

A Survey of Gender and Learning Styles¹

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This study was conducted to investigate differences in learning styles between men and women. The study is based on the learning style work by Belenky, Clinchy, Goldberger, and Tarule and David Kolb. A survey that included the Kolb Learning Style Inventory, 12 Educational Dialectical questions, and a subjective question was administered to 72 subjects of various ethnic groups. The results showed that men and women were found to have different learning styles, and in general, men seemed to find congruence between traditional education and their learning style while women did not.

Men and women are different but do these differences extend to learning styles? Although several researchers have started to compile a database to clearly identify the female learning experience, there is not enough data yet to definitively answer questions comparing women's and men's learning styles. Learning style is defined here as an "individual's characteristic ways of processing information, feeling, and behaving in learning situations" (Smith, 1982, p. 24). (A good review of the difference of men's and women's learning experiences can be found in the Project on the Status and Education of Women, Association of American Colleges' paper, "The classroom climate: a chilly one for women," (Hall, 1982).) Based on the theoretical work of Belenky, Clinchy, Goldberger, and Tarule (1986), this study attempts to advance the database by testing the hypothesis that men and women have different learning styles.

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Prompted by two main concerns, Belenky *et al.* (1986) examined women's ways of knowing based on the work of Gilligan and Perry. The first concern was that "conceptions of knowledge and truth that are accepted and articulated today have been shaped throughout history by the male-dominated majority culture" (Belenky *et al.*, 1986, p. 5). Modes of learning that are common, if not specific, to women have been devalued. In other words, rationalism and objectivity are valued over intuitive, personal knowledge. The authors note that this masculine bias is probably present in most traditional educational curricula and pedagogical standards. The second main concern was that "developmental theory has established men's experience and competence as a baseline against which both men's and women's development is then judged, often to the detriment or misreading of women" (Belenky *et al.*, 1986, p. 7). This bias is demonstrated with clarity in the models of intellectual development. Even in studies of women's intellectual development, the modes of learning cultivated and valued by men are studied rather than ways of knowing more common to and highly developed in women (Belenky *et al.*, 1986).

Belenky *et al.* (1986) interviewed 135 women about "their experience and problems as learners and knowers as well as . . . their past histories for changing concepts of the self and relationships with others" (p. 11). The subjects came from a variety of educational backgrounds including formal education settings and parenting classes, which allowed the researchers to compare extensively educated and essentially uneducated women. From the women's responses, the authors identified five ways of knowing, including silence, received knowledge, subjective knowledge, procedural knowledge, and constructed knowledge. They also developed coding categories for the women's responses called Educational Dialectics, which illustrate opposite modes of thought or learning styles such as rational-intuitive. The researchers suspected that "in women one mode often predominates whereas conventional educational practice favors the other mode" (Belenky *et al.*, 1986, p. 16).

Also investigating learning style variance, Kolb (1976) developed a Learning Style Inventory (LSI) to describe the ways people learn and how they deal with ideas and situations. The LSI is based on a Cartesian coordinate consisting of active experimentation (doing) versus reflective observation (watching) on the x-axis, and concrete experience (feeling) versus abstract conceptualization (thinking) on the y-axis. This coordinate system yields four learning styles: Accommodator, Diverger, Converger, and Assimilator. Accommodators are best at learning from "hands on" experience (doing and feeling); Divergers excel in using imagination and brainstorming, combining concrete experience and reflective observation (feeling and watching). Convergers' dominant learning abilities are focused on finding

practical uses for ideas and theories (doing and thinking). Assimilators are most adept at logically organizing and analyzing information, building and testing theories, and designing experiments.

It follows that, of the four learning styles, Assimilators are best suited to academic careers (Kolb, 1985). Since Assimilators are most likely to be conducting and shaping the academic world, this suggests that the Assimilator learning style most accurately reflects traditional education. This conclusion concurs with the belief of Belenky et al. (1986) that traditional education primarily values rationalism and objectivity.

Current data suggest that, on the average, men and women score differently on the Learning Style Inventory. Women tend to score higher on the Concrete Experience orientation while men tend toward Abstract Conceptualization. No consistent differences between men and women have been identified on the active/reflective dimension. (Kolb, 1976, p. 24)

Based on the theoretical work of Belenky et al. (1986) and Kolb (1976), this study attempts to test the hypothesis that men and women have different learning styles. Since the Belenky et al. study, much research has begun in this area. Studies are looking at application of Belenky et al.'s work in such areas as occupation and skills (Huston & Yribar, 1991; Luttrell, 1989; Mickelson, 1989; Tedesco, 1991; and Thompson & Crutchlow, 1993). However, the educational dialectics have not been directly targeted. The primary objective of this study is to identify gender differences in learning styles and experiences in regard to the educational dialectics.

METHOD

The hypothesis of the existence of a gender difference in learning styles was tested via a survey which consisted of four basic parts: demographic information, the Kolb Learning Style Inventory, twelve Educational Dialectic questions, and a subjective question regarding participant's educational experiences.

Subjects

The survey was distributed by the researchers to 72 subjects. Four researchers each contacted 18 subjects and asked them to fill out the survey which took approximately 15 minutes to complete. The subjects included friends, colleagues and acquaintances of the researchers.

Demographic information was collected from each subject. Information requested was: gender, age, ethnicity, education level, and if the subject

was currently enrolled in classes. Forty-five females and 25 males participated in the survey; 2 subjects did not indicate gender. Ages ranged from 21 to 60+; there were 23 people in the 21-30 age group, the largest group represented. The second largest group was 31-40. Ethnic groups represented were 48 White, 2 Black, 16 Hispanic, 5 Native American, and 1 "other." Educational levels ranged from 2 subjects with some high school to 18 with some college, 7 Associate Degrees, 6 Bachelor's Degrees, 18 with some graduate school, 19 Master's Degrees, and 2 Doctorates. Forty-one of the 72 respondents were enrolled in a class at the time of data collection.

Instrument

Kolb LSI. The revised Kolb LSI (1985) was used to identify each subjects learning style. The Kolb LSI and its learning styles are previously described. The LSI is one of the most widely used learning style instruments with a variety of adult populations (Baker, Cooke, Conroy, Bromley, Hollon, & Alpert, 1988; Brundage & MacKeracher, 1984; Davie, 1987; Harb, Durrant, & Terry; 1993; Katz, 1988; Kruzich, Friensen, & Van Soest, 1986), and the statistical validity of the LSI has been documented (Kolb, 1984). Curry (1983) reported that the LSI has an average test-retest reliability of .85 and an internal consistency of .69, and has concluded that the test-retest reliability and internal consistency of the LSI is adequate for its role in cognitive style assessment. However, researchers have occasionally challenged the construct validity of the LSI (Fox, 1984; Freedman & Stumpf, 1980; Geller, 1979; West, 1982). A study (Sims, Veres, Watson, & Buckner, 1986) that compared the first version of the LSI (Kolb, 1979), and the revised version (Kolb, 1985), found that the internal consistency of the revised version had substantially improved although it still remained unstable across time. A recent study by Romero, Tepper, & Tetrault (1992) that developed new scales to measure Kolb's (1985) learning style dimensions provides support for the reliability (internal consistency and six-week test-retest stability), factor structure, and validity of the new scales, thereby supporting the predictions derived from experiential learning theory which is the basis for the LSI. A careful assessment of currently available learning style instruments (Schmeck, 1988; Torrance & Rockenstein, 1988) and their applicability to this study indicated that the Kolb instrument, despite some criticisms related to construct validity was the most appropriate for the present study.

Educational Dialectics. Appendix B of *Women's Ways of Knowing* lists the Educational Dialectics used by Belenky et al. (1986) in their survey of women's experience of life and learning environment. Based on these

Table I. Educational Dialectic Questions from Survey

1.	What is the goal of education for you?	<input type="checkbox"/> Learning for learning's sake	<input type="checkbox"/> Degree/certificate/credit
2.	What method do you use most frequently for analysis?	<input type="checkbox"/> Logical	<input type="checkbox"/> Intuitive (gut feeling)
3.	How do you like to learn?	<input type="checkbox"/> With others	<input type="checkbox"/> By yourself
4.	How do you learn best?	<input type="checkbox"/> With a challenge	<input type="checkbox"/> With support
5.	What is the relationship between you and the content of your education?	<input type="checkbox"/> Impersonal	<input type="checkbox"/> Personal
6.	Is "concern for self" vs. "concern for others" an issue in your educational decision making?	<input type="checkbox"/> No	<input type="checkbox"/> Yes
7.	Are you comfortable participating verbally in an educational setting?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
8.	How do you prefer to behave in an educational setting?	<input type="checkbox"/> Listen	<input type="checkbox"/> Participate verbally
9.	How do you like to learn?	<input type="checkbox"/> Cooperatively	<input type="checkbox"/> Competitively
10.	What method of analysis do you value most?	<input type="checkbox"/> Subjective	<input type="checkbox"/> Objective
11.	Did your learning style facilitate your educational experience(s)?	<input type="checkbox"/> No	<input type="checkbox"/> Yes
12.	Did your educational experience(s) support your learning style?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

authors' work, this study's survey includes twelve similar Educational Dialectic questions. The questions were directed specifically toward educational experiences and the perception of the individual regarding the personal value of those experiences. Questions gave bimodal answers with one choice as masculine and the other feminine. These questions were intended to further test for gender biases in learning methods and environments, as perceived by the subjects. See Table I for a list of the questions.

Subjective Question. The final question of our survey was an open-ended, subjective question asking "How did your learning style 'fit' with your educational experience(s)?" Its intent was to allow participants an opportunity to express their positive or negative educational experiences as related to their style of learning.

RESULTS

Chi-square analyses were conducted on the Learning Style Inventory and the Educational Dialectics examining gender differences in responses.

Table II. Learning Style and Gender^a

	Accommodator	Diverger	Converger	Assimilator	Total
Female	22.22% (10)	28.89% (13)	28.89% (13)	20.00% (9)	45
Male	20.00% (5)	8.00% (2)	24.00% (6)	48.00% (12)	25
Total	15	15	19	21	70

^a $p = .0538.$

For the subjective question, a content analysis was conducted to categorize these responses. To protect against gender bias the analysis was conducted using a double blind method. These responses were categorized into four groups regarding whether the subject's learning style "fit" her/his educational experience(s). The four categories are: Fit, Didn't Fit, Response Unclear, No Response. Each response was categorized based on unanimous agreement among four raters.

Learning Style Inventory

The Learning Style of 30% ($n = 21$) of all subjects and of 48% ($n = 12$) of males was the Assimilator style (see Table II). Women's scores were more evenly distributed across the learning style categories, with Diverger ($n = 13$) and Converger ($n = 13$) being the greatest in number. Men's Diverger category is notably small with 8% ($n = 2$). Chi-square analysis showed a significant difference between males and females on learning styles ($p = .0538$).

Educational Dialectics

Chi-square analysis produced significant results ($p = .0118$) with the comparison of gender and Educational Dialectic question 6 (Is "concern for self" vs. "concern for others" an issue in your educational decision making?). Sixty-seven percent of females answered "yes" while 64% of males answered "no."

Subjective Question

Although not statistically significant, the responses to this question indicated that more males (23%, $n = 6$) felt their education did fit with their learning style. Conversely, the results indicated that more females (22%, $n = 10$) felt that traditional education did not fit with their learning style. Females seemed to have more difficulty than males in answering this question, as indicated by the gender breakdown of responses in the "Response

Unclear" category (42% female, n = 19; 30% male, n = 8). A response was deemed "unclear" when the raters were not unanimous.

CONCLUSION

The present research demonstrates that there is a significant difference in learning styles between the genders. Significance was also realized in the issue of "concern for others" being primarily a female response as opposed to the primarily male response of "concern for self."

The original hypothesis, suggested by Belenky et al. (1986), is definitely supported. Traditional educational settings may not be the best learning environment for females. The learning style that seems to fit women the least is the Assimilator and our study shows this learning style best fits men. The Assimilator learning style most accurately reflects traditional education and, in this study, more males chose the Assimilator style than women.

Traditional education is directed towards and appeals more to males since it is primarily abstract and reflective. Females learn better in hands-on and practical settings, emphasizing the realm of the affective and doing. Based on the results of this study, if females are watching and feeling or doing and thinking, they learn best. If males are thinking and watching, they learn best.

The subjective question showed that females generally felt that they did not fit in with traditional education learning styles or were unable to give a clear response to that question. A female respondent to the subjective question commented, "I felt like I was talked at; no transfer of knowledge, really, just words without meaning spoken. I never saw much practical application for the words/topics being discussed." Men generally did find congruence in their learning style and their formal education. A male respondent said, "I believe my learning style of using logical steps to break down things and analyze them helped me in my studies of computer science and systems analysis."

Limitations

Due to the small sample size and the method of sample selection, results from this study may be difficult to generalize. As further research is conducted regarding gender and education, several areas deserve added attention which would enhance generalizability. The population used in this research was randomly selected as acquaintances of the researchers. This could indicate sample bias and limitations. There were 25 males and 45

females; an obvious "overloading" of females. There was also "top-heavy" educational ranking, with mostly college graduates. It was also interesting to find a notably low Hispanic population in our sample, quite the opposite of the area in which the study was conducted. To enhance generalization further research should include a more heterogeneous sample and a larger sample with even distribution of males and females and a better sampling of the general population. The subjective question could have been worded more clearly, which would have lessened the "unclear" response and no response category. This question was chosen to include qualitative input, as illustrated so well in the Belenky study (1986). Future research could potentially gather more information by rewording the Educational Dialectic questions for clarity, limiting duplication.

Future Research

The results of this study, which indicate that there are differences in learning styles between the genders, prompt further research in this area. Specifically, research studies could examine the effect of a course designed to cater to the Diverger/Converger learning style instead of the traditional male-accommodating style. How would men learn in a course taught to this primarily feminine style? How would men have to accommodate their learning style in this situation and how would they rate such a course? Courses designed to accommodate all four learning styles would be of interest to teacher training institutions.

This study gives rise to the question of when girls begin to compromise their primary learning style and mathematics. Many studies concerning gender differences and mathematical achievement (Aiken, 1987; Becker, 1990; Byrnes, 1993; Callas, 1993; Educational Testing Service, 1989; Kaiser-Messmer, 1993; Midkeff, 1993; Reeves, 1992) suggest an incongruity in teaching and learning results. Teaching a subject in the traditional style (abstract and passive) to females who prefer a more concrete and active approach, could contribute to this discrepancy and open research for further investigation.

The results of this study suggest more questions for future research. How does lack of congruence in learning style encourage dropouts? What would a lesson or a course look like attuned to all four learning styles? How could a course and an instructor be rated for dealing with all four styles? Is there cohort relevance in learning styles? How does all this fit into adult developmental stages? Do people keep their same learning style throughout their whole life? How early do predominant learning styles surface?

Our culminating question mirrors the Belenky *et al.* (1986) material as they quote Jacobus, "if we can spare women the alienation, repression

and division' their schooling currently confers upon them" (p. 228), how would that affect the world of thousands of women? What would happen if formal education would encourage women to listen to their own authentic voices, instead of remolding their voices to fit into formal education? Answering this question is a start.

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