of reflection (Clift et al., 1990).

At a dialectical level, practitioners value the exploration of problems by assessing internal and external environmental issues. Dialectical practitioners address moral, ethical and socio-political issues. A general feeling of self-understanding and individual autonomy pervades. Often the veteran practitioner reflects at the dialectical level when engaged in disciplined inquiry. Few practitioners consistently reflect at the dialectical level (Clift et al., 1990).

Models of Reflective Thinking

The process outlined above and the levels, or modes, of reflection are inherent in many of the models of reflective thinking found in the literature. The reflective inquiry model which stemmed from Dewey's research (1933) serves as the seminal work on reflection. Other models presented are Van Manen's (1977) levels of reflectivity which supported Habermas's (1970) theory of cognitive interests and Schön's (1983, 1987) reflective thinking model which focuses on components of reflection-in-action. Models (see Table 1) devised directly through observations and research of teacher educators were initiated by teacher educators such as Grimmer et al. (1990), Valli (1990), Sparks-Langer et al. (1991), Eby and Kujawa (1994) and Lasley (1992).

Dewey's Reflective Inquiry Model

Dewey wrote about reflective thinking as early as 1903, developing the concept in subsequent texts of *How we think* (1910, 1933) and *Logic: The theory of inquiry* (1938). Reflective thought was defined by Dewey as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends" (1933, p. 9). Importance was placed upon discriminating between beliefs based upon tested inference and those that were not, developing open-mindedness and ingraining habits of inquiry.

Dewey (1910) contended that all knowing could be linked to problems originated in concrete experience and that problems created the need for reflection. A problem was defined as "the discovery of intervening terms which when inserted between the remoter end and the given means will harmonize them with each other" (Dewey, p. 72). Problems challenged existing beliefs; therefore, subprocesses of reflective thought involved a state of perplexity as well as investigations to corroborate or nullify belief.

Logical and conscious formulation of method prior to action was considered essential. Reflection involved a consequence; therefore, a chain of sequenced events were formed which determined subsequent action and were directly linked to previous actions. Reflective thinkers actively engaged in problem solving through identification of problems, contemplation of solutions, action, and analysis of the problem-solving process. Dewey (1933) described these phases as:

- (1) *suggestions*, in which the mind leaps forward to a possible solution;
- (2) an intellectualization of the difficulty or perplexity that has been *felt* (directly experienced) into a *problem* to be solved, a question for which the answer must be sought;
- (3) the use of one suggestion after another as leading ideas, or *hypothesis*, to initiate and

Table 1. Reflective Thinking Models

PHILOSOPHY/PROPONENT	PERSPECTIVE/RATIONALE	MODES/PROCESS
Reflective Inquiry Model <i>Dewey</i>	Social issues and problems critically examined by applying a technical model of problem solving	1. A felt difficulty 2. Location & definition 3. Suggestion of possible solution 4. Development by reasoning of the bearings of the suggestion 5. Further observation & experimentation leading to acceptance or rejection
Model of Reflective Teaching <i>Eby & Kujawa</i>	Improvement of reflection-in-action through systematic inquiry; focus on skills process of reflection	Observation Reflection Gathering Data Considering moral principles Making a judgment Considering strategies Action
Levels of Reflection <i>Grimmett et al.</i>	Instrumental mediation of actions Deliberation among competing views Reconstruction of experiences	Technical Deliberative Dialectical
Theory of Cognitive Interests <i>Habermas</i>	Explore education through a theoretical knowledge base Fundamental justification & legitimization of common practices Self-understanding, emancipatory learning & critical consciousness	Empirical-analytical Hermeneutic-phenomenological Critical-theoretical
Pedagogical Functioning <i>Lasley</i>	Use of instructional management approaches Fuse theory with practice Critically assess educational practice	Technical Conceptual Dialectical
Peer Collaboration Framework <i>Pugach & Johnson</i>	Provides for joint construction of problematic classroom situations through the process of dialogue	Reframing through clarifying questions Problem summarization Generation and Prediction Evaluation and Reconsideration
Reflective Thinking <i>Schön</i>	Problem-centered approach which utilizes past experience, theory, and the practitioner's value system	Reflection-in-Action 1. Problematic situation 2. Frame/reframe the problem 3. Experimentation 4. Review consequences/implementation
Orientations to Reflective Thinking <i>Sparks-Langer, Colton, Pasch & Starko</i>	Knowledge & process of decision-making Focuses on dilemmas of teaching and social outcomes Teacher description of circumstance under which decision are made; gain a better understanding of teaching phenomena	Cognitive Critical Narrative
Images of Teaching <i>Valli</i>	Non-reflective, technical Technical within a reflective context Moral, ethical, & social in a nonreflective mode Reflection of social & moral aspects	Technical rationality Practical decision-making Inculcation/indoctrination Moral reflection 1. Deliberative 2. Relational 3. Critical
Levels of Reflectivity <i>Van Manen</i>	Methodological problems & theory development to achieve objectives Pragmatic placement of theory into practice Value commitment toward educational process	Technical rationality Deliberative rationality Critical rationality

guide observation and other operations in collection of factual material; (4) the mental elaboration of the idea or suppositions as an idea or supposition (*reasoning*, in the sense in which reasoning is a part, not the whole, of inference); and (5) testing the hypothesis by overt or imaginative action. (p. 107)

If the action was not appropriate, the reflective thinker moved into a second action that would solve the problem or

put the learner back into a reflective stage. Dewey considered problem identification and setting as pre-reflective while the resolution of the problem was post-reflective. Resolution of problems was an ultimate goal predicated on past experiences and prior knowledge.

Meaningful observation was advocated by Dewey (1910). Observation was not an end in and of itself, but an active process of deliberate exploration concerned with mastering the

unknown. Observation served as a link between the current and the past. Beginning observations helped to determine the nature of problems forming a link between what is observed, past experiences and prior knowledge. At the end, observations assisted with testing the value of hypothetical conclusions. Experimentation was the result of observations formed by varying situations on the basis of theory or ideas.

Systematic observation led to systematic inference in the form of logical reasoning. Dewey (1910) defined the reciprocal movement between inductive and deductive reasoning as "the recognition of definite relations of interdependence between considerations previously unorganized and disconnected, this recognition being brought about by the discovery and insertion of new facts and properties" (p. 81). Discovery and insertion of new facts and properties was a result of observation and inference. Movement toward the suggestion or hypothesis was referred to as inductive discovery and linked to synthesis. Movement back to facts was referred to as deductive proof or testing and likened to analysis. Dewey contended "analysis leads to synthesis; while synthesis perfects analysis" (p. 115). The reciprocal movement between induction and deduction fostered a secondary goal of structuring and implementing subsequent systematic inquiry.

In nurturing and sustaining reflective thinking habits, Dewey (1933) advocated three attitudes: open-mindedness, which enhanced intellectual receptiveness to multiple perspectives; whole-heartedness which resulted in commitment to the resolution of a problem; and intellectual responsibility where reflective practitioners considered both short and long-term effects of resolution. The development of open-mindedness required that individuals appraise underlying rationales ordinarily taken for granted. For Dewey, the value of reflective thought

emancipates us from merely impulsive and merely routine activity . . . thinking enables us to direct our activities with foresight and to plan according to end-in-view, or purposes of which we are aware. It enables us to act in deliberate and intentional fashion to attain future objects or to come into command of what is now distant and lacking. (p. 17)

Van Manen's Levels of Reflectivity

Van Manen (1977) criticized the use of scientific method advocated by Dewey (1910) relative to curriculum effectiveness. Concurring with Habermas's theory of cognitive interests (1970), Van Manen voiced concern regarding emphasis placed upon technical, causal purposes to education. Shortcomings evidenced by such a model were preoccupation with "measurement of learning outcomes, quantification of achievement, and the management of educational objectives" (Van Manen, p. 209) in lieu of looking at worthwhile and purposeful experiences that were best for students from a curricular standpoint. Hume (1955) offered that through such a past-oriented, technical model, skills, conceptions and knowledge was gained, which served as the foundation for subsequent growth in knowing. Functioning in such a technical, managerial sense was indicative of an empirical-analytical model of thinking (Habermas). Van Manen referred to the technical base level of reflectivity as technical rationality.

The hermeneutic-phenomenological mode raised the level of reflection according to Van Manen (1977). Focus at this deliberative level was on action rather than behavior. Concern was placed upon "making visible and understandable. . . the educational experiences, actions, and the changing perceptions and preconceptions of teachers, learners, and other participants of the curriculum process" (Van Manen, p. 214). Actions were analyzed and meanings, perceptions and assumptions were clarified. Key issues centered on communication and interpersonal understanding. Justification and legiti-

mation, through value commitment of common practices, was also inherent in hermeneutic-phenomenological knowledge.

The third and highest level of reflectivity, according to Van Manen (1977), was critical reflection. Sharing ideas put forth by Habermas (1970), Van Manen offered that critical reflection "coincides with the progress in the autonomy of the individual, with the elimination of human misery, and with the facilitation of concrete happiness" (p. 220). As powerful as hermeneutics-phenomenological knowledge was in producing understanding, the mode lacked ways of dealing with distortions in communication and understanding (Habermas). A critical paradigm was suggested by Habermas (cited in Van Manen) which implied "a commitment to an unlimited inquiry, a constant critique, and a fundamental self-criticism that is most vital to the critical tradition he [the practitioner] furthers" (p. 221).

The critical approach fostered interpersonal and social conditions necessary for "understanding, emancipatory learning and critical consciousness" (Van Manen, p. 221). A deeper consciousness to social reality was evident. Questions of worthwhileness and the nature of knowing were included. Justice, equality, emancipation, and freedom were inherent in practitioners functioning at a critical level of reflectivity.

Schön's Reflection-in-Action

Schön (1983, 1987, 1991) collaborated Dewey's theories, adding that reflective practitioners augmented technical expertise with personal insight and professional artistry. Artistry involved problem framing and improvisation. Schön (1987) stated, "I have used the term professional artistry to refer to the kinds of competence practitioners sometimes display in unique, uncertain, and conflicting situations of practice" (p. 22). Professional artistry was manifested by knowing-in-action. Knowledge-in-action did not rely on conscious decision-making, but was inherent in spontaneous and automatic actions and based upon past experiences. Specialized skills were revealed in public actions, but were often unable to be verbalized. Cognitive activities were conducted without conscious realization which routinized action. Polanyi (1967) referred to such nonconscious activities as tacit knowledge. Tacit knowledge was defined as knowledge which is not explicitly described or consciously thought about.

Schön (1983) suggested knowing-in-action developed from dual processes of reflection-in-action and reflection-on-action. Examining nonlinear knowledge-in-action required reflection-in-action or reflection-on-action. Reflection allowed for critiquing and questioning of repetitive experiences brought about by routine actions. Reflection-in-action was the term used by Schön (1983, 1987) which referred to reflection while in the process of doing. "Reflection-in-action is a process with nonlogical features, a process that is prompted by experience and over which we have limited control" (Russell & Munby, 1991, p. 164). Reflection-in-action differed from knowing-in-action as elements of conscious thinking and questioning were incorporated into the thinking process. The process involved problem setting, framing or reframing, experimentation and conscious analysis of the consequences of the action. The entire process occurred while involved in action, which often caused changes in the current action. For instance, a practitioner reflected on the class's inability to determine a possible solution to a scientific inquiry. By looking at the situation in a different manner, reframing, the practitioner adjusted questions to cue students toward possible solutions. The practitioner created a gestalt shift or reframed a paradigm to allow for immediate adjustments in thought and action. Reframing was possible because of past experiences and knowledge which provided input into the thinking process. In reflection-in-action "doing and thinking are complementary. Doing extends thinking in the tests, moves, and probes of experimental action, and reflection

feeds on doing and its results. Each feeds the other, and each sets boundaries for the other" (Schön, 1983, p. 289). Reflection-in-action varied with intent and longevity of the action. For example, practitioners reflected upon roles characterizing position in a given situation or incurred over a period of time.

Reflection-on-action, in contrast, referred to "the ordered, deliberate, and systematic application of logic to a problem in order to resolve it; the process is very much within our control" (Russell & Munby, 1991, p. 165). Reflection-on-action involved consideration of familiar data rather than reframing. Reflection on reflection-in-action produced the control and the systematic nature of reflection-on-action.

Schön (1991) suggested a three step process which moved practitioners from technical training to thinking professionally, to enabling them to develop new forms of understanding and action. Schön maintained that professionals do consciously reflect on actions, putting actions in the context of problem creating and problem solving. Reflection could be demonstrated when professionals thought about actions, beliefs, goals, and theories relative to current situations.

Schön (1983) also stressed that reflective practice was grounded in the appreciation system which included a repertoire of values, knowledge, theories and practices. Similarly, Valli (1990) and Liston and Zeichner (1987) advocated moral as well as educational criteria in examining solutions and possible implementation.

Dimensions of Reflection

Grimmett et al. (1990) grouped reflective practice into three dimensions: instrumental mediation of action, deliberation among competing views of teaching, and reconstruction of experience. Grimmett et al.'s dimensions of reflectivity corresponded to Habermas's (1970) three forms of knowledge: empirical-analytic, hermeneutic-phenomenological, and critical-theoretical. For each perspective the relationship between knowledge and reflection was considered in terms of source of knowledge, mode of knowing, and use to which knowledge was put as a result of the reflective process.

The first dimension, instrumental mediation of action, supported thoughtful, mediated action which leads to praxis and assists practitioners in replicating effective classroom practices corroborated by research. The knowledge source used to direct practice was externally presented in a technical mode by experts in the field. Reflective Teaching (Cruikshank, 1985) exemplified reflection at an instrumental level. Practitioners taught pre-established lessons with predetermined goals during a short time frame. Immediate feedback regarding technical skills exhibited in teaching was provided by the small numbers of peers to whom the teacher directed the lesson. Reflection in small and large group settings followed the teaching episode.

Grimmett et al.'s (1990) deliberative perspective was based upon choice among competing versions of good teaching. Deliberative practitioners attended to the context of events with the understanding that deliberation involved competing views of teaching and examination of those views relative to consequences and action. An external source of knowledge was presented, similar to reflection in an instrumental dimension, but understanding of the knowledge was mediated through colleagues and the context of the situation. The mode was deliberative using research knowledge in an "informed eclecticism" (Schwab, 1978) to enlighten practice rather than direct it. Practitioners referred to personal experiences which fit the current context for interpretation of problems and for determining meaning. The deliberative mode fostered free exchange of views among practitioners and valued feedback. Through deliberations, actions, and feedback, practitioners developed extensive repertoires of practical knowledge which Sanders and McCutcheon (1986) called practice-centered inquiry.

The third dimension defined by Grimmett et al. (1990) was reflection as reorganization or reconstruction of experience leading to action, self-as-teacher, and assumptions of teaching derived from a critical-theoretical basis. The degree of reconstruction to which the act of problem setting was problematic in and of itself was a key component of dialectic reflection. The source of knowledge was both contextual and the practical application of personal knowledge. A dialectical mode was based upon problems and subsequent reflection. Knowledge was emergent and metaphorical as practitioners framed, reframed, and reconstructed past understandings to generate new perspectives on puzzling situations. The purpose of the third perspective of reflective thinking was to transform teaching to a more educative experience consistent with practitioners' beliefs and values of effective practice.

Valli's Images of Teaching—A Moral Perspective

Valli (1990) researched reflection in teacher preparation models. Four approaches to reflection were determined: technical rationality, practical decision making, indoctrination, and moral reflection. Moral reflection was looked upon as being most critical in nature and, therefore, most desirable.

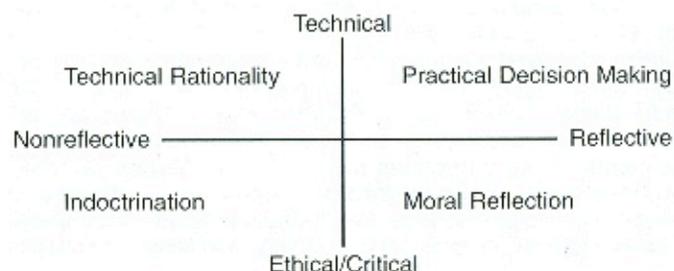
In determining the four images of teaching, Valli used a quadrant format. The horizontal axis held the dichotomous elements of nonreflective and reflective practice, while the vertical axis included the dichotomy of technical versus ethical/critical approaches (see Figure 1). Within the quadrant bounded by nonreflection and technical reflection was the technical rationality approach. Goals for technical rationality were to build principles and procedures which formed the basis for teaching and to help practitioners master knowledge and skills of teaching which fostered proficiency in performing basic tasks. Valli (1990) rejected the notion that a nonreflective, technical rationality approach was appropriate in teacher preparation for two reasons. First, teaching was too complex and situation specific to believe that through staff development practices alone, development of critical judgment by practitioners could take place. Secondly, Valli believed effective teaching to be a moral responsibility rather than a technical skill.

In the next quadrant, Valli (1990) included practical decision making which added reflection to the technical aspects of teaching. Pre-established goals were set which served as the basis for analysis of practitioner's actions and consequences of actions. Reflective Teaching (Cruikshank, 1985) was considered as a strategy within the practical decision making quadrant.

By making decisions on problematic situations found in classroom instruction, student motivation and classroom organization, practitioners framed and reframed problems found in the teaching-learning process. "The limitation of this approach to reflection and the reason it does not function as a comprehensive image of teaching is that it leaves the goals, social context, and . . . curriculum content of education unexamined" (Valli, p. 19). The practitioner was placed in a role of manager, rather than in a role of empowered educator.

Figure 1.

Valli's Reflective Thinking Model



Indoctrination was the third orientation to teacher preparation. Indoctrination, or inculcation, was nonreflective, yet critical. Practitioners trained with such a perspective held closed world views which were often imposed upon others (Valli, 1990). Indoctrination was considered to be nonreflective and noneducative limiting the examination of alternative perspectives by practitioners (Liston & Zeichner, 1987; Valli).

Valli (1990) considered moral reflection to be the approach of choice. Moral reflection was both reflective and critical in nature. Reflection was viewed as "a means toward the development of ethical judgments, strategic actions, and the realization of ethically important ends" (Liston & Zeichner, 1987, p. 127). Three approaches were found within moral reflection: deliberative, relational and critical. "Each is concerned with helping prospective teachers reflect on the moral aspects of teaching and assumes that educational decisions are inevitably based on beliefs, however tacit, about what is good or desirable" (Valli, p. 20). The deliberative approach encouraged thoughtful consideration of ethical decisions relevant to educational issues. Rightness of conduct and questioning of values were inherent in the deliberative approach (Tom, 1984). Key moral dimensions were practitioner/student relationships and the curriculum. Reflective practitioners in both instances viewed problems from a moral perspective, reasoning the most desirable means to an end which would be just and equitable based upon the practitioner's judgments and value system. The deliberative approach used long-range benefits to the student and the importance of the knowledge taught as the bases for judging moral practice. For a deliberative practitioner the morally right thing was making sound judgments while acknowledging legitimate differences.

The relational approach (Valli, 1990) was rooted in the natural relationship of mothering, subjective experience, and the uniqueness of human encounters. Like the preceding approach, moral deliberations were involved. Also inherent in Valli's relational approach were receptivity, relatedness and responsiveness. Relationships were more important than rationality and empathetic understanding more important than abstract principles. The primary goal was to help practitioners become caretakers of students. According to Noddings (1984), practitioners apprehended the reality of each student and gave importance to affective growth with less concern for academics. Those who cared about children (a) experienced a caring community through modeling, dialogue, practice and confirmation of such desirable qualities as meticulous preparation and constructive evaluation; (b) were encouraged to be autonomous decision makers through dialogue; (c) were provided practice in caring for and fidelity to persons; and (d) confirmed worthy motives and attainable images of moral educators (Valli). Relational capacities needed by caring practitioners included listening and responding to the cared-for, being engrossed in the other's reality, identifying individuals' growth needs, helping students find personal reasons for choices, and mutually struggling toward competence and ethical ideals. Practitioners would learn how to teach content, but would primarily learn how to live a caring ethic in the classroom "to induce an enhanced moral sense in the student" (Noddings, p. 179).

Primary content in a relational ethic was the practitioner's responsibility to individual students (Valli, 1990). Practitioners reflected upon, engaged in dialogue about, and practiced creating caring relations and communities. The relational approach evaluated moral choice according to benefits to the cared-for. Individual talents, aspirations, and personal desire superseded societal needs (Noddings, 1986). Caring practitioners assessed ethical practice by asking what effect choices had upon students and on the community.

The critical approach to reflective practice supported by Valli (1990) was derived from political philosophy, primarily Marxism. It explicitly treated schools and school knowledge as

political with teacher preparation aimed at "critical pedagogues" or "transformative intellectuals" (Giroux & McLaren, 1986). Proponents argued that schools were social institutions which reproduced a society based on unjust class, race, and gender relations and that practitioners have a moral obligation to reflect on and change practices and school structures which perpetuated such ideals. A primary goal for critical theorists was to assist practitioners in understanding ways in which schools might be contributing to an unjust society for the purpose of engaging in emancipatory action. Critical theorists argued that conventional knowledge, institutions, and social relations are socially constructed and should not be taken for granted. Zeichner (1983) challenged reflective teacher education programs to cause practitioners to examine assumptions and biases and to break through the parameters of conventional thought. In contrast to traditional field experiences, the goals were to help practitioners question the moral basis of practice and understand how schools reproduce and legitimate social inequality. Assignments aided prospective practitioners in critically analyzing conventional wisdom, rejecting technocratic approaches to teaching, and viewing schools from the perspective of those who benefit from them the least.

The critical approach served two purposes (Valli, 1990). The first was epistemological which allowed the teacher to break through dominant ideologies and hegemonic control. Radical social theory was often introduced to prompt such critical reflection. The second purpose was pedagogical, necessitating the voicing of personal experience. It evoked deconstruction of stereotypes and biases in order to transform education. Practitioners using the critical approach evaluated practice as moral if the purpose was to resist repressive hegemonic control, assist the least advantaged, or transform unjust structures.

Orientations to Reflective Thinking

Like Valli (1990), Colton and Sparks-Langer (1993) developed approaches to teacher education which hinged on reflection based upon moral and democratic principles. A conceptual framework presented a manner in which practitioners may become "thoughtful persons intrinsically motivated to analyze a situation, set goals, plan and monitor actions, evaluate results, and reflect on their own professional thinking" (Colton & Sparks-Langer, p. 45). Components of the framework for reflection included professional knowledge base, construction of knowledge and meaning, and action.

A professional knowledge base included seven categories. Content, students, pedagogy and context were taken from Shulman's (1987) work. Prior experiences (Kennedy, 1989), personal views and values (Van Manen, 1977; Zeichner & Liston, 1987) and scripts (Resnick & Klopfer, 1989) concluded the list. The practitioner first possessed an understanding of subject matter and curriculum which was related to students' cultural backgrounds, developmental levels and learning styles, then correlated knowledge with a sound pedagogical approach. Pedagogy came in two forms: generic methods and theories and those which were content specific. Practitioners then considered context of situations, prior experiences, and personal and social values derived from life experiences. Finally, two types of scripts were included. Those scripts that allowed practitioners automaticity while focusing on critical issues and those which included self-questioning as part of problem analysis and planning, often referred to as metacognition (Colton & Sparks-Langer, 1993).

Feelings bridged the gap between knowledge base stored in long-term memory and information from the immediate environment which aided construction of knowledge and meaning. By combining Kolb's (1984) and Dewey's (1910) models of reflective experience, a reflective process was formalized. The practitioner opted to focus on a particular aspect of experience.

Information was collected, analyzed and interpreted while accommodation of knowledge was made into existing schema. If disequilibrium occurred, additional information may be collected through internal or external sources. The situation was defined and hypotheses suggested and tested for long- and short-term consequences. Actions were implemented. If desired results were obtained, the process was complete. Otherwise, modifications were made and the process repeated (Colton & Sparks-Langer, 1993).

The process described by Colton and Sparks-Langer (1993) served as a model for reflective thinking. Within the model, practitioners functioned using three orientations to reflective thinking: cognitive, critical and narrative (Sparks-Langer et al., 1991). The cognitive approach dealt with the first four of Shulman's (1987) six categories of knowledge and the ways practitioners related content to students. Content, pedagogy, curriculum and characteristics of learners were used to develop cognitive skills in practitioners. The cognitive level at this point was likened to Van Manen's (1977) deliberative or technical level of reflectivity.

The thinking process was a second component of the cognitive level of reflection and emphasized how a knowledge base was organized. Organized structures of facts, concepts, generalizations and experiences composed the schemata of practitioners. Complex and deeper levels of schemata, often found in practitioners having more teaching experience, were paralleled with the experienced practitioner's ability to import information, form connections among bits of information, produce meaningful responses to situations and obtain the automaticity to perform more behaviors unconsciously while attending to existing tasks (Leinhardt & Greeno, 1986; Carter, Cushing, Sabers, Stein, & Berliner, 1988; Clark & Peterson, 1986). Complex levels of schemata were often lacking in novice practitioners. Borko and Livingston (1989) compared the reflective levels of novices with those of experienced practitioners concluding: (a) routine and content were available in the schemata of experienced practitioners as automatic scripts, and (b) rich schemata allowed the experienced practitioners to consider the cues in the environment and quickly access appropriate strategies.

The second level of reflection, according to Sparks-Langer et al. (1991), was the critical approach which emphasized the substance of decisions by examining experiences, values, socio-political implications and goals of practitioners. Schön (1987) stated that the majority of learning was derived from reflection on problematic situations which occurred on a continuous basis, but often the information learned became tacit and difficult to analyze. Through a practitioner's appreciation system, a repertoire of knowledge was stored in the form of theories, practices, knowledge and values. All of which influenced the decision making process of practitioners forming a link between the cognitive and critical levels of reflection (Sparks-Langer et al.).

Sparks-Langer et al. (1991) maintained that when practitioners were urged to question practices and encouraged to clarify personal beliefs and values regarding education, the practitioners were able to critically examine educational issues. Critical examination provided power and knowledge which fostered subsequent inquiry regarding long- and short-term goals and practices in education.

In the narrative approach to reflection, the "main emphasis is on teachers' own descriptions of the circumstances under which they make decisions" (Sparks-Langer et al., 1991, p. 5). A common thread was emphasis on validity of inferences drawn from practitioners' experiences. Narrative reflection was also touted as the bridge between the new and old methods of thinking about educational research.

Eby and Kujawa's Model of Reflective Teaching

Eby and Kujawa (1994) developed a model of reflective teaching for use in teacher preparation which was comprised of a series of skills that practitioners learned to improve reflection-in-action. In producing the model, Eby and Kujawa drew from the work of Pollard and Tann (1987). Pollard and Tann analyzed Dewey's (1933) work in identifying four essential characteristics of systematic reflective teaching: (a) active concern with aims and consequences as well as means and technical efficiency, (b) a combination of inquiry and implementation skills with attitudes of open-mindedness, responsibility and whole-heartedness, (c) a cyclical process whereby practitioners continually monitored, evaluated, and revised practice, and (d) practitioner judgments, informed by self-reflection and insights from educational disciplines.

Pollard and Tann (1987) identified six reflective inquiry skills that practitioners can learn to apply within classrooms. The first skill was empirical in nature concerned with collection of data and with descriptions of situations, processes, and cause and effects. Secondly, analytical skills enabled reflective practitioners to interpret descriptive data. Third, evaluative skills were used to make judgments about consequences of the results of inquiry and how those judgments may be applied to future policy and practice. Fourth, strategic skills fostered the ability in practitioners to plan for action and implement the plan. Practical skills were the fifth of the reflective inquiry skills. Practical skills allowed practitioners to link analysis and practice. Finally, communication skills were necessary to communicate and discuss ideas extensively with other practitioners.

Using the skills outlined above, a reflective teaching model was developed by Eby and Kujawa (1994). The practitioner first observed a classroom episode or student behavior. Questions were asked in an effort to frame the problem. Objective data and subjective information from the classroom environment were gathered and analyzed. Judgments were made on the basis of moral principles with alternative strategies being considered for implementation. A strategy was selected that best fit the classroom event or student behavior and plans were made to implement the strategy. The plan was put into action and monitored with decisions made regarding the validity of the strategy. Dialogue ensued which brought reflection into focus and expanded the knowledge and experience base of practitioners.

Lasley's Pedagogical Functioning

Lasley (1992) defined reflection as "the capacity of a teacher to think creatively, imaginatively, and at times, self-critically about classroom practice" (p. 24). Lasley devised a model of pedagogical functioning which parallels levels of teaching skills with ability of practitioners to exhibit skills in classroom contexts. Lasley also held that reflection helped practitioners move from one of the three stages to the next.

In Stage I survival was the focus. Stage I practitioners were concerned with personal adequacy for dealing with multidimensional tasks. Functioning at a technical level (Van Manen, 1977), practitioners seldom thought beyond immediate episodes and had high need for orderliness. Stage I included most new practitioners and some veteran practitioners.

According to Lasley (1992) practitioners in Stage I reflection needed to gain confidence in rudimentary instructional competencies and pedagogy. Focus was placed on technical issues such as refinement of specific classroom practices and how instructional or management approaches were used. Practitioners often examined and analyzed various approaches to learning and teaching in an effort to build a repertoire of practice.

Lasley (1992) defined Stage II practitioners as having a task focus. Emphasis was placed upon knowing the functioning of the classroom and knowing how to teach students. Survival skills were also a consideration. Practitioners were not overly concerned with how knowledge was constructed. Limited delivery approaches were evidenced. Most experienced practitioners were included within Stage II.

Reflection at Stage II involved striving to understand concepts and contexts of teaching and a theoretical basis. Practitioners had the ability to determine conceptual and philosophical grounding for classroom practices, could defend practices and articulate how the practices fostered students' growth, but needed to examine ways of establishing congruence between theory and practice (Lasley, 1992).

Stage III (Lasley, 1992) focused on the impact of instruction. Practitioners were process and outcomes oriented, held high personal and professional expectations, and believed that learning by the child was of key importance. Practitioners in Stage III fostered interrelatedness of disciplines and inquiry and were always looking for new ways of teaching. A limited but growing number of practitioners were included in Stage III.

Lasley (1992) stated that Stage III practitioners could conduct substantial internal and external dialogue about issues pertaining to teaching. Reflection was also exhibited through critically viewing ethical and instructional bases. Practitioners in Stage III were intellectually active, critically reflective and could extend classroom implications to society.

"Adopting a 'reflectivity program' without adequate attention to the needs and dispositions of teachers will most likely result in disillusionment by all involved," warned Lasley (1992, p. 28). Therefore, staff development must be specifically oriented to practitioner disposition and pedagogical stage. Also advocated was consideration of a variety of delivery mechanisms that meshed with the pedagogical stage of the practitioner.

Conclusion

Dewey's (1933) seminal work on reflective thinking has served as the model on which to build reflective inquiry approaches. Dewey has provided a model which examines social issues and problems critically through the process of applying a technical problem solving approach. The process initiated by Dewey was closely followed by Eby and Kujawa (1994) as they developed a model designed to improve reflection-in-action through systematic inquiry. Pugach and Johnson (1990) and Schön (1983) also delineated process-oriented models. Pugach and Johnson stressed the use of dialogue. Schön provided a model for reflection-in-action which was problem-centered and utilized past experiences, theory and the practitioner's value system.

Several educational researchers categorized levels of reflection used by practitioners. Habermas (1970) stratified reflection using three modes. The empirical-analytical level explored education through a theoretical knowledge base. Hermeneutic-phenomenological reflection was evidenced by a fundamental justification of practice. Habermas's highest level of reflection was termed critical-theoretical which incorporated elements of self-understanding, emancipatory learning and critical consciousness. Van Manen (1977) offered the following three modes: technical rationality, which focused upon methodology and outcomes; deliberative rationality, which sought to integrate practice with theory; and critical rationality, which placed value commitments on the educational process.

In recent years additional theories on levels of reflective thinking have been re-popularized. Grimmet et al. (1990) and Lasley (1992) supported three modes of reflection beginning with a technical level, progressing through a deliberative, or conceptual, level which valued context and theory, and peaking with a dialectical level which encompassed moral, ethic and socio-political aspects of education. Sparks-Langer et al.

(1990), likewise offered three modes of reflection. The lowest level was cognitive, which provided knowledge and process for decision-making. The critical level focused on dilemmas of teaching and social outcomes, while the narrative modes was added to provide descriptions of circumstances which served to provide tangible tools for reflection. Valli's (1990) images of teaching provided a technical level and an indoctrination mode which was non-reflective. Additional modes which were reflective included practical decision-making and moral reflection with subcomponents of deliberative, relational and critical reflection.

While the process of reflection proved to be consistent in all models, variations were found regarding levels of reflection as well as controversy of the practicality of a hierarchy. Within all models, levels of reflection are termed situational and can be augmented through knowledge of theory, availability of practice situations and training in strategies which enhance reflection.

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