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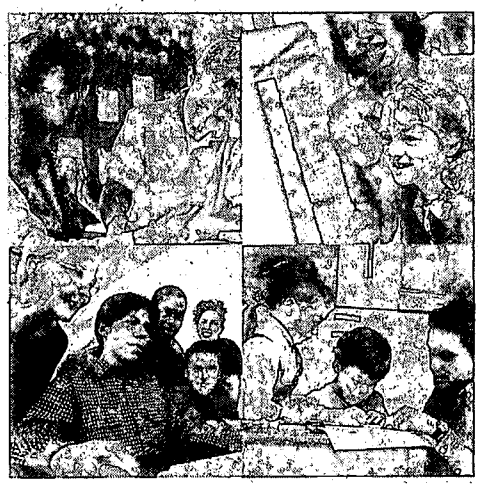
ABSTRACT

Building on trends toward interdisciplinarity, this monograph features articles that explore educational and professional collaborations. After the editor's commentary, "The Art of Collaboration, The Science of Teaching" (Brian Jory), three essays include: "'Now I Trust You': Bridging the Ethical Dilemma in Professional Development School Relationships" (Samuel Hausfather and Elizabeth L. Strehle; "An Integrated Approach to Gender Equity in Schools" (Susan Logsdon Conradsen and Michelle Rosen Haney); and "Interdisciplinary Curriculum as Complementary Practice: A Philosophical Perspective" (Alvin H.F. Smith). A book review section reviews four books that focus on developmental problems experienced by preadolescents, adolescents, and young adults. (Papers contain references.) (SM)

CAMPBELL MONOGRAPH SERIES
ON
EDUCATION AND HUMAN SCIENCES



ESTABLISHED BY
ISABEL C. AND C. FRANK CAMPBELL
TO PROMOTE INNOVATION IN
EDUCATION AND HUMAN SCIENCES

August 2001 Volume 2

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DR. ISABEL C. CAMPBELL AND
DR. C. FRANK CAMPBELL

Dr. Isabel C. Campbell and Dr. C. Frank Campbell were exemplary educators throughout their long careers. Isabel attended Berry College and later earned a doctorate from The University of Georgia. She taught at a number of schools in North Georgia, and was the first reading consultant in Floyd County, Georgia. Later she became Director of the Rome City Schools Reading Clinic. She held professorships at Berry College and DeKalb College. After retiring from teaching in 1981, Isabel went to work for the U.S. Department of Education and the U.S. Army Education Centers in Ft. McClellan, Alabama, and White Sands Missile Range, New Mexico.

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Frank and Isabel Campbell reside in Green Valley, Arizona, where their personal activities include keeping up with five grandchildren. Their two sons, Keith and David, also attended Berry College. Generous support from the Campbell family has brought this monograph to fruition.

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CAMPBELL MONOGRAPH SERIES ON EDUCATION AND HUMAN SCIENCES

August 2001 *Volume 2*

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EDITOR'S COMMENTARY
THE ART OF COLLABORATION, THE SCIENCE OF TEACHING

Brian Jory
Berry College

Twentieth Century scholar Kenneth Burke once wrote, "A way of seeing is always a way of not seeing" (1965, p. 49). As an epistemologist, Burke was describing the psychological structure and organization of learning and knowledge. As a sociologist, however, Burke was also illuminating the human propensity to see life in habitual patterns, to consort exclusively with those who share one's thought patterns, and to filter out divergent ideas, particularly those ideas that might catalyze social change. With some intellectual latitude, Burke's aphorism can be applied to modern educational institutions, where knowledge is sometimes artificially dissected into disciplines, and where faculty researchers and teachers, segregated by disciplines, sometimes narrowly focus on knowledge that is perfectly intelligible to their immediate colleagues, but seems irrelevant or inaccessible to colleagues outside their disciplinary bounds, particularly potential colleagues outside of academia altogether.

Drawing on post-modern analyses by Burke and others, some educators and educational institutions have attempted, at various levels, to implement interdisciplinary collaborations. For example, a recent volume *Constructivism and Education* draws together a collection of chapters from ethics, mathematics education, philosophy, social psychology, science education, and social studies and challenges teachers to reflect on the compartmentalization of school subjects, the mediating role of teachers, the validity of knowledge, and the meaning of education (Larochelle, Bednarz, & Garrison, 1998). Pruitt, Sanders, and Wayne (1998) describe the development of interdisciplinary instruction in a high school in Athens, Georgia, where multidisciplinary teams were organized to teach ninth grade English, social studies, history, and science. According to these authors, multidisciplinary teams are effective at the high school level in tracking student progress, reinforcing ties across content areas, and giving students a feeling of community. In another interesting analysis of interdisciplarity in schools, Linn, Songer, and Eylon (1996) highlight the contributions of psychologists to science education and describe a successful ten-year collaboration between psychologists and science teachers in public schools. Finally, Reynolds (1997) emphasizes the critical role of interdisciplinary research teams in conducting meaningful community research and action programs, including human development and family studies, social welfare, law/psychology, and community-social psychology.

Building on the trend towards interdisciplinarity, Volume 2 of the *Campbell Monograph Series on Education and Human Sciences* features three articles that explore educational and professional collaborations. In an article entitled, *"Now I Trust You:" Bridging the Ethical Dilemma in Professional Development School*

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Relationships, Samuel J. Hausfather and Elizabeth L. Strehle describe the development of collaborative relationships between two teacher education professors and a group of classroom teachers, school-level administrators, and pre-service teachers in a rural elementary school. Through a form of qualitative analysis called portraiture, the researchers developed a model for Professional Development School relationships which is grounded in ethical theory and conforms to the Professional Development School Standards of the National Council for the Accreditation of Teacher Accreditation. As Professional Development Schools become more prevalent, this article should be interesting to those who want to tear down the great divide between academicians and practitioners in education.

In an article entitled *An Integrated Approach to Gender Equity in Schools*, psychologists Susan Logsdon Conradsen and Michelle Rosen Haney focus attention on harm caused by gender bias in schools. The article challenges a growing, yet erroneous, belief that gender equity has been achieved in schools. The authors illuminate the presence of gender bias in subtle areas of curriculum, school climate, teacher expectations, classroom interactions, and special education referrals. Drawing on psychological methods and concepts, the authors explain how gender bias has been internalized and incorporated into schools and offer numerous specific recommendations and strategies for administrators, teachers, and teacher-educators who are working to enhance fairness in schools to both girls and boys.

For many teachers, the road to interdisciplinary collaboration is blocked by nagging questions about disciplinary fidelity, about whether one's own discipline might take a back seat to some other. Put in more colloquial terms, these teachers ask, "What's in it for my discipline?" In an article entitled *Interdisciplinary Curriculum as Complementary Practice: A Philosophical Perspective*, Alvin H. F. Smith analyzes the epistemological meaning of interdisciplinary curriculum in terms of reciprocal exchange of methods. Smith argues that interdisciplinarity is achieved only when two or more disciplines share their methods of exploration and gives examples of how the complementary exchange of methods between disciplines enhances, rather than denigrates, one's own discipline. The article offers several concrete examples of complementarity in interdisciplinary teaching and explores the benefits for teachers and students alike as this process unfolds.

Each article featured in the *Campbell Monograph Series on Education and Human Sciences* is reviewed by members of the Editorial Board, through a process which is anonymous. The editor is grateful to the Editorial Board, whose contributions to the quality of the articles is priceless. The Editor is also thankful beyond measure for the generosity of the family of Dr. Isabel C. Campbell and Dr. C. Frank Campbell, whose financial contributions make Volume two of the *Campbell Monograph Series* possible.

A Book Review section has been added to the *Campbell Monograph Series*. This volume features four reviews of books that might be valuable for parents and teachers, since they focus on developmental problems experienced by children, pre-adolescents, adolescents, and young adults. All of the reviews were written by Berry College undergraduate students who were enrolled in FAM 330—Family Problems and Interventions. Admittedly, the books focus on the dark side of child and adolescent development; yet, those who teach in public schools are increasingly called upon to be aware of children-at-risk, and indeed they have a professional

responsibility to take steps to protect the children that are entrusted into their care. Hopefully, the reviews will be instrumental in improving the quality of life for some child or young adult. The editor commends the students who wrote the reviews, whose educational objective was to critically evaluate the book in terms of its usefulness for solving family problems.

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"Now I Trust You:" Bridging the Ethical Dilemma in Professional Development School Relationships

Samuel J. Hausfather
East Stroudsburg University of Pennsylvania
Elizabeth L. Strehle
Northern Illinois University

This article considers the complex issue of how to work in an ethical manner to equalize the voices of all stakeholders so that Professional Development School (PDS) relationships will be self-sustaining. A two-year journey to establish ethical relationships resulted in movement from a college/school partnership to a Professional Development School. A model for establishing principled, responsible, and caring relationships was grounded in ethical theory while conforming to the stages outlined in the Draft PDS Standards of the National Council for the Accreditation of Teacher Education.

Teacher education involves an accumulation of many diverse inputs: the core liberal arts, the foundational human sciences, curriculum and methodology, and multiple opportunities for application of theory within school environments. Professional Development Schools (PDSs) represent a nationwide effort to create new institutions focused on partnering between stakeholders in teacher education (Levine, 1998). Through partnerships between liberal arts faculty, teacher education programs, local public schools, and school districts, PDSs aim to improve teacher preparation and professional development and to encourage collaborative inquiry in real school contexts. "Professional development schools are regular P-12 schools that have entered into partnerships with universities to assist in the preparation of future educators and to serve as sites for research and development" (Sykes, 1998). As such, they should reflect best practice educational environments as well as commitment from both school and university to support the partnership. Although this sounds simple, it involves complex new relationships for both university and school practitioners.

Professional Development School relationships raise issues of status, power, care, and equity. Zeichner (1995) maintains that there is a divide between the interest of the academy and the interest of school and that academic inquiries are essentially irrelevant to the school inquiries. He reports that researchers who use classrooms to explore questions are not sensitive to the complex work place of school, do not involve teachers in data analysis, and do not find time to engage in dialogue about research results. Teachers, on the other hand, often view research as conducted by those on the outside with the knowledge produced used by academics,

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not by teachers (Nixon, 1981). Colleges cannot impose their own agenda on schools, an approach ineffective in promoting change (Lewison & Holliday, 1999; MacNaughton & Johns, 1993). To go beyond this gap, collaboration must be a necessary condition of partnership relations among university and school personnel.

Relationships form the basis for successful PDS efforts (Darling-Hammond, 1994; Hausfather, Outlaw, & Strehle, 1996). As relationships between university and school partners grow over time, differences in status are equalized. Relationships are created through caring, and a collaborative relationship is necessarily a caring one (Vare, 1997). A caring relation is one where a connection between two human beings is defined by becoming open and receptive to each other (Noddings, 1992). This description of caring acknowledges that decisions in caring relationships lead to decisions based in ethics of goodness. As we apply this to PDS relationships, we are concerned with relationships that extend over time, "characterized by equal relations; that is, the parties alternate as carers and cared-fored" (Noddings, 1992, p. 91). Relationships based on friendship, in the broadest sense, provide us with an ethical direction useful to the development of PDS efforts.

Aristotle (1986) has written extensively on the ethics of friendship. The Greek word philos expresses a concept much broader than the term "friendship" (Cooper, 1980). It covers family relationships, civic friendship, business relationships, and community memberships. Aristotle defines friendship as doing well by someone for her/his own sake, oriented toward a mutual well-wishing and well-doing out of concern for one another (Cooper, 1980).

Aristotle (1986) outlines three categories of friendship. The first is friendship based on utility and is motivated by a common purpose shared by both parties. An example of this exists in business relationships and changes according to circumstances. The second category of friendship is based on recreation and involves pleasure in being with one another. There is more of a sense of openness to dialogue about personal and professional issues as interactions move beyond the business realm. Both these types of friendship involve "a complex and subtle mixture of self-seeking and unself-interested well-wishing and well-doing" (Cooper, 1980, p. 305). Finally, there is friendship based on goodness, where people "desire the good of their friends for the friends' sake . . . because each loves the other for what [who] he is" (Aristotle, 1986, p. 263). This mutual form of admiration is the highest form of friendship and demands equality. This level of friendship takes time to cultivate and is difficult to attain. Equality in relationships exists when respectful attention to social customs and principles results in consideration for each other (Noddings, 1992). For PDSs to be successful over the long term, we must strive for perceiving each other as equal in status.

Context

This study reports on the work of two teacher-educators involved in a collaborative effort with the faculty and administration in a rural elementary school in the southeast. The authors were involved in different roles, one as a teacher-education faculty member working as the PDS site coordinator, and the other first as director of field experiences and, then, as the director of PDS initiatives for Berry College, a private liberal-arts college. The researchers became participant observers as they initiated relationships with classroom teachers, school-level administrators,

and preservice teachers. The use of portraiture as a method of inquiry and empirical description captured the essence of the relationship between the authors and their colleagues to shape an authentic "portrait" of the human experience in a social and cultural context (Lawrence-Lightfoot & Hoffmann, 1997, p. 3). Initially, action research projects, written reflections, records of meetings, and conversations with classroom teachers and administrators provided the data for capturing the voice of the partnership in three descriptive narratives. The narratives were then coded by generating categories, themes, and patterns to identify the connections between the inquiries (Ely, 1991; Miles & Huberman, 1994; Strauss & Corbin, 1990).

From an analysis of the descriptive narratives a model emerged creating an organizational framework (Strauss & Corbin, 1990) reflecting the themes of relationships, learning community, and reflection and change. These themes became a clear model to align the grassroots work of the evolving partnership at the elementary school to the NCATE Draft Standards for Professional Development Schools (NCATE, 1997). During the final analysis an ethical dimension emerged, which was then aligned with Aristotle's stages of friendship.

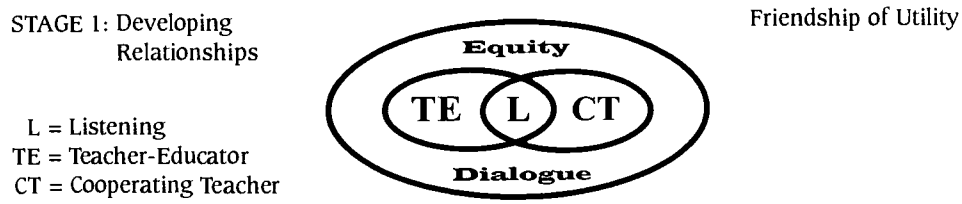
Development of a Model of PDS Relationships

A developmental model is postulated that reflects the relationships formed in our PDS work. The model consists of the following three stages: developing relationships, creating a learning community, and sustaining reflection and change.

Stage I: Developing Relationships

In this stage, the teacher-educator, the cooperating teachers, and the principal get to know each other through listening and sharing common concerns. Intersections of common interest define the place for dialogue that fulfills each person's own agenda. The key to the development of relationships between the teacher-educator and the cooperating teachers is listening to each other's concerns (see Figure 1). Dialogue involves listening, responding to each other's concerns, and valuing each other's voice. Dialogue moves back and forth between listening, responding, and coming to an appreciation of what the other is saying and doing. This forms the basis for developing an equitable relationship and is similar to Aristotle's friendship of utility. This happens when the teacher-educator and the classroom teacher are both interested in the preservice teachers' success. The teacher educators acknowledge the success of the preservice teachers as an opportunity to enhance student learning. The cooperating teachers focus on the preservice teachers' ability to assist the academic achievement of their pupils. For us, this process began the evolution of a community based on care for each other focused on a genuine concern for the learning of students, both school and college.

FIGURE 1: ETHICAL DEVELOPMENT OF PDS RELATIONSHIP



Even before this study, our college and this elementary school had an ongoing relationship focused on placing preservice and student teachers in classrooms. The second author was assigned to the school to supervise her elementary curriculum and methods courses. Her entire class was placed with teachers throughout the school. One of the first efforts to establish a link between the college and school was to invite teachers to campus to discuss classroom issues with the elementary education students. A research project between one classroom teacher and the second author became a catalyst to involve others. Through the classroom teacher, others at the school became interested in collaborating on projects. Through discussion and shared interests, the principal and the teacher-educators collaborated in creating goals for the college and the school to develop a learning community. Other teachers began thinking about their role in collaborating with the college.

A two-day retreat in October gave every teacher an opportunity to spend one day on the college campus discussing the relationship between the college and the school. The retreat focused on three goals: an opportunity to share visions of what our PDS might look like, effective practice in supervising preservice teachers, and defining expectations and goals for the partnership. As teacher-educators, we came in with our agenda for strengthening placements for our preservice teachers. Teachers came in wondering what they were going to get out of the relationship. Our goal was to have each teacher think of her/himself as a teacher-educator. We hoped to empower them to understand their strengths as teachers and to articulate their tacit pedagogical knowledge (Elbaz, 1991) through writing vignettes of effective practice. Each vignette described something special in their teaching from which preservice teachers might learn. Teachers came away from the retreat with a clearer idea of their roles as teacher-educators. They began sharing perspectives openly as individual barriers began to break down. Through the process of listening and building dialogue, teachers felt, some for the first time, that what they had to say was valued and important.

A number of initiatives began involving individuals and groups in collaborations with the college. A project involving one K-2 grouping (family) of teachers explored in-depth involvement with preservice teachers. A research inquiry extended the placement for several preservice teachers and studied the impact of this lengthened placement from the perspective of both preservice teacher and cooperating teacher. A professor of literacy received a grant allowing seven teachers and the principal to study reading methods in depth and develop a summer reading clinic. At the same time, the school principal served on a college committee studying field-based practice and helped make recommendations for the development of Professional Development Schools. We furthered our relationship with the principal by inviting her to attend a workshop in Washington D.C. focused on National Board Certification collaborations. During that weekend away, we were able to collaborate with the principal to write a grant to NCATE to field test the new PDS Standards in her school. Being away from school and college provided us the opportunity to develop a personal relationship based on shared experiences together.

These activities and shared expectations reflect the pre-threshold stage as defined in the NCATE Draft Standards (NCATE, 1997). Relationships had been created and care was exhibited among the participants. Through dialogue, multiple

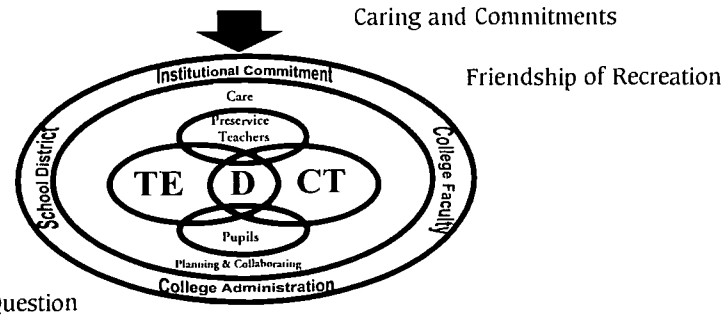
opportunities were created for listening to the concerns of each other. A relationship of care and mutual commitment focused on understanding each other's individual concerns.

Stage II: Creating Learning Community

Institutional supports and an ethic of caring laid the foundation for the movement from partnership to PDS that occurred in stage II (see Figure 2). A learning community is built as teachers collaborate on ideas and daily conversation turns into dialogue between individuals and collective inquiries. The basis of a learning community is an inquiry-oriented approach based on asking questions about student learning of elementary school pupils and preservice teachers (Levine, 1998; NCATE, 1997). Within a learning community, learners share their new knowledge through public teaching and dialogue about their teaching. Dialogue and public teaching involve both cooperating teacher and teacher-educator in planning and collaborating around the learning of preservice teachers and classroom pupils. This newly generated knowledge impacts the institutional structures, allowing for broader dissemination.

Institutional commitment comes with the support of the principal, the school district administration, college administration, and the broader school and college faculty. As defined by the Draft PDS Standards (NCATE, 1997), the threshold stage focuses mainly on the institutional commitments that support the development of the PDS. An organizational structure was necessary to provide the support and resources to move our collaborative efforts forward. In April, we met with the School Improvement Team to present our goals for establishing a PDS site at the school. Teachers were excited about moving forward with a partnership. In May, a meeting with the district superintendent and college dean allowed us to discuss the progress in our partnership and secure the institutional supports necessary to fulfill the movement from partnership to PDS.

FIGURE 2: STAGE II, LEARNING COMMUNITY



D = Dialogue: Listen–Question

It was important to continue to involve all teachers in the school if it was to be a learning community. In creating a PDS steering committee, all grade levels, viewpoints, and interests were represented. The committee was designed to represent the concerns and interests of the teachers, giving them "an equal voice" with the teacher-educators. Through a process of brainstorming and conversation, the steering committee identified broad goals and specific objectives for the Professional Development School. The three goals established involved studying literacy

approaches, effectively utilizing technology, and developing a learning community among teachers and teacher-educators.

Other activities, such as picnics, retreats, discussions, and shared classrooms, led to the development of relationships based on Aristotle's friendship of recreation. Spending time with each other inside and outside the classroom gave us time to explore our mutual interests. In September, a Saturday picnic focused on team-building gave those involved an opportunity to share meaningful memories and feelings. We were no longer teachers and professors, no longer detached professionals, but instead, friends talking and listening to each other. The "secret society" of school culture had been opened to include college colleagues.

A visit to the PDS school revealed a welcoming atmosphere. Teachers smiled as they conversed with you while leading their class through the halls. A circle of friends in the office warmly brought visitors into their conversation. Preservice teachers stood side by side with teachers, collaboratively assisting and instructing their pupils. In so many ways, the environment reflected a feeling of care for pupils, preservice teachers, and visitors. "Democratic" and "equitable" were words that framed all the activities of the partnership. The aspect of care was an underlying force that moved our relationship forward, creating opportunities for trust between partners.

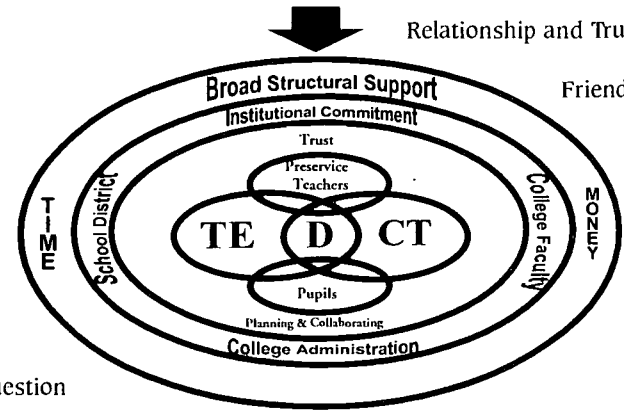
Stage III: Sustaining Reflection and Change

Trust emerges as the learning community sustains reflection and change. This movement through the stages of dialogue allowed for the development of an ethic of care among the people involved as they changed their view of the classroom and each other. The principal's comment, "Now I trust you," highlighted for us the changes that were occurring. People were responding ethically as they supported each other, moving to the level of friendship characterized by mutual admiration. This involved respecting the decisions made by each other, based on the trust generated by really knowing each other. We had become a community that respected and listened to each other. Trust led those involved to operate with the other's concern in mind, to see the other's viewpoint. Stakeholders gained confidence in each other's decisions. The principal opened up as a learner and saw the college as a vital part of the school.

Stage three reflected the maturing of the PDS as the effort took on a life of its own, characterized by its own goals and initiatives (see Figure 3). In the movement from individual projects to the broad PDS goals, the focus included building on existing relationships, connecting individual inquiries to broad PDS goals, and collaborating to bring all faculty into the PDS efforts. We saw, in the study of literacy, study groups piloting different approaches to literacy and sharing their findings with the whole group. As stakeholders worked to utilize technology initiatives through the support of the PDS relationship, major leaps in technology occurred in the elementary school. Several teachers had already participated in state technology training, but the lack of technology access did not allow them to make use of their new knowledge. Through the efforts of the PDS steering committee, the school was empowered to break out of the limiting constraints from the district office. They began to educate district-level administrators to the importance of technology in an elementary school. Using the clout of PDS status, they were able to change the

thinking of the higher administrators and connect all classrooms to the Internet. This then created a "need to know" from the teachers as their interest in technology was piqued. Indepth state training was provided to all teachers which encouraged the school to move forward rapidly to take control of their technology, using the PDS partnership as a resource in their quest to improve the school.

FIGURE 3: STAGE III, SUSTAINING REFLECTION AND CHANGE



D = Dialogue: Listen–Question

To sustain this stage, dialogue and collaboration around ideas and interests provided opportunities for trust to be maintained. This still requires institutional commitments but also requires broad structural supports. Broad structural support could include time, money, and/or structures that encourage participants to move beyond the everyday and embrace other forms of professional development. The steering committee focused on how to recognize teachers for their work with the PDS. Several ideas were presented to the college, including a Teacher-in-Residence. The college has moved ahead to create a Teacher-in-Residence position jointly supported by the school district and college administration. This Teacher-in-Residence team teaches courses at the college, supervises preservice teachers, and helps coordinate PDS efforts. The teacher is a curriculum broker for the role of the classroom teacher in a teacher education program, helping college faculty and administrators understand the realities of day-to-day practice. The teacher also brokers the role of the college in the PDS, helping classroom teachers and administrators understand and appreciate the concerns of higher education in educating future teachers.

The financial impact on the college and school has been minimal through this process. The college has committed to funding the Teacher-in-Residence but is using a faculty line previously allocated. The district is paying the higher salary required of the Teacher-in-Residence while having a new teacher in the school; however, this cost is covered through state allocations. The financial commitment of the college to this process continues to evolve. Release time given to faculty to develop PDS relationships is negotiated by various faculty, although it never seems enough. Various ways to recognize the work of classroom teachers are being considered including a field-based faculty card with campus privileges. The college has supported several teachers to present with college faculty at professional meetings. These initial financial supports need to continue to promote a sense of collective action.

As a result of sustained reflection and change, the teachers developed a stronger sense of voice, evident in individual and collaborative projects. The school culture began to change toward an openness to new ideas. Teachers became proactive as learners, implementing, exploring, and experimenting with new ideas. As teacher-educators, we became much more students of teaching, listening to the voice of the teachers and their concerns in educating our students and their children. The academic achievement of the elementary school pupils became our concern too. Decision-making became informed by the friendship of goodness, where the teachers' goals became as important as our goals. The focus of our work included their success.

Discussion

The model we have created highlights issues in the ethical development of PDS relationships. Stage I focuses on initially developing the relationships upon which a structure must depend. Through listening, care and dialogue are promoted. It is a friendship of utility based on the common goals of teacher-educators and classroom teachers. Caring and commitment move the PDS relationship to stage II, the creation of a learning community. Preservice teachers and classroom pupils become a focus of the dialogue as teacher-educators and classroom teachers plan and collaborate. An institutional commitment supports and structures the relationships. The friendship of recreation develops as people spend more time with each other, becoming open to dialogue about personal and professional issues. Over time, trust grows out of these relationships, allowing the movement to stage III. Broad structural support is necessary to sustain the community that has formed. The goal is a level of trust that allows for the friendship of goodness to emerge, marked by an ethical concern for the well-being of the other. It seems friendships that emerge out of genuine concern and interest for each other are ones that are successful. When these friendships include genuine concerns of teachers they lead to opportunities for collaborative efforts between friends.

As teacher-educators, we believe these are steps necessary to establish PDS sites that can survive over time. While these stages have parallels with those outlined in the NCATE Draft PDS Standards (Levine, 1998; NCATE, 1997), they go beyond the NCATE stages in their emphasis on ethical considerations. Activities focused on collective inquiries allowed our relationships to develop. But the inquiries derived from the interests of the teachers and led to clear benefits for their pupils. Equity is necessary for caring to become the basis for further relationships. Teacher education classroom practice moved from the college to the PDS site. We needed to be in the schools physically on a regular basis. We also needed to change the nature of our discourse, as we focused more on the shared goals of elementary pupil learning as an aspect of our goals for preservice teacher education.

Through an intense focus on our preservice students, cooperating teachers, and the ongoing work of the Professional Development School, we have changed in the knowledge we are constructing to improve practice. As teacher-educators, we are deepening our understanding of the dynamics of learning to teach. In moving instruction to the school classroom, we constantly examined teaching and learning, asking about its effectiveness in reaching all pupils. This habit of inquiry and reflection became a model for teacher interns. Schools cannot be understood without

the teacher's classroom. College classrooms are not dynamic unless they are involved with children in real classrooms.

We have concluded that sustaining PDS efforts requires a strong base of ethical involvement that develops over time. Tensions can put strains on the individuals involved in these relationships. In this case, the university faculty found themselves overwhelmed by the effort to work with the school without adequate reassigned time from their existing course load. If PDS work is dependent on long-term ethical relationships, how can partners sustain their efforts when key people leave? This challenge faced us as the PDS coordinator left the state. While this might set efforts back somewhat, we assume we have reached a level of "empowered teachers" as leaders, institutional commitment, and broad structural support to uphold a continuing relationship. The tenuousness of PDS relationships must be countered with clear institutional commitments. New connections will be established based on a past pattern of ethical behavior in the college-school relationship.

Institutional commitments appear vital in sustaining the PDS relationship. Those directly involved in PDS efforts must continue to give attention to maintaining the commitment of the institutions involved. This involves educating those in positions of power within the institutions of college and school district. From the dean to the president, from the principal to the superintendent, those making institutional decisions must continually be reminded of the value of ongoing PDS efforts. PDS relationships must move beyond grant activities, personal initiatives, or institutional add-ons if they are to survive (Abdal-Haqq, 1998). Not much has been written about the institutionalization of PDSs (Teitel, 1998). Clearly, tensions might exist between relationships based on ethical behavior and those based on institutional necessity. As PDSs become a way of life, we must continue to negotiate this tension so that institutions provide support to the continuing grass-roots efforts of teacher-educators and classroom teachers in PDSs.

Conclusion

PDS communities move through stages as they develop. There is a sense of flow and movement in the development of PDS relationships that leads to optimum conditions for growth and learning. Optimum conditions involve the stakeholders constantly working and thinking together, in the process experiencing change in their views of schooling. It takes a long time. Relationships are important. Structures do not create relationships; relationships are created based on an ethic of care and friendship through dialogue about professional questions and issues. As teacher-educators collaborate in the development of PDSs, they must view PDS efforts through the lens of a classroom teacher. Until teacher-educators take an ethical stand, PDSs will not reach the potential to truly impact the lives of all learners involved. It is only in and through friendship that "we can come to know ourselves and to regard our lives constantly as worth living" (Cooper, 1980, p. 332).

The results of this study reflect the efforts of individuals with intense commitments and the support of both K-12 and higher education institutions for PDS work. This represents beginning the reinvention of higher education to create a new paradigm of learning for preservice teachers, cooperating teachers, and higher education faculty. Moving beyond "it takes an entire college to educate a teacher," we begin to understand that "it takes an entire educational community to educate a

teacher." The findings point to some meaningful insights into the ethical fiber and disposition of college faculty working in schools. Perplexing questions continue to exist, including the following:

1. How do institutions support and reward college faculty and K-12 teachers for working in schools together to achieve their goals?
2. How do colleges of education train teacher-educators to view PDS sites as a place to learn about schools and the value of developing relationships with a K-12 faculty?
3. How can we ensure that those involved in PDS relationships have a disposition toward ethical behavior?

These complex questions surface as PDS sites move beyond a view of school as a research site to observe the successful implementation of policy, programs, and procedures to become organizations that care about individuals and the school culture.

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An Integrated Approach to Gender Equity in Schools

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This article highlights the prevalence of gender inequities in education and provides suggestions for the prevention of gender bias in schools. Gender biases can be found in many subtle areas of education, including curriculum, school climate, teacher expectations, class interactions, and special education referrals. Both general recommendations and specific strategies to combat gender biases are provided in order to promote gender equity in educational settings. Ways in which administrators, teachers, teacher-educators, and continuing education workshops can address gender inequity are discussed. Other recommendations discussed include teacher self-assessment techniques, modification of environment/curriculum, and the importance of role models.

Many commentators claim that gender equity has been achieved and that gender bias no longer exists (Nelson, Aron, & Poole, 1999; Sadker, 1999). Despite these proclamations, there is conclusive evidence that gender inequity still exists throughout our society. The purpose of this article is to focus on the existence of gender inequities in a very significant institution, school. Schools are one of the few social institutions in America to which all children have access regardless of socio-economic status, ethnicity, geographical region, or gender. Furthermore, schools are one of our earliest experiences with society and social norms outside the home setting. Thus, schools appear to have the unique capacity for providing equal opportunities independent of gender, ethnicity, or socio-economic status and for modeling an environment marked by equality.

Unfortunately, the stereotypic beliefs of the dominant culture are likely to be internalized and incorporated into institutional practices (Canada & Pringle, 1995) and schools are no exception. Gender inequity in many areas and on many levels within schools is prevalent (e.g., Bhargava, Kirova-Petrova, & McNair, 1999; Evans, 1998; Marshall, Robeson, & Keefe, 1999; Walsh, Hickey, & Duffy, 1999). Teachers are frequently unaware of the gender inequities in their classrooms although their students are aware of these inequities (Guzzetti & Williams, 1996). Contributing to this lack of awareness by teachers is the fact that the majority of teacher education and staff development programs do minimal training in recognizing and eliminating gender bias (Campbell & Sanders, 1997; Sadker, 1999).

Although sexism can be overt such as sexual harassment (which 80 percent of school-aged girls have experienced, Sadker, 1999), gender bias in schools is often subtle and difficult to recognize. In fact, gender bias has been described by some educators as the "hidden bias" in education (Wellhousen, 1996). Subtle biases prevalent in schools include teachers asking males to elaborate more and calling on

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females less frequently in class, the overrepresentation of males in leadership roles in textbooks, and females having less access to computers and laboratory equipment. Many individuals would agree that overt sexism should be eliminated but would argue less forcibly about covert sexism.

So why should we care about subtle gender bias? The reality is that the effects of gender bias, whether subtle or obvious, intentional or not, are damaging to both boys and girls. This is a crucial point; boys and girls alike are discriminated against and suffer due to gender bias. Despite claims that sexism does not exist, or that if it does, it is "not a big deal," differential treatment due to one's gender has significant consequences on social, psychological, and occupational functioning. As Allensworth and Byrne (1982) stated after reviewing existing research, "if the schools adhere to and promote the cultural stereotypes of males and females, they may be condemning a female to a lifetime of occupational discrimination, social inequality, and psychological problems, and a male to disease, accidents, and premature death" (p. 418). Further, while gender biases impact both females and males in schools, the negative effects on female students are arguably more pronounced from the perspective of long-term access to financial resources and ultimately power (Glick & Fiske, 2001; Jones, Howe, & Rua, 2000). Many of the biases described in this paper potentially promote an educational culture that discourages women from pursuing leadership opportunities and roles associated with higher incomes, thus perpetuating the high percentage of women in low-status occupations and the "feminization of poverty" (Rice, 2001).

As early as infancy, adults tend to both view the personality of and interact with a baby differently according to gender (Schickendanz, Schickendanz, Forsyth, & Forsyth, 2001). Likewise, gender is commonly used by school personnel to classify and group school-aged children (for an interesting commentary on the pervasiveness of the influence of gender see Gould, 1972/1990). While a common practice by parents and school personnel, classification based upon gender has been linked to gender stereotyping (Bigler & Liben, 1992). Gender stereotypes are socially validated beliefs that certain traits, activities, items, and occupations (also referred to as gender-typed behaviors) are appropriate for one gender only. Gender stereotypes can be both positive (e.g., "girls are sweet and pretty" or "boys are strong") and negative (e.g., "boys are mean" or "girls always complain"). Endorsement and reinforcement of gender stereotyped roles has been called "benevolent sexism" and for marginalized groups (such as women and members of the nondominant majority culture) is associated with inhibiting equality (Glick & Fiske, 2001).

Individuals who are gender-stereotyped believe in gender stereotypes and behave accordingly. Gender stereotyped beliefs can negatively impact children's development in a number of ways including limiting their exposure to certain toys associated with specific skill development, the development of opposite-sex relationships, and ultimately their perception of competencies (Debacker & Nelson, 2000; Martin & Little, 1990; Rainey & Rust, 1999). When internalized by children, gender stereotyped beliefs lead girls to avoid scientific and technical subjects since they are seen as masculine, and boys to avoid reading which they perceive as feminine (Kelly & Smail, 1986; Pollack, 1998). Conformity to rigid gender roles is also linked to mental health problems for both sexes (Huselid & Cooper, 1994).

Androgynous individuals possess both masculine and feminine traits and are not gender-stereotyped. Androgyny is associated with several beneficial consequences including increased confidence, independence and a higher sense of competency in children (Alpert-Gillis & Connell, 1989); higher self-esteem and social adaptivity (Allgood-Merten & Stockard, 1991); and improved decision-making skills (Radecki & Jaccard, 1996). Androgynous individuals are also more accepting of nontraditional occupations, behaviors, and toys (Rainey & Rust, 1999). The benefits of androgyny are important since reducing gender bias in schools can increase androgyny in children (Rainey & Rust, 1999).

Similarly, adopting a more stereotypical feminine or masculine identity is associated with certain behaviors. Individuals with a more feminine identity are less likely to voice what they think or believe (Harter, Waters, & Whitesell, 1997), but they earn higher grades in a variety of academic subjects compared to children with more masculine gender identities (Burke, 1989). Adolescents who adopt a masculine ideology are associated with higher rates of problem behaviors such as drug use and school suspension (Pleck, Sonenstein, & Ku, 1993). Teachers also viewed feminine or androgynous boys as more prosocial while they perceived masculine boys as aggressive (Piche & Plante, 1991).

Although the research supports the benefits of androgyny, it is important to consider the costs of deviating from gender roles. Gender roles are more rigidly defined for boys than for girls and people react more negatively to males who adopt feminine traits (Hort, Fagot, & Leinbach, 1990; McCreary, 1994). Peers are a powerful influence and it is prudent to consider the social context that reinforces gender-typed behavior. With children, the relationship between popularity and gender is complex. Feminine boys are significantly less popular with other boys but slightly more popular with girls. Boys prefer masculine boys and masculine girls (Zucker, Wilson-Smith, Kurita, & Stern, 1995).

Recently several articles have discussed gender bias in specific areas, and these articles are excellent resources for teachers in these areas. For instance, gender equity has been discussed in the areas of early childhood education (Evans, 1998; Marshall, Robeson, & Keefe, 1999; Rainey & Rust, 1999), middle schools (Herr, 1996; Masucci, 1995; Subrahmanyan & Bozonie, 1996), science (Guzzetti & Williams, 1996; Kelly & Smail, 1986; Subrahmanyan & Bozonie, 1996), mathematics (Flessati & Jamieson, 1991; Walsh, Hickey, & Duffy, 1999), and technology (Bhargava, Kirova-Petrova, & McNair, 1999). Readers are referred to these resources for more content-specific or age-specific information. The purpose of this article is to summarize major findings of gender bias in education and provide a resource for educators to prevent gender inequities. This article is intended to be useful for teachers and school administrators of all grade levels and all subject areas.

Areas of Gender Bias

Gender inequities have been observed in several areas in the educational system. The focus of this article is on academic areas of gender bias within the school system although there are many other equally important areas (e.g., social, behavioral, psychological) that are beyond the scope of this manuscript. The primary areas of gender bias include differences in academic achievement, environmental or curricular materials, special needs (i.e., learning disabilities), and teacher-student interactions.

Academic Achievement

Substantial gender differences have been well documented in several primary academic areas. To begin, the way in which ability is assessed may impact performance outcomes. In many academic areas girls generally outperform boys where grades are concerned, whereas boys outperform girls on most standardized tests of school achievement (Crawford & Unger, 2000). Thus, women's performance on the SAT underpredicts their ability to succeed in college as measured by college grades and negatively effects their chances of gaining admission and scholarships (Leonard & Jiang, 1999; Nelson, Aron, & Poole, 1999; Stricker, Rock, & Burton, 1992; Wainer & Steinberg, 1992). Gender differences in performance have also been found based on subject. Girls have frequently been found to perform better in subjects that require verbal proficiency (Mewborn, 1999; Stevenson and Newman, 1986). Girls score higher than males in both reading and writing proficiency (Hedges & Nowell, 1995). Since reading and writing are involved in virtually all aspects of our society, these skills are vital to success. Interestingly, this bias in favor of girls is not always found; boys score higher on the verbal section of the SAT while girls score higher on the verbal section of the ACT (Sadker, 1999).

In mathematics, technology, and science, boys outperform girls. Not only do males continue to perform significantly higher than females on noteworthy standardized tests (i.e., SATs math section, science and math achievement tests), but more males are enrolled in courses in these fields and go on to be disproportionately represented in related occupations (Lee & Burkam, 1996). In fact, gender differences in attitudes towards and interest in science have been documented in elementary school children (Jones, Howe, & Rua, 2000). It is noteworthy that the gender gap in math and science has been narrowing with female enrollment in math and science courses increasing in the 1990s. In fact, currently girls are more likely than boys to take biology and chemistry courses, albeit physics is still male-dominated and boys take all three of these core science courses more frequently (Sadker, 1999). However, gender differences between science achievement appears to be larger for students at the upper end of the distribution, with women still lagging behind men in enrollment and grades earned for more advanced scientific and technical course work (Lee & Burkam, 1996). In addition, males perform better than girls on standardized entrance tests for medical school, law school, and graduate school and are more likely to receive college credit for advanced placement courses (Sadker, 1999; Sadker & Sadker, 1994).

Despite the lessening of the gap in the mathematics and sciences, a new gender gap has developed in the field of computer technology that is also perceived as a masculine field (Bhargava, Kirova-Petrova, & McNair, 1999). Specifically, boys have more computer experience when they start school, report more positive attitudes toward computers (Bhargava, Kirova-Petrova, & McNair, 1999), and report more positive attitudes about their ability in computer technological skills (Ryan, 1999). Boys also have greater access to computers, attend more computer classes, and are more likely to enroll in advanced computer science and computer design courses whereas girls are more likely to enroll in word processing and clerical courses (Bhargava, Kirova-Petrova, & McNair, 1999; Sadker, 1999). Due to the growing importance of computers and technology in society, this gap will perpetuate the gender inequities in the occupational world. Further, gender

inequities in these fields are particularly meaningful since careers in related areas tend to be accompanied by considerable power, economic benefit, and status.

Environmental/Curricular Materials

Gender bias exists in a variety of materials, including computer software and textbooks. The majority of computer software programs use males as their main characters, and males are represented in high status positions and active roles. Females are generally depicted in traditional roles (Hodes, 1995). In addition, computer software is generally more appealing to boys and is geared toward males' way of learning (Bhargava, Kirova-Petrova, & McNair, 1999). Textbooks are another common source of gender bias. For instance, science books are generally created by male authors, male consultants, male illustrators, and male photo editors. Although sexist language is frequent, the most blatant source of gender bias in science books is the illustrations (Guzzietti & Williams, 1996).

Other gender inequities within the environment have also been documented including males having more active involvement with operating computer and laboratory equipment (Guzzietti & Williams, 1996) and males having more male role models for prestigious occupations via written biographies, visual pictures, and guest speakers. Other potential environmental areas of bias include representation in student government, access to leadership roles, biased language present in written and spoken language such as daily announcements and school memos, multimedia, and visual stimuli such as posters, bulletin boards, and school team names and logos (e.g., boys' team being called the Wildcats versus the girls' team being the Kittens) (Mewborn, 1999).

Special Needs

Given the importance of early intervention for the provision of optimal and equitable learning, it is crucial that gender biases in the identification of special needs children be discussed. Historically, the research in special education has been based upon male subjects and male norms (Adelman & Vogel, 1995). Furthermore, gender bias exists in referrals for special education services. Teachers are on the front line for identifying children that may need special education services. Typically, teachers are part of a student support team in which they work with the school psychologist, school administrators, and other school personnel to identify students who appear to be having academic difficulties. In a study of teacher identification of special needs children, Green (1993) found that teachers tended to provide more details about boys. In addition, externalizing behaviors tended to receive the greatest attention. Because boys were more likely to demonstrate externalizing behaviors, such as aggressive behavior and overactivity, they were more likely to receive extra support. Girls tended to have learning difficulties that were not accompanied by externalizing behaviors and consequently were less likely to be identified as needing extra support. Overall, Green's (1993) finding that boys are more likely to be identified as needing extra support is consistent with the special education literature.

In the field of learning disabilities, research reveals a significant discrepancy between prevalence rates of school-identified (identified by school personnel)

versus research-identified (identified during a research study as part of a random sample of participants) with reading disabilities (Shaywitz, Shaywitz, Fletcher, & Escobar, 1990). However, no significant discrepancies are found between research-identified and school-identified boys with reading disabilities (Shaywitz et al., 1990). In fact, while boys are more likely to be referred for educational support in developing reading skills, girls are actually just as likely as boys to experience difficulties learning to read (U.S. Department of Education, 1991; Shaywitz, Fletcher, & Shaywitz, 1996; Shaywitz et al., 1990). Thus, girls with reading difficulties are more likely than boys to "fall through the cracks" with lifelong consequences of academic difficulties. The outcomes for undiagnosed learning disabilities are quite dismal. Low literacy skills are associated with teen pregnancy, unemployment, and school failure (Adelman & Vogel, 1995; Giovengo, Young, & Moore, 1997).

While it might be argued that boys are actually being over-identified for disabilities when, in fact, none exist, this is unlikely. The Individuals with Disabilities Education Act or IDEA (U.S. Department of Education, 1998) stipulates an extensive multifactor and multidisciplinary assessment process by which students found eligible for special education services through the Learning Disabilities Program must score significantly below average (generally two standard deviations below the mean) on at least one standardized achievement test in addition to having demonstrated a pattern of poor academic performance in the classroom. Thus, boys receiving special education through a Learning Disabilities Program must document below average academic skills across time, across settings, and do so both in the classroom as well as on standardized academic instruments. Overall, both males and females receiving special education services through the Learning Disabilities Program demonstrate a clear need for academic assistance. However, females experiencing academic difficulties are less likely to receive such services.

Teacher-Student Interaction

There is conclusive evidence that teachers interact differently with their male and female students. Teachers speak to boys more and give them more praise and encouragement (American Association of University Women, 1992; Hansen, Walker, & Flom, 1995; Sadker & Sadker, 1994; Sadker, Sadker, & Stulberg, 1993). Teachers also hold higher expectations for boys, challenge them more with higher-order questions, elaborate more on their responses, and give them more critical and constructive feedback (Becker, 1981; Jones & Wheatley, 1990; Sadker & Sadker, 1985). Male students tend to be more demanding of their teachers' attention and they receive more time and attention, including more negative attention when they have demonstrated poor conduct (Eccles & Blumenfeld, 1985). Further, boys tend to verbally dominate class in a variety of domains including whole-class discussions, small-group activities, and small-group discussions (Guzzetti & Williams, 1996).

Recommendations and Conclusions

Efforts to prevent gender bias in education must be made by school personnel at many different levels and for every age group of students. The following recommendations provide both broad areas along with more specific strategies to consider in order to ensure a gender equitable learning environment.

Awareness

Educators and school administrators must be made aware of the fact that gender bias continues to pervade education and negatively impact many students, both male and female. Awareness of this problem is essential because gender biases are often quite subtle. However, while teachers may not realize that they are engaging in gender-biased behaviors, students (particularly female students) are more likely to be aware of these biases (Guzzetti & Williams, 1996). Although school personnel are not intentionally behaving in ways that promote gender inequity, they may be creating an environment where gender biases flourish. School personnel must be educated as to biases inherent in daily activities and materials including curriculum, school environment, teacher-student interactions, and identification of at-risk students in need of support.

Furthermore, the far-reaching consequences of failing to remove gender biases from educational settings should be emphasized. This may be done through teaching training programs, staff development, and continuing education workshops. School administrators must be made aware of the need for this training and should receive specific training themselves in what gender-biased behaviors they should look for as they evaluate teachers. Further, administrators must make a commitment to providing a clear message of acknowledging the existence of gender biases and the importance of preventing gender biases in their schools. By providing time and funding to attend workshops, materials about gender bias, time at faculty meetings to discuss issues relating to gender bias that may be present in the school, and feedback of teacher performance related to gender bias in the classroom, administrators can deliver such a message to all school personnel.

Self-Assessment

Teachers and other school personnel should engage in periodic self-assessment activities to aid in the identification of gender bias that may be unknowingly promoted. In fact, research has found that individuals who are gender stereotyped themselves are more likely to reinforce gender stereotyped behaviors of others (Kelly & Smail, 1986). Self-assessment activities are useful to heighten awareness of gender biases and provide a tool for ongoing self-monitoring that can be used to target specific areas for intervention. Examples of self-awareness assessment tools are the Bem Sex-Role Inventory (1981), which assesses the rater's conformity to traditional gender stereotypes, and the Sex-Role Egalitarianism Scale (King & King, 1997), which measures attitudes toward the equality of men and women across several domains including educational and employment roles. Other measures that assess endorsement of sexist attitudes, such as the Ambivalent Sexism Inventory (Glick & Fiske, 1996), the Neosexism Scale (Tougas, Brown, Beaton, & Joly, 1995), and the Old-Fashioned and Modern Sexism Scale (Swim, Aikin, Hall, & Hunter, 1995) would be useful as well.

Other tools have been developed specifically for teachers to monitor gender biases in daily classroom practices. Tracy and Lane (1999) describe two tools that were found to be useful in teacher training programs. The Gender Equity Observation Form (GEOF) allows teachers to self-monitor gender biases in daily classroom interactions. After videotaping a class lesson, the GEOF guides a teacher through an analysis of gender-equitable teaching behaviors including use of acceptance,

praise, questions to prompt higher level thinking, criticism, wait time before calling on students, and proximity. The GEOF provides a grid for tallying these behaviors for both male and female students in the class. In addition, the Survey of Gender Equitable Teaching Strategies (SGETS) evaluates awareness of teaching strategies that promote gender equity. Both instruments are provided in the Tracy and Lane article. Another tool designed for teacher self-assessment of gender bias can be found in the manual of gender-equity strategies for educators (Wheeler, 1993).

School Climate and Curriculum

School climate and choice of curriculum must be carefully evaluated to prevent gender bias. School personnel and students should be expected to avoid sexist remarks and jokes. Sexual harassment policies should be made very clear and enforced. Nonsexist language should be used in school memos and during announcements, lectures, and presentations. Textbooks should be chosen that depict men and women in a variety of leadership and employment behaviors, rather than stereotypic gender roles. Literature available in the library should include a noteworthy collection of women and minority authors. A variety of books at all reading levels should include characters engaged in non-stereotypic gender roles. Students should have equal access to materials such as lab equipment, reference material, and computers. Helpful strategies to ensure equal time for use of these resources include using a timer and then rotating to another activity or asking students to keep a log documenting that they spent a certain amount of time engaged in several different activities.

Videos and other media presented in school should portray both men and women involved in a variety of roles. For instance, a video demonstrating safety procedures should include both women and men as police, narrators, and demonstrators of safety techniques. In addition, bulletin boards should celebrate accomplishments of both men and women in various domains. School publications, such as yearbooks and literary magazines, should reflect all students in the school. Likewise, an effort should be made to include equivalent numbers of male and female students as staff for school publications. Efforts should also be made to encourage males and females to both consider leadership roles in student council and other school leadership positions. Female students should be represented on such committees in capacities other than as secretary of the organization. School resources and time should be equitable in supporting both male and female sporting activities. For instance, rather than having a pep rally devoted to cheering on the football team, a pep rally could be used to support several different sporting teams that are active at that particular time of the year.

Role Models

Special events, such as Career Day, should include women and men involved in nonstereotypic jobs (i.e., male nurse, woman fire fighter) and women in positions of leadership (i.e., woman executive, city council member). In order to increase girls' perceptions of career options, it is particularly important that they are exposed to more women who are successful in their careers and those women who have successfully combined a career and family (Wheelahan & Knowles, 1993).

Mentorship programs should include men and women mentors who hold androgynous attitudes, especially in education, life roles, and careers, and display non-gender-stereotyped behaviors. Mentors should be educated on gender inequities and ways in which they may inadvertently reinforce gender stereotypes, and all mentors should be committed to ending gender discrimination.

Clearly, teachers are also role models and an influential source for learning gender role expectations (Davies, 1989). Therefore, teachers must have and articulate expectations for student achievement and behavior that are not influenced by student gender, and they need to explicitly display gender equitable behaviors and attitudes. For example, teachers should avoid labeling activities, toys, classes, or subject matter as more appropriate for a specific gender (e.g., dolls for girls or math for boys) and encourage non-stereotyped behaviors from both genders. One great way to accomplish this is to offset the scarcity of male teachers by encouraging males to pursue teaching degrees for all ages and hiring egalitarian male teachers. This is particularly true for primary grades where male teachers are a rarity. In addition, teachers should teach in less gender-stereotyped areas, for example, have women teach math and science and men teach literature and art (Pollack, 1998). Furthermore, it is essential that leadership roles be available for women educators to provide models of competent women leaders in schools. Schools are bastions of traditional gender-stereotyped employment roles with women predominately serving as teachers and men as higher level school administrators.

Classroom Interactions

Classroom interactions must be continuously monitored to ensure equal time for boys and girls to ask questions and respond to teacher-posed questions. Mewborn (1999) suggests strategies that are useful in facilitating equitable class interactions. For instance, Mewborn notes that even when students are required to raise their hands before asking questions, boys still tend to dominate the class discussions. She describes a strategy to combat this problem that involves distributing a number of chips to students at the beginning of class and requiring that each student end the class with no chips. Students turn in a chip each time they wish to speak. This strategy may increase equity in classroom interactions by encouraging girls to participate actively, giving those who may feel intimidated by speaking in class the opportunity to do so, and requiring that those who tend to dominate class discussions carefully consider which points they wish to make during the course of the class period. Mewborn also suggests that teachers utilize "wait time" during class discussions. She defines wait time as "... the time between when a teacher asks a question and when a student is called on to answer the question" (p. 110). This strategy helps give girls, who typically take longer to respond than do boys, a chance to respond to teacher questions. Additionally, Mewborn notes that asking students to first write down any questions they may have helps promote thoughtful participation by everyone.

During class and individual interactions, teachers should also be aware of the messages they may be inadvertently sending via verbal and nonverbal cues. Lafrance (1991) argues that females are discouraged from talking by behaviors including delayed feedback, withholding of active listening skills (such as requests for elaboration or encouraging nods), gaze aversion, and interruptions. Although

these subtle behaviors were described as unintentional behaviors that promoted the social conventions that females should be good listeners and not talkative, these behaviors would discourage both females and males from verbal participation. Teachers need to directly communicate that all tasks and academic domains are appropriate for both genders since perceptions of the gender-appropriateness appear to influence motivation to learn (Greene, DeBacker, Ravindran, & Krows, 1999). Children should also be reinforced when they engage in non-gender-typed behaviors, such as nurturing behaviors for boys and assertiveness for girls. In addition, teachers need to actively intervene to stop gender stereotyping. For instance, if a teacher overhears another student saying "girls aren't any good at math" the teacher should tell the student (and whoever is in the group) that "girls and boys are equally as good at math." Oftentimes, silence is seen as agreement.

Nonbiased Play

Facilitation of nonbiased play is another valuable strategy for preventing gender bias. Play is a fundamental childhood activity that reflects cognitive development and contributes to the development of cognitive skills. Furthermore, play can be a vehicle for the prevention of gender bias. By two years of age, children begin to engage in dramatic play with increasingly elaborate stories in which events and materials are combined in novel and more complex ways (Linder, 1990). Evans (1998), in her review of strategies for early childhood, provides several recommendations for promoting nonbiased play. For instance, dramatic play areas should include a fair balance of male and female dolls with accessories for both genders, housekeeping areas should include a variety of tools and spaces for play, and dress up clothes should be such that they could be used by either boys or girls. Toys that are clearly sexist and perpetuate stereotypes (e.g., "Teen Talk Barbie" who says "Math is tough," Turkel, 1998) should not be used. In addition, teachers could require that each child spend a certain amount of time in each play area to ensure that girls have access to activities such as blocks and computers, and boys to dramatic play areas such as the housekeeping center and dolls.

Marshall, Robeson, and Keefe (1999) also provide recommendations for promoting nonbiased play and remind teachers that they have the power to influence how children play. Teachers are also reminded to be careful that they do not encourage play with gender stereotypic toys by providing differential treatment. In addition, Marshall, Robeson, and Keefe (1999) review the research on teacher expectations according to student gender and note that teachers often have different expectations of girls and boys during play. Girls are often expected to be quieter and sociable, while boys more aggressive and exploratory. Teachers are urged to be wary of such biases and to prepare their children "...for a more gender-equitable future" (p. 11).

Conclusion

The issue of gender inequality in schools is a hot topic for researchers and the popular media. Several popular press books have been published recently discussing the ways in which schools are failing to meet the needs of both boys and girls (e.g., Pollack, 1998; Sadker & Sadker, 1994). Although the claims of these books need verification since they are based on personal observations, anecdotal evidence,

and informal interviews rather than empirical research (Harter, Waters, & Whitesell, 1997), their popularity gives testimony to the magnitude of the issue. Despite the fact that these authors disagree on whether girls or boys suffer more, the idea that gender inequity is prevalent in our academic system is not disputed. Moreover, scholars point out that gender bias is far-reaching in our society, as seen within media, peer relationships, romantic relationships, violence, work environments, and schools. The consequences of this gender discrimination are profound, impacting vocational achievement, social relationships, mental health, and even physical health. Boys and girls are treated differently from birth by the majority of the people with whom they interact, and although focusing on experiences in the school will not solve the problem of gender inequity, it is a noble start.

Instruction and activities aimed at preventing gender stereotypes should begin with preschool-age children and continue throughout higher education. Early intervention for preventing gender bias is not only cost effective, which is especially significant in education settings where resources are often limited, but also likely to provide more stable and far-reaching effects in comparison to later interventions (Barnett, Bell, & Carey, 1999). However, strategies to prevent and eliminate gender bias are crucial for individuals of all ages. Furthermore, due to the pervasiveness of gender stereotypes in our society, it is necessary to continually challenge gender stereotypes and provide consistent reinforcement for non-gender typed behavior. Self-awareness on the part of teachers and administrators is the first step towards achieving a more equitable school environment. However, self-awareness alone may not be sufficient to identify the insidious gender biases that exist in American schools. Differential teacher-student interaction styles by gender, overrepresentation of males in certain science classes, less access by females to technology and laboratory equipment in classrooms, and under-identification of females with academic difficulties in need of special education services are a few of the subtle biases that continue to prevent gender equity in our schools. Gender biases unquestionably lead to less than optimal outcomes for our children. With appropriate training, feedback, supervision, and support, educators can provide an equitable learning environment to serve as a model for all social institutions. Although deeply ingrained in the fabric of our society and our schools, these biases can be identified and in time perhaps eliminated.

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Interdisciplinary Curriculum as Complementary Practice: A Philosophical Perspective

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Despite increased interest in interdisciplinary curricula in recent years, many teachers feel reluctant to become involved in courses that cluster two or more subjects together under a common rubric, seeing interdisciplinary combinations as having no disciplinary bearing on the subject(s) they teach. However, through mutual investigations of disciplinary methods and a complementary exchange of these among participating disciplines, teachers have the opportunity to try out another discipline's methods and to explore firsthand how this might add to their own discipline's knowledge and pedagogy.

Teachers often find themselves confronted by shifting pedagogic infrastructures as current trends move curriculum away from traditional single-disciplinary models toward interdisciplinary units of instruction. Many teachers eye this interdisciplinary shift with caution, even suspicion, feeling they have to take a stance in what amounts to an either/or relationship: Either they abandon their discipline for a totally interdisciplinary approach, or they cling to their discipline, "feeling highly territorial about their subjects" and "threatened as new [interdisciplinary] views of their subject are promoted" (Jacobs, 1989, p. 2). Since teachers' identities (as well as their contracts) are strongly invested in the subjects they teach, it is understandable that teachers want to guard their disciplinary turf. Of a potential interdisciplinary experience, they ask, as does Roth (2000), "Does one discipline become subservient to another—or to a 'theme'—and thus get misrepresented or diminished?" (p. 113). What is needed is an approach where teachers, by engaging in interdisciplinary instruction, do not see themselves as traitors to the disciplinary cause, guilty of allowing their own discipline to become devalued in some way, but as equal collaborators who return from the interdisciplinary enterprise with valuable insights into their own disciplines and how to better teach them.

To enable teachers to see their own discipline as enhanced rather than shortchanged in the interdisciplinary encounter, I would like to suggest a complementary approach to interdisciplinary curriculum. The emphasis in this approach is on the complementary exchange of disciplinary methods, techniques, or epistemology—whatever makes the content "work." By focusing on the exchange of methods, either as a guiding philosophy for a whole curriculum, or as part of a single curricular activity, teachers show their students how knowledge tools integrate to form a "unified metadisciplinary process applicable to a broad range of topics" (Reckmeyer, 1990, p. 58). The goal is not to play down the importance of content, nor to advocate the premature dismantling of disciplines, but to show how

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disciplinary methods handle their own content areas in a way that "incorporates an appreciation of principles that are isomorphic to different aspects of the world" (p. 59). The exchange of methods occurs when a disciplinary tool is identified and passed to another disciplinary partner for application in that partner's own discipline. Complementarity is achieved when participating disciplines have the opportunity to both provide and receive epistemological tools for application, thus giving teachers not only a disciplinary investment in the interdisciplinary process, but in testing the isomorphic nature of a given tool, a pedagogic investment, too. In the process, both teachers and students learn how and why disciplines use the tools they do, but just as important, which of those tools could be effectively used elsewhere.

Let us consider how this approach would work in an English/social studies cluster at the high school level focusing on, say, mental health. In planning the English side of the cluster, the English teacher may take a content approach and collect poems and other literary pieces on the topic and discuss how mental illness as a social phenomenon is reflected in the literature of a certain genre or period. The culmination of the project (on the English side) might be a research paper based on the treatment of mental illness in a given work or collection, in a way that forges an interdisciplinary link between mental illness as a sociological problem and as a literary phenomenon within the specified genre or period. To raise thinking to the metadisciplinary level, the English teacher could add an exchange based on methods involving the examination of one of society's techniques in helping citizens with mental difficulties—psychoanalysis, for example. Here, the English teacher takes the principles and rationales of psychoanalysis—which would have already been discussed in the social studies class—and looks for an arena in her own discipline in which to test the tool. Since psychoanalysis involves the analysis of problems in accordance with a basic theory via the medium of talk for therapeutic purposes, the teacher could have students apply the theory to themselves using writing rather than talking as the medium, thus attempting an "English" application of the sociological tool of psychoanalysis. The rationale is straightforward: If psychoanalysis can help citizens feel better as a result of an analysis of their problems via talking, can students feel better in their emotional lives if they use psychoanalytical approaches to analyze their own problems via their own writing? In other words, can (psycho)analytical writing be as therapeutic as psychoanalytical talk? The undertaking is, admittedly, an exploratory one. Yet, at the higher metacognitive levels of thinking where knowledge is a candidate for reconstruction (see Applebee et al., 2000, p. 95), we should expect and welcome such explorations. Indeed, Drake (1998) affirms, "Many experts believe that there is a continuum along which progressively more and more connections are made" and notes that Burns (1995) "interprets the continuum as evolutionary" (p. 18). As teachers and students become creative users of others' disciplinary tools, they should expect their curricular experience to be largely tentative.

In the above example both instructors would have to collaborate on methods for the new application of psychoanalytical theory and agree on criteria for a successful application. Any "answers" or insights gained would have implications for both social studies and for rhetoric and writing: Indications that the psychoanalytical paradigm is effective *across* disciplines, for example, strengthens its role and its prestige *within* its discipline; similarly, any observable and/or reported improvement

in students' writing and emotional well-being via a written application of psychoanalytical theory would strongly promote the latter as a dynamic tool in rhetoric's own disciplinary arsenal.

Complementarity is achieved when the disciplines involved feel that something of disciplinary use has been gained. However, the complementarity need not be simultaneous, occurring within the same project in connection with the same epistemological tool. Social studies, for example, may not feel unduly enlightened by the English teacher's application of psychoanalytical theories to the realms of rhetoric, but may see advantage in the way writing-to-learn techniques in the shape of journals help the teacher discover what students do and don't understand regarding a different aspect of sociological material explored later. In the complementary process, the timing of the exchange is not crucial.

As suggested before, it is unnecessary to dismantle the disciplines while the process of achieving meta levels of thinking is being explored and new connections are being made. Indeed, many approaches to interdisciplinary curriculum still remain predominantly discipline based (Drake, 1998). And even Brady (2000), who advocates a non-disciplinary approach to curriculum based on a "master conceptual framework" of reality, admits "The disciplines certainly have their uses. We've created a society that can't function without highly specialized knowledge, and the disciplines provide that" (p. 5). Mathison and Freeman's (1998) findings are similar. Even though interdisciplinarity involves consciously bringing two or more disciplinary elements together, "the content, methods, process or skill sought remain bound to the primary discipline from which they come" (p. 9). However, it is exactly for the reason that disciplines are treated as foundational that we should explore how their epistemologies and methods make them so and unbind these elements from their primary discipline.

Moving such tools across disciplines within an interdisciplinary course requires new ways of thinking. At the beginning of his article, "How to Create a Literate Environment in Freshman English: Why and How," Patrick Hartwell (1987) tells a story that illustrates how an insight can emerge when traditional thought patterns are changed. The original story, Hartwell recalls, is taken from Michael Cole and Sylvia Scribner's 1974 study, *Culture and Thought*, and goes something like this. An anthropologist studying the Kpelle tribe in Liberia, West Africa, decides to test a member of the tribe, an illiterate farmer, to see how he arranges common objects. The anthropologist sets out twenty objects on a table and arranges them, quite logically in the anthropologist's mind, into four groups of five items each—fruits, vegetables, kitchen utensils, and farm implements. The anthropologist asks the farmer to group the objects in a way that would seem logical to him. The Kpelle farmer quite spontaneously rearranges the objects into ten groups of two items each, evidently using what the French psychologist Piaget would term "operational thought"—the knife (a kitchen utensil) goes with the orange (a fruit) because the knife *cuts* the orange. When the anthropologist quizzes the farmer about the logic of the arrangement, the farmer, becoming somewhat defensive, states adamantly, "This is the way a smart person would do it." "How would a dumb person do it?" asks the anthropologist. The Kpelle farmer immediately rearranges the objects back into four groups of five objects each: fruits, vegetables, kitchen utensils, and farm implements. So, Hartwell concludes, "there are smart ways of doing things and

dumb ways of doing things—even illiterate people know that" (p. 4). However, the main point for us is not that the Kpelle farmer thought he was smarter than the anthropologist; it resides in the fact that the farmer was able to see beyond the anthropologist's arrangement based on formal properties to his own arrangement based on functional ones. Indeed, the Kpelle farmer is not blind to the formal properties of the objects just because he thinks functionally; rather, he moves past the formal qualities of the objects to what can be done with them.

As I work on a college freshman syllabus combining my own discipline of (analytical) writing with mathematics, I wonder how I might adopt the Kpelle farmer's functional approach and unbind some of mathematics' epistemological tools to try out in my writing class. Since writing (across the curriculum) is accustomed to venturing out into nonreciprocal relationships, I already have a fair idea of what some of writing's disciplinary tools can offer mathematics: the explicit concept of a (nonspecialist) audience requiring reader-based writing (Price, 1989), a tried and tested journal ethic that serves simultaneously as a writing-to-learn medium and as a diagnostic tool (Nahrgang and Petersen, 1986) and a way of practicing, sharing, and refining mathematical concepts and definitions by means of instructor and peer feedback (Elliott, 1996), to name just a few.

However, for writing instructors to get something from mathematics via functional thinking is more challenging. To achieve disciplinary enhancement for writing, Kirtland and Hoh (2000) adopted a functional approach by seeing an existing complementarity between mathematics and composition in the thinking skills both disciplines share and identify these in the planning stages of curriculum design:

> Both syllabi are organized according to thinking skills or rhetorical modes, while foregrounding argumentation strategies. Many of the components of the mathematical process also involve critical thinking strategies. Defining, serializing, classifying, comparing, generalizing, analyzing, and argumentation are skills crucial to success in mathematics, but each is also a rhetorical mode that must be mastered to become an effective writer (p. 4).

Based on this epistemological complementarity, Kirtland and Hoh assign six papers, each focusing on a single rhetorical mode which both mathematics and composition explore simultaneously. When the mathematics class is exploring the role of sequencing in cryptography, for example, the writing class focuses on the rhetorical mode of serializing. Although this does not involve any exchange of methods, it paves the way for such to take place. In setting up the epistemology based on rhetorical modes, they open up possibilities for exploring differences and similarities in the way the two disciplines treat a similar process. In cryptography, for example, the specific series of steps leading to the deciphering of a code has to be discovered. If the exact sequences were predictable, there would be no secrecy (and, therefore, no point) in encoding messages. However, in a narrative text, the serializing process is different: For a start, the series of events has to be given; the formal sequence must be present for the narrative to make sense. What is often hidden is the functional aspect, the rhetorical purpose for the series. For instance, in "My Daily Dives in the Dumpster," Lars Eighner (1999) outlines the basic steps a person has to go through to be become a "dumpster diver," a scavenger living off others' discarded possessions. Although the formal process in itself is enlightening

(How does one overcome feelings of disgust and eat out of trash cans?), Eighner leaves it to the reader to figure out what the series means. The act of daytime dumpster diving may be embarrassing at first, he claims, but the disgust that the act engenders in passersby is often sufficient to force them to look the other way. It is left to the reader to realize that this public reaction effectively renders the dumpster diver socially "invisible." This contrast in the way serializing works in mathematics and in a written narrative text invites both closer inspection and a transposition of principles across disciplines. In analyzing the formal vs. functional relationship in serializing, we might ask, "Does the formal serializing process in cryptography embrace a similar strategic (invisible) role for the encryption function"? In other words, is the purpose of encryption to render someone, something, or some act invisible? Conversely, we can investigate further what happens when the serializing process in cryptography is identified and applied to narrative text. Can cryptographic serializing shed light on, and render more effective, the same process in rhetoric? Comparisons and contrasts of methods can create ideal platforms for an interdisciplinary exchange.

Functional questions along the lines of those above have strong philosophical roots. In his seminal work, *Human Understanding: The Collective Use and Evolution of Concepts*, philosopher Stephen Toulmin (1972) claims that the human activity of shaping reasoning into disciplines and professions is an integral part of what he calls rational enterprises, the systematic thinking in any given field of inquiry. Ensuing disciplines formed in this way provide a sharing ground for communal knowledge and for the communal ways that members of the discipline talk about that knowledge—what Toulmin refers to as "concept-use" (p. 134). However, it is not merely a common subject matter embodied in common concepts that gathers individuals into communal groups, but a continuity of questions which, over time, represent a kinship of knowledge. As Toulmin puts it: "The groups of men who work as atomic physicists, or cell biologists, or neuroanatomists, are linked as masters and pupils in scholastic genealogies" (p. 146). As a result, the kindred questions that a discipline asks throughout its history not only become characteristic of that discipline, but also identify the specific questions as "family":

> In this way, the problems around which successive generations of scientists focus their work form a kind of dialectical sequence; despite all the changes in their actual concepts and techniques, their problems are linked together in a continuous family tree. (p. 148)

(It should be mentioned here that although Toulmin makes specific reference to the hard sciences, his definition of "discipline" applies to all disciplines.) Toulmin seems to suggest that teachers, by asking questions that are germane to their discipline, contribute to the "scholastic genealogies" of that discipline. Moreover, as they pose questions regarding the applicability of disciplinary tools to other disciplines, teachers not only add to interdisciplinary knowledge, but also keep their own discipline's "family tree" alive and growing.

Interdisciplinary questions emerge in a variety of situations. Indeed, not all interdisciplinary links arise out of the compare/contrast situation mentioned previously. Some emerge out of a specific process or problem and invite interdisciplinary exchange afterward. Mayer and Hillman (1996), for example, describe how an opportunity to teach an alternative problem-solving technique in mathematics

presented itself when second-year algebra students at the high school level were posed the following problem:

If $xy = 3$ and $x + y = 2$, find $\frac{1}{x} + \frac{1}{y}$

The authors report:

> When they wrote their laboratory reports, many students battled through solving for a single variable and tried to substitute. Although possible, the notation became unwieldy. After reading their laboratory reports, I noticed that they had difficulty in reaching conclusions or making sense of the ugly radicals that they had generated. Consequently, I asked my students to "look at what you're being asked to find" and "can you write in another way?" (p. 431)

Once the students followed the teacher's suggestion, the authors claim, "the light bulbs came on." Expressing the question in its alternative form

$$\frac{x+y}{xy}$$

made the problem immediately solvable since the respective values of both $x + y$ and xy were given (2, 3). The teacher was then able to point out that "working backward" is an admissible problem-solving strategy in algebra, much like the one used in geometric proofs.

As I contemplate my mathematics/composition syllabus, I see how the "working backward" strategy that Mayer and Hillman employed in algebra can be applied to invention processes in writing. In essay assignments, students who concentrate on developing a highly viable thesis first and then look for specific cases to support it often get stuck when they fail to "see" their thesis in any of the specific cases they want to work with. The reason for this disjunction lies in the nature of the "top down" approach, where principles, claims, or enthymemes tend to be derived from general rather than specific experience. In practice, students with a more philosophical bent can and do produce viable, narrowly focused thesis statements in this way. Besides, for years, students had little choice in the cognitive matter since writing was taught as a linear process where students were "forced, before they begin to write, to state their thesis in a single declarative sentence" (Corbett, 1963, p. 162), and this philosophy structured class activities and class time. Unfortunately, it is a compositional commonplace that many students struggle when forced to compose within such a linear pedagogic mold. For those who can't produce a thesis statement this way, "thinking backward" offers a powerful alternative. By starting with specific cases and analyzing themes and principles from them, students are able to adopt a "bottom up" approach and arrive at a common thesis that is automatically supportable since it derives from the content of already identified cases. On an interdisciplinary level, the "thinking backward" strategy can be visited as complementary practice as soon as it emerges from any part of a course. By applying strategies across disciplines, both teachers and students come to see how strategies transcend disciplinary lines, and how complementary exchange adds to disciplinary knowledge.

We can move further towards complementarity in our interdisciplinary approach to curriculum by seeing the question-asking process as part of a larger

disciplinary paradigm. Whereas Toulmin sees the genealogy of disciplinary questions against a changing background of disciplinary procedures, philosopher of science Thomas Kuhn (1962) gives such procedures a more prominent paradigmatic role in his definition of a discipline. In the highly influential *The Structure of Scientific Revolutions*, Kuhn points out that a paradigm is a master-theory or template that has demonstrated its authoritative explanatory power within a given domain of inquiry. Although Kuhn's use of the term paradigm covers many different kinds, Masterman (1970) narrows these down to three basic categories: 1) metaphysical paradigms; 2) sociological paradigms; and 3) artifact (or construct) paradigms. This last category is important for Education since it houses manifestations of a paradigm that teachers are already familiar with: textbooks, seminal works, and educational instruments or tools. These may be physical tools (such as measuring instruments, or what Kuhn calls "paradigm procedures") or mental tools, such as the gestalt figures (duck/rabbit; old woman/young girl). Kuhn reminds us that a disciplinary paradigm not only encourages the gathering of new facts, but also controls the gathering of these facts by determining which concrete operations and measures are relevant, thus acting as a conceptual sieve, sifting out the facts that (according to the paradigm) don't belong and retaining those that do. In this way, the paradigm is seen to generate disciplinary ways of arriving at salient facts via the discipline's own "concrete operations and measures," its own way of doing things if you will.

Teachers can engage their own disciplines right here. After identifying their discipline's "conceptual sieves," teachers would be in a position to consider how their own pedagogy might change if such "sieves" were modified from within the discipline, borrowed from another discipline, or even taken away completely. The "backward thinking" just mentioned is an example of this. The more traditional and expected forward thinking acts as a sieve, sifting out everything that doesn't belong to the predictable, linear, "left-to-right" process. Consequently, mathematics students will continue to produce "ugly radicals" in the algebraic example just mentioned until they abandon the sieve that filters "backward thinking" out. And many writing students will continue to struggle with thesis statements until they change the "thesis first/support second" sieve that filters out the arguably more powerful "bottom up" approach to invention. Put another way, disciplinary paradigms may be powerful ways of seeing, but we have to ensure they don't make us blind. Conceptual sieves need to be constantly checked, and sometimes put in check.

An advantage of complementary exchange is that it can be used at all levels of the curriculum. Even at the earlier grade levels, where interdisciplinarity is likely to center on integration driven by thematic units, teachers can see opportunities for complementary exchange in the same vein as Applebee et al.'s curricular "domains for conversation," i.e., as curricular points of focus or subdomains to be applied when and where appropriate. In David McManus's thematic unit on "Communities" for his second grade students (Meinbach, Rothlein, & Fredericks, 1995), for example, the integrated lesson plan includes three kinds of communities: animal, plant, and human (p. 8). Although students are likely to focus on a description of these three communities, the teacher has certainly set them up as candidates for comparison based on the principles upon which such communities operate. Students could focus on explaining whether the workings of one community are

reflected in another. For example, McManus's lesson plan allows for an analysis of the duties of individuals in human communities. Students could be asked, as part of a group project, to explain whether animals and plants also have "duties" within their respective systems. Is an ant's duty in the colony the same as a honey bee's duty in the hive? How are the organizations different or similar? One group could role play what two minutes of a human community might look like if the group members took on the responsibilities of, and acted like, ants or bees. Time permitting, one group of students might ponder specific communities where rules are imposed by some authority in that community (e.g., prison, hospital, club). Do animal and plant communities have rules, and if so, what might they be? None of this is totally abstract thinking. McManus's reading component, for instance, ensures that students can satisfy their curiosity with the necessary information regarding all three types of community. No one cares whether at a given moment students focus more on biology than on environmental science or, in graphing results, more on math than on organizational behavior. The main point for students at this grade level is not whether they can identify which disciplines are involved in the exchange; rather, it is for them to discover how metacognitive principles of community do or don't translate across different types of community. It is the teacher's prerogative to contemplate disciplinary links and to share with colleagues how disciplinary knowledge is enhanced when taken to meta-levels, ensuring the promise of viable disciplinary investment for any teachers contemplating interdisciplinary involvement. Metadisciplinary thinking is a powerful tool for teachers and students even at the lower grade levels.

In *Human Understanding*, Toulmin reinforces this disciplinary duality of how content can be operated on by metadisciplinary thinking—knowledge plus the methods that have produced the knowledge—in the context of the *transmit*, what it is that one generation of disciplinary practitioners passes on to the next generation of "apprentices." Although Toulmin's concept of the *transmit* is almost three decades old, it homes in on a perennial theme in the interdisciplinary literature, namely on what it is of value that teachers will pass on to the next generation that will enable students—society's apprentices—to handle not only the explosion of knowledge that is proliferating at a phenomenal rate (Tchudi, 1991), but also the emergence of new disciplines, e.g., Environment, that require new mental maps (Brady, 2000). Of this vital transfer of knowledge Toulmin states:

> In that apprenticeship, the core of the transmit—the primary thing to be learned, tested, put to work, criticized, and changed—is the repertory of intellectual techniques, procedures, skills, and methods of representation, which are employed in "giving explanations" of events and phenomena within the scope of the science concerned. (p. 159)

Like Kuhn, Toulmin emphasizes that disciplinary packages are more than just the sum total of disciplinary facts; they comprise the instrumental genealogy of how those facts were added to the disciplinary family tree in the first place. By exploring the application of disciplinary instruments across partner disciplines, teachers not only provide themselves the opportunity to add to the growth of their own discipline, but also demonstrate to their "apprentices" in specific ways how knowledge per se is constructed. If the new mental maps that Brady calls for are to be developed and

the essential "intellectual techniques" that Toulmin calls for are to be passed on, they will both have to emerge from this teacher-assisted interaction between disciplinary knowledge and the epistemological tools that produce it.

Finally, a word about interdisciplinary alliances. Even a cursory historical glance at the use of disciplinary tools in interdisciplinary or integrated curriculum shows that disciplinary roles change. The math role in thematic units at the lower grades (Meinbach, Rothlein, & Fredericks, 1995), for example, is an instrumental one, and happily so, lending its techniques willingly to the "Environment" theme to "calculate rain forest areas, graph [the] spread of ozone depletion, chart extinction rates and time zones, and [weigh] garbage" (p. 12). However, at the high school level, Siskin (2000) reports that math teachers balk at this same instrumental role, hesitating at the prospect of being subservient to the "interdisciplinary imperialism" of science, "not surprisingly, less enthusiastic about seeing their subject viewed as providing the calculating and graphing tools for the other people's content" (p. 183). In this regard, a complementary approach to the handling of (inter)disciplinary tools will do much to demonstrate the self-worth of all disciplines as we admit that an instrumental role (e.g., Math for the Environment, Math for Computing Science Data, Writing Across the Curriculum) is just one of several roles that disciplines will end up playing as epistemological tools are shared. And let us not forget that those disciplines falling outside of the English, math, science, and social studies core may need extra time to situate themselves in the complementary exchange process. Art and music teachers should take their rightful place in interdisciplinary curriculum as they discover how their disciplinary tool of creativity actually works in time, sound, and space and how their findings can be applied to other disciplines. And who is to say that the vocational studies teacher may not ultimately be the one to come up trumps as she discovers areas where academic tools may be too blunt to be used in the demanding world of work and offers vital suggestions for tool sharpening? The final outcomes of interdisciplinary curriculum are not foreseeable, but many students are counting on us to teach them ways of handling complexity in addition to calculus, decision making in addition to dance, barriers in addition to band, worship in addition to weather. We may not arrive at a perfect mental map, but we have to at least try. Besides, I have a feeling that the Kpelle farmer is watching us.

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Book Reviews

Pipher, M. (1994). *Reviving Ophelia*. Chicago, IL: Ballantine Books.

Dr. Mary Pipher, a clinical psychologist who has treated adolescent girls for over twenty years, wrote this book as a means of helping parents, educators, and others who work with teenage girls. In this book she provides insight as to why adolescent girls act and feel the way that they do by discussing how culture, family, and school influence a girl's life.

The first topic discussed in the book is a girl's relationship with her mother. This book provides insight for mothers who want to gain an understanding of the important impact they have on their adolescent daughters. Pipher states that part of the reason mothers and daughters often do not get along is because mothers do not understand the world that their daughters live in. Girls often reject the help of their mother as a means of showing their independence. Daughters want to be their own person, but they need their mother's love and guidance without feeling that their mother is trying to control their life.

The second topic discussed is the father's role in his daughter's life. Pipher states that in society today, not only are men expected to financially provide for the family, but they must be emotionally involved as well. While most girls have a stronger bond with their mothers, they have varied relationships with their fathers. Pipher claims that fathers cause harm to their daughters if they engage in sexist remarks and lookism (a belief that success and popularity depend on one's looks). It is important for a young girl to observe men who model strong male-female relationships and who respect women in a variety of roles that are equal to men. Pipher stresses the importance for men to teach their daughters that it is okay to be smart, independent, and assertive.

Besides discussing an adolescent girl's relationship with her parents, Pipher also addresses a variety of issues that can impact a young girl's life. The first of these is divorce. Pipher states that, while in some cases divorce may be the best option, it often tears a girl between her two parents. Many adolescents are torn between choosing which parent to live with and often fear hurting the parent they do not choose. A divorce may result in several life changes including relocation, new friends, and possibly a step family later on. Children often forget that their parents are not perfect and that they have lives of their own. Adolescents are often unforgiving of the anguish they experience because of the divorce. Pipher offers insight on how families can deal with divorce as well as how parents can assure their child of their love.

Another influence on adolescent girls is the consumption of drugs and alcohol. Drug and alcohol abuse are often caused by a desire to fit in and do what others do. Pipher declares that for teenage girls there are three basic motives for chemical use. The first motive is to increase insight or awareness. The second is for thrill seeking or new experiences. The third is often a coping strategy for teenage girls who are confused, depressed, or anxious.

Sex and violence are also discussed. Girls face the pressures of not only defining their own sexuality, but also of the danger of being sexually assaulted. Pipher states that culture is divided over sexuality. Girls are often taught to value

themselves for the person they are, while the media tells them to utilize their body. Girls are taught that sex can be dangerous while movies and television make it look exciting and fun. Adolescent girls are torn between which to believe. Often girls rely on sex to fulfill their needs for attention and affection that they may not receive at home.

Violence can be traumatic in a young girl's life. Rape can devastate a female, leaving her feeling dirty, depressed, and guilty. The most traumatic assaults are by a family member. Girls experience many symptoms after being sexually assaulted. At first they are shocked and in denial. Later, they encounter self-blame and anger for not fighting back. Many adolescents are worried that telling an adult about a rape will cause the adult to look down on them or view them differently.

To find and save a young girl's self requires strong, loving parents as well as the ability for her to decipher the contradictions between what the media portrays and reality. Pipher successfully helps those who want to understand adolescent girls and why they often act the way they do. Her insight on how culture has changed allows the reader to empathize with the pain that many female adolescents experience as they journey through life.

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Krakauer, J. (1996). *Into the Wild*. New York: Anchor Books.

This book is a true story about a young man named Christopher Joseph McCandless who abandoned the restraints and conveniences of modern America by going into the Alaska wilderness alone, where he spent four months before the rugged wild took his life. Krakauer originally wrote an article about McCandless' death for *Outside* magazine, but was so intrigued that he did more research and eventually wrote an entire book about the story.

This thought-provoking book is based on the journals Chris McCandless kept, the first-person accounts of his family and people he met along the way, and the author's own personal anecdotes. According to Krakauer, this is not only the story of one young man, but also addresses larger issues like "... the allure high-risk activities hold for young men of a certain mind, and the complicated, highly charged bond that exists between fathers and sons." Those who love nature, adventure, or dangerous sports, or who have contemplated making their own exit from the bustle of society might find McCandless's life hauntingly similar to their own innermost desires.

Jon Krakauer is, undeniably, a great writer, and his expertise in mountaineering makes him qualified to write this book. Krakauer has also written *Eiger Dreams: Ventures Among Men and Mountains* and *Into Thin Air: A Personal Account of the Mt. Everest Disaster*. His *Outside* article on Chris McCandless was a finalist for a National Magazine Award. His works are powerful because of the personal experience he brings to them. Krakauer has "been there and done that." Because he shares similar passions as the outdoor enthusiasts he writes about, he brings a very insightful perspective when looking at their lives. However, it is not just his outdoor experience that makes his writing unique, it is his highly analytical view of the situation that makes this book so interesting. While many have written Chris McCandless off as a "nut case" or a naive and foolish kid who underestimated the backcountry, Krakauer looked deeper. He strove to understand McCandless by analyzing his personality, his family relationships, and his attitudes about life.

At first glance, one might question the relevance of this book to adolescent issues. However, thanks to Krakauer's thorough research and detailed analysis, this book is definitely relevant. The main purpose of this book is to shed light on why a well-educated, upper-middle class kid would choose to take an extreme risk that ultimately cost him his life. McCandless's life was not all that different from many American youth, but Chris had some serious issues. He had a very rocky relationship with his parents, especially his father. Although not perfect, by most standards McCandless's parents were loving and supportive. However, McCandless could not forgive their faults. When he found out that his father had left his former wife and family for Chris's mother, he seemed sickened by his father's immorality. McCandless formed close relationships with several people in his days on the road. As Krakauer points out, many of these people were less than your model citizen, but McCandless was always able to forgive these imperfections and see the good in the person. Why was he unable to do the same for the people who loved and raised him?

McCandless was an idealistic person with tenacious grit for sticking to his beliefs. These are characteristics our society usually admires. Krakauer argues that if McCandless had made it out alive, which he almost did, some might have

considered him a hero. But that is not what happened. Instead, after sixteen weeks of success in the wild Alaskan backcountry, McCandless made a simple mistake that probably led to his demise. One of the reasons Krakauer wrote this book was to counter criticism of McCandless he received after his article was published in *Outside*. Krakauer's goal is to show that McCandless was not a foolish, unprepared kid who was naive about the harshness of the Alaskan backcountry. Instead, Krakauer suggests that McCandless was a dreamer who practiced what he preached until he made an understandable mistake that could have happened to anyone. While the author admits McCandless took some enormous risks, he believes that the young man was not crazy or foolish.

Even though Krakauer does not condemn McCandless for his decision to brave the Alaskan backcountry, he does make a point of emphasizing the effects his choice had on those who loved him. Interviews with Chris McCandless's mother, father, and sister help the reader to understand the pain he caused them. In this way, Krakauer presents the family as a system that is necessarily intertwined. Carine McCandless, Chris's sister, shares her fond memories of her brother with the author and also the depression she has faced since his death. Carine tells Krakauer that she still "can't seem to get through a day without crying." Despite Krakauer's understanding for McCandless's actions, after spending time with Billie, McCandless's grieving mother, he says, "even the most eloquent apologia for high-risk activities ring fatuous and hollow." Krakauer admits that he is not an impartial biographer. McCandless's story touched him too deeply to render a dispassionate account of the tragedy. However, he does an excellent job of seeing the big picture and presenting all sides of this saddening story.

This is an excellent read. This book would be especially relevant for young men who are drawn to high-risk activities or who have a rocky father-son relationship. This book would be most important for their parents or other adults trying to understand these young men. Although this is in no way a self-help book or an instruction manual on dealing with a rebellious son, it might give parents insight into the mindset of their child and help them to understand where he is coming from.

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Pelzer, D. (1995). *A child called it: One child's courage to survive.* Deerfield Beach, Fla.: Health Communications.

Anyone who plays a role in the lives of children should consider investing $10 or a trip to the library, to read Pelzer's first-person account of child abuse. Those who are child-abuse victims may also be encouraged to know that the human spirit is strong and can survive. This book is not recommended to the weak-stomached, however, or younger audiences, due to its graphically detailed accounts of child abuse. It is also not for those who are too jaded or cynical. For those willing to fight for the rights of children, read on.

The book introduces the reader to young Dave, the son of a psychotic and sadistic alcoholic mother. Years of emotional and physical abuse were suffered prior to his rescue, which Pelzer expounds upon in great detail. Recollections are drawn to brighter days and happier times, before the alcohol, before the abuse. The majority of the book, however, focuses on Pelzers' adolescence, retelling the misery he faced all day, everyday. Story after story of intentional and extreme negligence, isolation, starvation, and poisoning fill the pages.

Although the focus of the book is on Dave and his mother, other important relationships are explored briefly, such as those with his father, brothers, teachers, and neighbors. These secondary relationships are significant when considering their respective roles in explaining the focal point more precisely. Pelzer's account is simply written, perhaps a polite way to suggest it lacks style and eloquence and exhibits occasional rambling and verbosity. Readers can expect a dramatic and sensational testimony. It could be perceived as melodramatic by some, and they would not be inaccurate. As a personal narrative, the book lacks objective authority in the matter of child abuse. For example, the Pelzer case claims to be the third worst case of child abuse in the history of California. Such a statement lacks face validity, due to the hundreds of children who die at the hands of their parents or guardians every year. However, one could reasonably say that it is *one* of the most horrific accounts of child abuse most people will ever hear.

The book as a whole could be improved by including testimonies from Dave's siblings and father to counteract some of the first-person bias. The first in a series of three books, *A Child Called It* leaves many questions unanswered, such as the fate of the wicked mother and Dave's relationships with his brothers after he was removed from the home by authorities. This forces the reader to either continue reading the second two books or dismiss their curiosity. It is presumptuous to think that people are interested in reading *three* books to learn about the earlier years of Pelzer's life, which could have been captured in one standard length book, rather than three 150-page books.

Dave Pelzer, an adult now, is not considered an academic expert in the field of family violence, nor does he claim to be. Yet he is perhaps more qualified than any professional on the topic because he has survived the injuries, the emotional wounds, and the social stigmas of child abuse. Living through such an ordeal entitles a man to tell his story to whoever will listen, especially if his story encourages and inspires others to rise above their circumstances—to not simply survive, but to *thrive.*

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Williams, K. (1995). *A Parent's Guide for Suicidal and Depressed Teens*. Enter City, MN: Hazelden Foundation.

Kate Williams is the mother of an adopted daughter who, in her teen years, became clinically depressed. From her personal experience with her child's depression, Williams offers a first-person view of what steps parents can take to help their teen if they believe that their child is, or could be, depressed. Warning signs for depression are given to help parents who believe their child is depressed, along with steps that should be taken to help the child. The book not only offers suggestions on how the parent can help his or her teen, but also how the parent can help him/herself. While some self-help books can be hard to understand because of the medical jargon, the author introduces the ideas in a way that is easy to follow. The author keeps the book focused on her daughter's depression and does not expand unnecessarily on the other factors in their personal lives. This not only keeps the focus on depression but also keeps their family anonymous.

The developmental view Williams has on the family had a large impact on her opinions. The author recognizes that families change continually and that these changes can be stressful. When talking about her daughter's depression, several factors were discussed as possible stressors that could have contributed to the depression, along with ways they dealt with those factors in therapy and at home. Some of the issues that Rachel faced were anger about being adopted and not knowing her family history, trying to hide a learning disorder, and a father who seemed uninvolved in her life. All of these factors, along with the fact that her biological family had a history of depression and learning disorders, may have had a large impact on Rachel's susceptibility to depression.

In the introduction, the author encouraged readers to go to the topics that seemed most relevant to their child. The format of the book made this easy to do while maintaining the reader's ability to follow the book. The information in later chapters was not dependent on information from earlier chapters and all terms were well defined.

Because the author is not a professional in the field of teen depression, the validity of some suggestions she made, as well as information she got from her daughter's therapist, should be critically examined. In several instances she made suggestions without giving a reason to act on the suggestion, who the recommendation was by, why the person recommending the information was credible, or citing any other case in which the suggestion was helpful to someone else. While she may have been knowledgeable, no information was provided about her educational level. When reading the book, parents should be critical of advice given and make sure the advice they follow is credible and not based solely on the author's opinion.

The book emphasized communicating with a child if he or she is depressed. The book would be a good place to start for parents who suspect their child is suicidal or depressed. The book should not be recommended to a teen, especially if a parent gives them the book. Some of the information could impede a teen from expressing his or her emotions to parents. If a teen thinks the parents want her to get help and does not think she has a problem, the teen may become more isolated from her parents.

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