

A workplace and gender-related perspective on financial planning information sources and knowledge outcomes

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Abstract

This paper examines financial learning in the workplace through employer provided, self-directed financial learning media, such as newsletters, print publications, software, and the Internet. Independent variables of interest also include an employee's use of family, friends, and co-workers as financial planning sources. The paper addresses whether the use of the personal sources relates to the use of the financial learning media, whether the media utilization affects an employee's financial knowledge, and whether genders influences these relationships. Results suggest that the social network influences utilization of employer-provided financial learning media which, in turn, increases actual retirement-specific and self-reported financial knowledge. Differences by gender appear for a number of variables. © 2006 Academy of Financial Services. All rights reserved.

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1. Introduction

The analysis of financial learning, and the examination of the specific settings that stimulate it, is a small but growing focus of research in the personal finance field. Most recently, attention has been directed toward financial learning in the workplace because of the significant growth in employer-provided financial education since the passing of the Employee Retirement Income Security Act of 1974 (see, for instance, Mastin, 1998).

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Although evidence shows how important it is to improve workers' financial knowledge to help them reach long-term savings goals (see, for instance, Lusardi, 2004; Bernheim, 1994; Madrian & Seha, 2001), little is known about the effectiveness of different types of educational offerings in the workplace. This is particularly true for educational materials that are designed for self-study. The majority of studies on workplace financial education focus on interactive seminar-based formats (Kim, 2000; Joo & Pauwels, 2002; Lusardi, 2004; Madrian & Seha, 2001). Less attention has been directed toward employer-provided financial print media, financial planning software, or the Internet as a place to learn about one's own personal finances.

This paper focuses on two aspects of the self-directed learning mode in the workplace setting: (1) We assess whether the use of financial learning media at the workplace is influenced by family, friends, and co-workers. (2) Further, we evaluate whether the use of financial learning media at the workplace relates to the financial knowledge of employees. In addition, we examine whether gender differences exist in these relationships. Overall, the paper proceeds as follows. In Section 2 we review literature and describe the hypotheses of the study. Section 3 describes the data. Section 4 presents the empirical analysis and Section 5 explores the various explanations that can account for the findings in Section 4.

2. Literature review and hypotheses

2.1. The use of personal and employer sources of financial planning information

In adult-learning literature, learning on one's own is considered the primary mode of learning in adulthood (Tough, 1979). Commonly called "self-directed learning," it is basically any form of study in which individuals have primary responsibility for planning, implementing, and evaluating the learning effort (Knowles, 1975). Research on this concept is relatively recent (Merriam & Caffarella, 1999) and has only sporadically been closely examined with regard to financial learning. Results of these research efforts are mixed. They indicate that the type of material—both its content and the media in which it is offered—seems to matter. For example, Clark and Schieber (1998) find that company-provided written communications describing the need to save for retirement significantly increase the probability of participation in a 401(k) plan and the contribution rate to the plan. Another recent survey indicates that of those workers whose employers offer some form of financial education, self-directed materials are widely used: 80% read retirement benefit statements, 63% read brochures, and 53% read newsletters and magazines. In addition, about 24% used online investment advice, 21% browsed the Internet for other online services, and 13% used software programs (Employee Benefit Research Institute, 2004).

To increase our understanding about the determinates of the use of self-directed financial learning media, we propose following a social learning framework. Social science researchers utilize social learning theory to examine and explain the setting in which learning occurs (Merriam & Caffarella, 1999). Social learning theory asserts that an individual gains knowledge and develops behaviors through interaction with a variety of individuals or groups of people, such as parents, siblings, friends, co-workers, and teachers (Bandura,

1986). We suggest that Bandura's (1977) definition of social interaction might be useful to explain the influence of personal information sources on financial learning. We define social interaction as any situation in which the individual comes into contact with others, directly or indirectly, who can potentially influence the individual's finance-related learning and actions. Based on this definition of financial learning, a variety of individuals or groups of people could be considered influential for financial learning, such as family, friends, and co-workers (Phares, 1980; Lefrancois, 1999; Lin & Lee, 2004). Interestingly, the social environment that enhances financial learning in adulthood has been addressed in the literature only sporadically. For instance, Garman (2004) considers conversation with co-workers most important to prevent or solve financial problems. Bernheim (1998), using data from the 1993 Merrill Lynch household survey, supports the notion that parents and other relatives are the most common sources of financial information and advice. In another study, he points out that one's financial situation is usually not thought of as an appropriate subject for general discussion (Bernheim, 1994). Similarly, popular literature finds that fewer than one in three families have frequent conversations about money and the authors consider personal finances to be one of the least talked-about topics (Schwab-Pomerantz & Schwab, 2002).

This limited literature points toward the notion that financial conversations are beneficial for influencing financial learning. Likewise, it is obviously a difficult, "touchy" topic in private conversation. We are not aware of studies that have specifically examined the relationship between the use of personal sources and self-directed learning sources for financial planning information. We propose based on the literature available that individuals who use family, friends, or co-workers for financial planning information might be more motivated to start financial learning on their own and may, therefore, show increased use of the employer-provided financial learning media.

Hypotheses 1a and 1b. The use of family and friends (H1a), or co-workers (H1b), as sources for financial planning information will predict the use of employer-provided self-directed financial learning media, such as newsletters, publications, software, and the Internet. Gender, age, ethnicity, marital status, number of household members, and job classification serve as control variables because of their potential relationship with the dependent variable.

Hypothesis 1 leads to another question: Does the use of self-directed, employer-provided financial planning information influence financial knowledge? A recent study by Blinder and Krueger (2004) addresses general economic knowledge and finds that that most respondents expressed a strong desire to be well informed and that television is their dominant source of information (47%). The second most common source is newspapers (19%), and the Internet is next (10%). Other publications, such as magazines and books, rank very low in use for economic information (2%, 0.5%). Those who consult more sources, and consult them more often, are only slightly better informed. When answering a quiz of economic policy facts, however, those who rely on television as their prime source for economic information perform less well than those who rely on written material or information provided on the Internet. Bayer, Bernheim and Scholz (1996), on the other hand, find that programs that rely on print media—either through newsletter or summary plan descriptions—have generally no influence on participation rates or contributions to retirement savings plans. Their analysis indicates that seminars are the most effective type of communication.

For the present paper, we had the opportunity to examine the influence of self-directed financial learning on both actual financial knowledge, that is, general and retirement-specific financial knowledge, as well as the self-reported financial knowledge of a person. The outcome of self-directed financial learning is important to consider because of the highly personal nature of self-direction. According to Day (1988), individuals have to take personal responsibility for the learning outcomes and the application of the new knowledge. “Unsophisticated individuals” (Bernheim, 1994, p. 59) may not fully understand new financial information and fail to conceptualize the relations between actions and outcomes. Consequently, we propose that evaluating financial knowledge, actual as well as self-reported, may indicate the usefulness of the employer-provided media. In so doing, we follow the notion forwarded by Bernheim (1994) that literacy encompasses both financial knowledge and the analytic ability to conceptualize the relations between actions and outcomes. An increase in actual financial knowledge may show that the employer-provided information was valuable. In addition, an increase in self-reported financial knowledge may be influenced by the extent of financial understanding about specific financial topics, such as retirement needs, investments, providing for the financial future, and credit use.

Hypotheses 2a and 2b. The use of employer-provided, self-directed financial learning media will significantly predict increased actual financial knowledge (H2a) and self-reported financial knowledge (H2b). Gender, age, ethnicity, marital status, number of household members, and job classification serve as control variables because of their potential relationship with the dependent variable.

2.2. *Gender differences in the proposed relationships*

Gender differences in financial knowledge are well documented in the professional literature (see, for instance, Applied Research & Consulting LLC, 2003; Merrill Lynch Investment Managers, 2005; OppenheimerFunds Distributor, 2004). Women generally show lesser financial knowledge, have more financial concerns, and are less confident about their financial situation (Hira & Mugenda, 2000; National Endowment for Financial Education, 2000; Wilhelm & Varcoe, 1991). Gender differences in the use of learning technology have also been studied. Research generally supports the notion that women have less overall experience with new information technologies and are more likely than men to have negative attitudes toward them, especially toward the use of computers (Schumacher & Morahan-Martin, 2001; Bredin, 1999; Adam, 2001).

Consequently, if women engage in self-directed financial learning, they might prefer print media. We also suggest that those women who start learning on their own benefit more than men because of the supposedly larger knowledge gap. We are not aware of studies examining gender differences with regard to the use of personal and self-directed sources for financial planning information. However, studies on using personal sources for information about sexual issues show that women more frequently use family and friends for information and that this actually results in the desired behavior change (Diiorio, Kelley, & Hockenberry-Eaton, 1999; Adolph, Ramos, Linton & Grimes, 1995; Lefkowitz, Boone, & Shearer, 2004; Miller, Levin, Whitaker & Xu, 1998). Following this line of inquiry, we suggest that women

may feel more comfortable than men contacting family, friends, or co-workers about the topic of personal finances and may, therefore, be more motivated to start learning about personal finance.

Hypotheses 3a, 3b, and 3c. The effect of the use of family, friends, or co-workers as sources for financial planning information on the use of self-directed, employer-provided sources for financial planning information (H3a) will differ significantly by gender. Similarly, the effect of the use of self-directed, employer-provided sources for financial planning information on actual financial knowledge (H3b) and self-reported financial knowledge (H3c) will differ significantly by gender. Age, ethnicity, marital status, number of household members, and job classification serve as control variables because of their potential relationship with the dependent variable.

3. Using personal and employer sources of financial planning information

3.1. Procedure

3.1.1. Data collection process

The present study utilizes data gathered from a randomly selected national sample of employees working for a national insurance company. Occasion for the data collection was a six-month long employer-sponsored financial education initiative in the second half of 1999. The educational initiative included all employees and encompassed instructional as well as self-directed learning offerings. The topics covered were: the importance of systematic saving with 401(k) plans, investment choices, life planning processes, and protecting a family with wills, trusts, long-term care plans, and life insurance.

The instructional learning offerings included three types of workshops: Wake-up Call (one-hour session), Financial Awareness Workshop (half-day session), and Preretirement Planning Workshop (two-day session). The self-directed learning offerings at the workplace included an employer-distributed financial planning newsletter entitled “Understanding Personal Finances,” an employer-provided financial planning software entitled “LifeFocus,” as well as information about financial planning web sites and financial planning print publications. Employees were encouraged by the employer to use these media for their personal financial planning. At the end of the six-month period, a mail survey was used to collect impact data from employees in Michigan, northern Texas, the northeastern U.S.A., a region encompassing Arizona, Nevada, and New Mexico, and a region encompassing Oklahoma and Kansas. A sample of 2,400 individuals was selected from a list of 12,275 employees using a fractional systematic sampling and was sorted by gender and job classification. The sampling method ensured that the gender and job classification composition of the resulting sample was approximately the same as that of the sampling frame.

After the *Dillman Total Design Method for Mail Surveys* (Dillman, 1978), questionnaires were mailed to a total of 2,361 employees in early August 1999. The number of 2,361 is smaller than the 2,400 individuals initially selected, because 39 were no longer with the company. Because August is traditionally a month when many employees take vacation, the

Table 1 Description of sample by number and percentage

Variable	Males* (37.9%)	Females* (62.1%)	All* (N = 1,486)
Age	N = 549	N = 900	N = 1449
29 and younger years (= 1)	14.6	14.6	
30 to 39 years (= 2)	37.7	38.4	38.2
40 to 49 years (= 3)	23.3	27.1	25.7
50 to 59 years (= 4)	21.7	17.9	19.3
60 years and over (= 5)	2.7	2.0	2.3
Mean/median/mode	40.73/39/37	39.94/38/36	40.24/39/37
Standard deviation	10.11	9.71	9.87
Ethnicity	N = 557	N = 904	N = 1,461
Non-whites† (=0)	12.7	17.4	15.6
White (=1)	87.3	82.6	84.4
Marital Status	N = 563	N = 905	N = 1,463
Never married/divorced/ widowed/separated (= 0)	17.9	29.8	25.3
Married/living as married (= 1)	82.1	70.2	74.7
Household Size	N = 560	N = 911	N = 1,471
1 (= single)	11.4	14.1	13.1
2	32.1	34.2	33.4
3	19.5	22.6	21.4
4	24.8	21.6	22.8
more than 4	12.1	7.4	9.3
Mean/median/mode	2.97/3/2	2.77/3/2	2.84/3/2
Standard deviation	1.28	1.22	1.25
Job classification	N = 563	N = 923	N = 1,486
Trainees (= 0)	0.5	0.9	0.7
Field claim workers, temp. assign. (= 1)	7.1	0.8	3.2
Field claim workers, lower level (= 2)	63.9	33.9	45.3
Field claim workers, upper level (= 3)	22.7	6.0	12.3
Headquarter management, lower level (= 4)	3.2	43.1	28.0
Headquarter management, medium level (= 5)	2.5	15.4	10.5

* Valid percent: only cases with non-missing values are considered; † Includes African Americans, American Indians, Aleuts, Eskimos, Asian or Pacific Islander, and “something else.”

follow-up postcard reminder notice was sent to each non-respondent 15 days after the original mailing. A total of 1,519 employees returned completed questionnaires, producing an overall response rate of 64.3%. The survey was designed to create a semi-controlled environment in which to modify the impact of unusual factors in the external environment that could influence participants’ responses. A total of 1,486 questionnaires were correctly filled out and entered the statistical analyses.

3.1.2. Respondents

The participants represented a variety of white-collar positions. A profile of the sample is presented in Table 1. The typical respondent was female (62%), 37 years old, white (84%), married or living with a partner (75%), and sharing a residence with other household members (87%). Male respondents were more often employed as field staff (94%), whereas the female employees were more often employed at the company’s management headquarter-

ters (59%). More male employees than female employees were married or living with a partner (m: 82% vs. f: 70%), living in larger households (m: 37% with four or more household members compared to f: 29%), and were white (m: 87% compared to f: 83%).

3.1.3. *Limitations*

This study is based on a randomly selected national sample of employees of a national insurance company. Although the U.S. Bureau of Labor Statistics (2002) reports this group of office and administrative personnel as the largest job category of the workforce, caution should be exercised when generalizing these results beyond the type of population studied here. Like any other mail survey, there may be restrictions because of recollection of financial behavior that has taken place several months before the time of the survey or an unwillingness of respondents to reveal certain kinds of information. Also, consistent with common practice, no attempts were made to verify the accuracy of respondents' statements.

3.2. **Measures**

Because of the limited amount of literature on personal and employer-provided information sources for financial planning information, to date there is no standardized survey instrument available to assess these measures in the workplace environment. Therefore, a new survey instrument has been specifically designed to test the hypotheses of this study.

3.2.1. *Personal information sources*

Personal sources for financial planning information was measured by responses to the question: "Which of the following sources of information have you used for financial planning over the past six months? Circle all that apply. (1) Family or friends, (2) Co-workers." The responses were coded yes = 1 and no = 0. Almost half of the respondents (47%) approached family or friends, whereas a much smaller proportion (19%) identified co-workers as source of financial planning information (see Table 2).

3.2.2. *Employer-provided information sources*

Employer-provided sources were assessed by the frequencies with which respondents used various employer-provided sources of financial information, such as financial newsletter, financial planning publications, financial planning software, and the Internet. The use of employer-provided financial planning information sources was measured by responses to the question: "Which of the following sources of information have you used for financial planning over the past six months? Circle all that apply. (1) [Company name] newsletter 'Understanding Personal Finances,' (2) Other financial planning publications, (3) Financial Planning Software, (4) the Internet." The responses were coded yes = 1 and no = 0. As can be seen in Table 2, the use of these media varied among the respondents. Slightly under half (42%) read the employer-provided financial newsletter, about one third used the Internet (30%), and slightly over one fourth (28%) made use of financial publications, and less than one fourth (22%) used the financial planning software for their financial planning needs.

Table 2 Descriptive statistics: profiles of respondents by gender

Variables	Males (%)†	Females (%)†	All (%)†	Test statistics
Using personal sources, such as family/friends	<i>N</i> = 544	<i>N</i> = 888	<i>N</i> = 1432	
no = 0	54.4	52.4	53.1	
yes = 1	45.6	47.6	46.9	
χ^2 statistic				1.986
Using personal sources, such as co-workers	<i>N</i> = 544	<i>N</i> = 888	<i>N</i> = 1432	
no = 0	78.5	82.1	80.7	
yes = 1	21.5	17.9	19.3	
χ^2 statistic				365.878***
Use of financial planning newsletter	<i>N</i> = 544	<i>N</i> = 888	<i>N</i> = 1432	
no = 0	56.4	59.0	58.0	
yes = 1	43.6	41.0	42.0	
χ^2 statistic				28.829***
Use of financial planning publications	<i>N</i> = 544	<i>N</i> = 888	<i>N</i> = 1432	
no = 0	62.9	77.4	71.9	
yes = 1	37.1	22.6	28.1	
χ^2 statistic				265.986***
Use of financial planning software	<i>N</i> = 544	<i>N</i> = 888	<i>N</i> = 1432	
no = 0	71.9	81.4	77.8	
yes = 1	28.1	18.6	22.2	
χ^2 statistic				350.635***
Use of the Internet for financial planning	<i>N</i> = 544	<i>N</i> = 888	<i>N</i> = 1432	
no = 0	59.9	76.2	70.0	
yes = 1	40.1	23.8	30.0	
χ^2 statistic				244.545***
General financial knowledge	<i>N</i> = 525	<i>N</i> = 844	<i>N</i> = 1369	
0 correct answer	0	0.9	0.6	
1–2 correct answers	7.8	15.4	16.8	
3–4 correct answers	31.1	31.1	37.9	
5–6 correct answers	43.2	29.0	35.5	
7–8 correct answers	15.2	5.5	9.2	
χ^2 statistic				398.555***
Cronbach's coefficient alpha				0.0762
Retirement-specific financial knowledge	<i>N</i> = 514	<i>N</i> = 790	<i>N</i> = 1304	
0 correct answer	4.3	5.9	5.3	
1 correct answer	32.9	44.8	40.1	
2 correct answers	38.7	33.9	35.8	
3 correct answers	24.1	15.3	18.8	
χ^2 statistic				293.494***
Cronbach's coefficient alpha				0.1990
Self-reported financial knowledge about: "Financial needs during retirement"	<i>N</i> = 529	<i>N</i> = 859	<i>N</i> = 1,388	
"strongly disagree" = 1	1.7	4.8	3.6	
"disagree" = 2	16.1	28.6	23.8	
"neutral" = 3	27.0	29.5	28.5	
"agree" = 4	45.2	33.4	37.9	
"strongly agree" = 5	10.0	3.7	6.1	
χ^2 statistic				361.017***

continues

Table 2 Continued

Variables	Males (%)†	Females (%)†	All (%)†	Test statistics
“Invest my money”	<i>N</i> = 529	<i>N</i> = 861	<i>N</i> = 1,390	
“strongly disagree” = 1	2.6	2.3	2.4	
“disagree” = 2	16.3	20.4	18.8	
“neutral” = 3	38.9	33.4	35.5	
“agree” = 4	39.1	40.5	40.0	
“strongly agree” = 5	3.0	3.3	3.2	
χ^2 statistic				514.755***
“Provide for financial future”	<i>N</i> = 529	<i>N</i> = 861	<i>N</i> = 1390	
“strongly disagree” = 1	2.6	2.3	2.4	
“disagree” = 2	15.5	18.1	17.1	
“neutral” = 3	36.5	31.5	33.4	
“agree” = 4	41.6	44.9	43.7	
“strongly agree” = 5	3.8	3.1	3.4	
χ^2 statistic				583.106***
“Manage credit use”	<i>N</i> = 527	<i>N</i> = 859	<i>N</i> = 1386	
“strongly disagree” = 1	5.7	3.1	4.1	
“disagree” = 2	21.1	16.9	18.5	
“neutral” = 3	42.9	38.4	40.1	
“agree” = 4	26.9	38.1	33.8	
“strongly agree” = 5	3.4	3.5	3.5	
χ^2 statistic				29.143***

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

† Valid percent: only cases with non-missing values are considered.

3.2.3. Actual financial knowledge

Respondents' actual financial knowledge was measured in two areas: general and retirement-specific financial knowledge. General financial knowledge was measured by eight different items, whereas retirement-specific financial knowledge was measured by three items (for descriptions of the items see Appendix). The responses to each item were summarized to create the variable “general financial knowledge” and the variable “retirement-specific financial knowledge.” Respondents were asked, “Please indicate whether you think each statement is true or false.” The responses were coded true = 1 and false = 0. The scores for the general financial knowledge variable ranged from 0 (no correct answer) to 8 (all answers correct). The retirement-specific financial knowledge variable scored from 0 (no correct answer) to 3 (all answers correct).

About one in 10 respondents (9%) made none or only one mistake by answering the eight general financial knowledge questions. A small group (6%) failed to answer any of the questions correctly. Most respondents answered about half of the general financial knowledge questions correctly (73%). With regard to the retirement-specific knowledge questions, as many as one in five respondents (19%) answered the three retirement-specific questions correctly and only one in 20 answered none of the questions right. Most respondents answered one question correctly (40%). The results on the two actual knowledge variables are also presented in Table 2.

3.3.4. Self-reported financial knowledge

Self-reported financial knowledge was measured using a five-item Likert scale where strongly disagree = 1 to strongly agree = 5. Higher scores indicated increased self-reported

financial knowledge. Respondents were asked, “Please indicate whether you agree or disagree with each of the following statements. (1) I have a very clear idea of my financial needs during retirement; (2) I have a better understanding now of how to invest my money than I did six months ago; (3) I feel more informed now about how to provide for my financial future than I did six months ago; and (4) I have a better understanding now of how to manage my credit use than I did six months ago.”

About half of the respondents felt informed about how to provide for the financial future (47% “agree” or “strongly agree” responses), about two in five were confident that they know about retirement needs (44% “agree” or “strongly agree” responses) and had confidence in their ability to invest money (43% “agree” or “strongly agree” responses), whereas only a third felt comfortable with the management of credit use (37% “agree” or “strongly agree” responses). On the other hand, about one in four respondent (27%) reported to have not much of an idea of the financial needs during retirement and about one of every five respondents were uncertain about how to manage credit use (23%), invest money (21%), and provide for the financial future (20%). The results are also shown in Table 2.

3.3.5. *Gender differences*

Significantly more male respondents (m) than female respondents (f) reported co-workers (m: 22%, f: 18%) as sources for financial planning information and used the employer-provided financial newsletter (m: 44%, f: 41%), financial publications (m: 37%, f: 23%), financial planning software (m: 28%, f: 19%), and the Internet to gather financial planning information (m: 40%, f: 24%). Similarly, male respondents scored higher on knowledge questions than female respondents. For instance, more than half of the men answered more than half the general financial knowledge questions correctly (58%) compared to less than one in four women (24%). Most men had five or six of the questions correct (43%), whereas most women had three or four of the questions correct (31%). With regard to the retirement-specific knowledge questions, almost two in three men responded right to two or all three of these questions (63%) compared to about half of the women (49%). The majority of men answered two retirement-specific knowledge questions correctly (39%) compared to only one question for the female respondents (45%). The results are also shown in Table 2.

With respect to self-reported financial knowledge, male respondents scored higher only with regard to financial needs during retirement (m: 55%, f: 37% of “agree”/“strongly agree” responses), whereas female respondents seemed to feel more knowledgeable about how to invest (f: 42%, m: 44% of “agree”/“strongly agree” responses). Women also felt more informed about how to provide for the financial future (f: 48%, m: 45%), and felt they had a better understanding of how to manage credit use (f: 42%, m: 30%). The results are also shown in Table 2.

3.3.6. *Control variables*

Gender, age, ethnicity, marital status, number of household members, and job classification served as control variables. They were included in the regression equations because of their potential relationship with the dependent variables. Gender was coded as a dummy variable (males = 0; females = 1). Age was reported in actual numbers. The ethnicity measure had five categories. Because of the small number of minorities, the four categories

of African Americans, American Indians/Aleuts/Eskimos, Asian/Pacific Islander, and “something else” were summarized and coded with a “0,” whites were coded “1.” Marital status was coded as a dummy variable (divorced, widowed, separated, never married = 0; married or living together as married = 1). The number of household members was reported in actual numbers. Job classification reflects five categories that are characteristic for an insurance company and range from 0 to 5: trainees = 0, temporary field claim worker = 1, lower-level field claim worker = 2, upper-level field claim worker = 3, lower-level headquarter management = 4, medium-level headquarter management = 5.

4. Results

Hypotheses 1a and 1b were tested with binary logistic multiple regression analysis because of the dependent variable’s two values, no = 0 and yes = 1 (Norusis & SPSS Inc., 1999). The results in Table 3 show that the odds ratios associated with using personal sources, such as family and friends, were significant for three of the four self-directed learning media: newsletter [$\exp(\beta)=1.432, p < 0.01$], publications [$\exp(\beta) = 2.379, p < 0.001$], and the Internet [$\exp(\beta) = 2.294, p < 0.001$]. Using co-workers as information sources was only related to the use of the Internet for gathering financial information [$\exp(\beta) = 1.645, p < 0.01$].

The binary logistic regression coefficients cannot be interpreted in the usual manner of regression coefficients because they do not represent the impact of a one-unit change in the independent variable on the binary dependent variable. Rather, the coefficients relate to an index number which, in turn, can be transformed into a probability of being in each of the two levels. By definition, these two probabilities sum to 1. The binary logistic regression procedure also produces a set of predicted values probabilities for each value of the dependent variable, providing an estimate of the magnitude of the effects that each independent variable has on each level of the independent variable, compared with other groups. These predicted values probabilities are analogous to the coefficients in ordinary least squares regression. That is, they provide an estimate of the impact of a change in the independent variable on the dependent variable. For binary variables, the predicted values probabilities are calculated by allowing the variable to take on values of 0 and 1, holding all other variables at the mean (continuous variables) or mode (categorical variables). The predicted values probabilities sum to zero that follows from the requirement that the probabilities across the two categories sum to 1 (Hogarth & Anguelov, 2004). These predicted values probabilities are also presented in Table 3. For example, the predicted values probabilities indicate that using family, friends, or co-workers as information sources significantly increased the probability of using the Internet for financial planning by 27% and increased the probability of using financial publications by 21%. Less significant was the influence of these personal sources on reading the newsletter (+9%) and using the software (+5%).

Hypotheses 2a and 2b were tested with ordinal multiple regression analysis because of the ordinal nature of the dependent variable (SPSS Inc., 1999). The results in Table 4 indicate that the regression coefficients associated with the self-directed financial learning media

Table 3 Parameter estimates of binary logistic regression coefficients for using personal information sources on using self-directed financial learning sources for financial planning information (H1a, H1b)

Independent variables	Using self-directed financial learning sources			
	Newsletter Exp(β)	Publication Exp(β)	Software Exp (β)	Internet Exp (β)
Using personal information sources				
Family/friends	1.432**	2.379***	1.282	2.294***
Co-workers	1.017	1.134	1.009	1.645**
Control variables				
Gender (female = 1)	1.336	0.676**	0.796	0.566***
Age (cont.)	0.995	1.027***	0.980**	0.979**
Ethnicity (white = 1)	1.208	0.713	1.316	1.227
Marital status (married = 1)	0.999	1.762**	1.366	1.074
Household size (cont.)	0.965	0.890	1.007	1.027
Trainees (= 0)	0†	0†	0†	0†
Field claim workers, temp. assign. (= 1)	0.802	3.449	1.339	1.487
Field claim workers, lower level (= 2)	0.840	0.749	1.696	1.593
Field claim workers, upper level (= 3)	1.840**	1.728*	1.971*	1.687*
Headquarter management, lower level (= 4)	2.198**	3.384***	3.080***	3.176***
Headquarter management, medium level (= 5)	0.749	0.900	1.259	1.233
Predicted values probabilities‡	0.09406	0.20656	0.05045	0.27327
R ² Cox & Snell	0.049	0.102	0.041	0.109
Valid sample size	1,352	1,352	1,352	1,352
Missing values §	134	134	134	134
Total sample size	1,486	1,486	1,486	1,486

Valid observations: 1,352; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; χ^2 test statistics are significant at the $p < 0.001$ level.

† This parameter is set to zero because it is redundant.

‡ For changing the independent variables “Family/friends” and “Co-workers” from 0 to 1 and holding all others constant at their mean (continuous variable) or mode (categorical variables): gender (= 1, female), age (= 40.24 years.), ethnicity (= 1, white), marital status (= 1, married), household size (= 2.84), job classification (= 2, field claim workers, lower level).

§ Missing values are excluded listwise. Only cases with valid values for all variables are included in the analyses.

newsletter ($\beta = 0.246$, $p < 0.05$), publications ($\beta = 0.447$, $p < 0.001$), and software ($\beta = 0.411$, $p < 0.01$) predicted general financial knowledge. The use of the Internet was not related to general financial knowledge. Regarding retirement-specific financial knowledge, all four self-directed learning media acted as predictors (newsletter: $\beta = 0.268$, $p < 0.05$; publications: $\beta = 0.520$, $p < 0.001$; software: $\beta = 0.381$, $p < 0.01$; Internet: $\beta = 0.446$, $p < 0.01$).

Again, direct interpretation of the ordinal regression coefficients for the four self-directed financial learning is difficult because of the nature of the logit link function (SPSS Inc., 1999). Therefore, the related estimated response probabilities were calculated and are shown in Table 5. These results indicate that the probability of answering a higher number of general financial knowledge questions correctly was several percentage points higher for those who were engaged in self-directed financial learning than for those who were not.

Table 4 Parameter estimates of ordinal regression coefficients for using employer-provided, self-directed financial learning media for financial planning information on financial actual and self-reported financial knowledge (H2a, H2b)

Variables	Actual knowledge		Self-reported knowledge			
	General	Retirement	Retirement	Investment	Fin. future	Credit use
Use of self-directed learning sources						
Parameter estimates						
Newsletter	0.246*	0.268*	0.023	1.055***	1.191***	0.763***
Publications	0.447***	0.520***	0.499***	0.222	0.227	-0.119
Software	0.411**	0.381**	0.317*	0.909***	0.943***	0.508***
Internet	0.144	0.446**	0.283*	0.155	0.206	0.046
Control variables						
Gender (female = 1)	-0.448***	-0.097	-0.303*	0.139	0.109	0.293*
Age (cont.)	0.020***	0.003	0.026***	0.001	0.002	-0.001
Ethnicity (white = 1)	0.421**	0.325*	0.356*	-0.271	-0.360*	-0.537***
Marital status (married = 1)	0.136	0.182	0.158	0.082	-0.030	-0.135
Household size (cont.)	-0.033	0.107*	-0.034	-0.085	-0.065	-0.039
Trainees (= 0)	1.127	0.107	-1.408*	0.100	0.041	-1.121
Field claim workers, temp. assign. (= 1)	-0.086	-1.025**	-0.656	0.394	0.341	0.088
Field claim workers, lower level (= 2)	1.068***	0.242	0.027	-0.343	-0.448*	-0.589**
Field claim workers, upper level (= 3)	1.449***	0.467	0.362	-0.543*	-0.811**	-1.062***
Headquarter management, lower level (= 4)	-0.119	-0.637**	-0.603**	-0.376	-0.437*	-0.401*
Headquarter management, medium level (= 5)	0†	0†	0†	0†	0†	0†
Valid observations	1,253	1,192	1,270	1,272	1,272	1,269
R ² Cox & Snell	0.229	0.149	0.131	0.149	0.167	0.092
Valid sample size	1,253	1,192	1,270	1,272	1,272	1,269
Missing values ‡	233	294	216	214	214	217
Total sample size	1,486	1,486	1,486	1,486	1,486	1,486

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; χ^2 test statistics are significant at the $p < 0.001$ level.

† This parameter is set to zero because it is redundant.

‡ Missing values are excluded listwise. Only cases with valid values for all variables are included in the analyses.

Using significant regression results, self-directed financial learners were, for instance, 14 percentage points more likely to answer six of the general financial knowledge questions correctly than those who were not engaged in this mode of learning (compared to: 5 questions: +3%, 7 questions: +12%). On the other hand, the probability of answering only half or fewer of general financial knowledge questions correctly was several percentage points lower for those who were engaged in self-directed financial learning than for those who were not. For instance, self-directed learners were 3 percentage points less likely to answer only one question correctly, 9 percentage point less likely to answer 3 questions correctly, or 11 percentage points less likely to answer 4 questions correctly than those who were not engaged in self-directed learning (see Table 5).

With regard to the retirement-specific questions, the estimated response probabilities indicated that the probability of answering these three questions correctly was 3 and 29 percentage points, respectively, lower for those who were engaged in self-directed financial learning than for those who were not. There was no difference for answering only two questions between the groups.

For self-reported financial knowledge, the self-directed financial learning media varied in their explanatory power. Financial planning software had the strongest influence on the four aspects of self-reported financial knowledge (retirement: $\beta = 0.317$, $p < 0.05$; investment: $\beta = 0.909$, $p < 0.001$; financial future: $\beta = 0.943$, $p < 0.001$; credit use: $\beta = 0.508$, $p < 0.001$). Next in predicting power was the newsletter, which was significant for all but reported knowledge about the financial needs during retirement (investment: $\beta = 1.055$, $p < 0.001$; financial future: $\beta = 1.191$, $p < 0.001$; credit use: $\beta = 0.763$, $p < 0.001$). Publications and the Internet supported only reported knowledge about the financial needs during retirement (publications: $\beta = 0.499$, $p < 0.001$; Internet: $\beta = 0.283$, $p < 0.05$).

The estimated response probabilities, presented in Table 5, quantify the impact of the four self-directed learning media on self-reported financial knowledge. Overall, the probability of at least “agreeing” that a person has a higher self-reported financial knowledge about retirement needs, investments, ability to provide for the financial future, and credit use than six months ago was several percentage points higher among those who were engaged in self-directed financial learning than among those who were not. For instance, the probability of agreeing that that one has a better understanding now of how to invest than six months ago was 42 percentage points higher for those who were engaged in self-directed financial learning than for those who were not. On the other hand, the probability of “strongly disagreeing” or “disagreeing” with the proposed statements were several percentage points lower for those who were engaged in self-directed financial learning than for those who were not. For instance, the probability of “disagreeing” that one feels more informed now about how to provide for the financial future than six months ago was 25 percentage points lower for those who were engaged in self-directed financial learning than for those who were not. Hence, the four self-directed financial learning media were strong—but not fully consistent—predictors of actual and self-reported financial knowledge.

Hypothesis 3 suggested gender differences for the effects of using personal sources, such as family, friends, or co-workers, on the utilization of employer-provided self-directed financial learning media (H3a), as well as for the effects of using employer-provided, self-directed financial learning media on actual financial knowledge (H3b) and self-reported

Table 5 Estimated response probabilities of ordinal regression coefficients for the use of employer-provided, self-directed financial learning (changes 0 to 1) on actual and self-reported financial knowledge

Dependent variables	Estimated response probabilities								
	0 quest.	1 quest.	2 quest.	3 quest.	4 quest.	5 quest.	6 quest.	7 quest.	8 quest.
General knowledge	0***	-0.03**	-0.06	-0.09**	-0.11***	0.03***	0.14***	0.12***	0.02
Retirement knowledge	-0.03***	-0.29*	0***	0.31	—	—	—	—	—
Self-reported knowledge	“strongly disagree”	“strongly disagree”	“disagree”	“disagree”	“neutral”	“agree”	—	“strongly agree”	—
Retirement	-0.02***	-0.15	-0.10***	0.19***	—	0.08	—	—	—
Investment	-0.04***	-0.24**	-0.25	0.42***	0.11	—	—	—	—
Fin. future	-0.04***	-0.25***	-0.27	0.45***	0.11	—	—	—	—
Credit use	-0.03***	-0.15***	-0.10	0.23***	0.04	—	—	—	—

Note: Holding all other independent variables constant at their mean (continuous variable) or mode (categorical variables): gender (=1, female), age (=40.24 years.), ethnicity (=1, white), marital status (=1, married), household size (=2.84), job classification (=2, Field claim workers, lower level).
 * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

financial knowledge (H3c). To determine the existence of gender difference, the equality of the linear regression slopes of the male and female sub set was tested. Specifically, a second-order interaction model was utilized, including an additional 0–1 indicator for gender, the respective predictors, and the interaction of the predictor and the indicator. Significant interaction coefficients suggest that the male and female subsets have significantly different regression slopes and significant indicator coefficients indicate that the two subsets have essentially the same regression slope but the intercepts are different. If both the interaction of the predictors and the indicator and the 0 to 1 indicator for gender are not significant, then there are no gender differences with respect to the relationship between the response and the predictor.

The regression results indicated significantly different regression slopes for the effects of using personal information sources, such as family or friends, on the use of the Internet for financial planning (interaction gender*family/friends: $\beta = -0.109$, $p < 0.05$, 0 to 1 indicator: $\beta = -0.120$, $p < 0.01$). In addition, significantly different intercepts also indicated gender differences for the influence of using personal sources on the use of financial planning software (0 to 1 indicator: $\beta = -0.100$, $p < 0.05$) and, marginally, on the use of financial planning publications (0 to 1 indicator: $\beta = -0.076$, $p = 0.054$). No significant gender differences were found for the use of the financial newsletter.

For the effects of self-directed financial learning on actual financial knowledge (H3b), the second-order interaction model showed significantly different intercepts for general financial knowledge (0 to 1 indicator: $\beta = -0.197$, $p < 0.001$) and for retirement-specific knowledge significantly different regression slopes for the use of software and the Internet (interaction gender*software: $\beta = -0.097$, $p < 0.05$, gender*internet: $\beta = 0.102$, $p = 0.001$, 0 to 1 indicator: $\beta = -0.092$, $p < 0.01$). Gender differences also existed for the effects of the four self-directed financial learning media on self-reported financial knowledge. Significantly different regression slopes suggested gender differences for the use of financial publications and the Internet to predict self-reported financial knowledge about retirement needs (interaction gender*publications: $\beta = -0.145$, $p = 0.001$, gender*internet: $\beta = 0.057$, $p = 0.059$, 0 to 1 indicator: $\beta = -0.110$, $p = 0.01$), for the use of financial publications and financial planning software to predict self-reported financial knowledge about how to invest (interaction gender*publications: $\beta = 0.085$, $p < 0.05$, gender*software: $\beta = -0.087$, $p < 0.05$), and for the use of financial planning software to predict self-reported financial knowledge about how to provide for the financial future (interaction gender*software: $\beta = -0.093$, $p < 0.05$). No significant gender differences were observed in the understanding of how to manage credit use. Hence, evidence for gender differences was found concerning general and retirement-specific financial knowledge as well as for three of the four self-reported financial knowledge measures. To summarize, Hypothesis 3b was fully supported, Hypotheses 3a and 3c supported in parts.

5. Discussion

We assess the use of personal and self-directed learning sources of financial information to advance the literature on financial learning in the workplace. We find that using family and

friends to gather financial planning information generates increased utilization of employer-provided newsletter, publications, and the Internet for financial planning information. Further, we find that using newsletters, publications, and software results in higher general financial knowledge and that the use of all four media increases the actual retirement-specific financial knowledge. Newsletters and financial planning software also influence the self-reported financial knowledge about investments, financial future, and credit use. Self-reported knowledge about retirement needs was, in addition, influenced by information provided by the Internet. We were also able to show differences by gender for a number of variables. These findings generally support our initial suggestion that social learning, in our case through family and friends, enhances self-directed learning.

5.1. Using personal and employer sources of financial planning information

Professional and popular literature already suggested that the family relationship, such as between parents and children or adult children and their aging parents, would initiate financial learning (Schwab-Pomerantz & Schwab, 2002; Timmermann, 2001; Rowland, 1990; Rosendorfer, 2000; Bell, 1988). Our regression results indicate that family and friends have the strongest impact on the use of the Internet for financial enquiries and the reading of financial publications. Co-workers seem less likely to influence self-directed financial learning—they significantly facilitate only the use of the Internet for financial information seeking. This may not be surprising for this sample of office personnel for whom high-speed Internet access has become standard-issue office equipment (Naughton, 1999). Although literature suggests that there is more conversation in the workplace today about investing because of the introduction of defined contribution plans (Powell, 2003), our regression results indicate that personal finance is an uncommon subject in workplace conversation. Instead, financial conversation seems to occur in a family environment. Further research might identify “teachable moments” (Havinghurst, 1972) and appropriate contents of different “life-stage conversations” (Schwab-Pomerantz & Schwab, 2002). Insights about the timing of “teachable moments,” those critical incidents in people’s lives that are considered more predisposed to change, might improve the understanding of the relationship among socio-economic predictors and the most useful educational offerings.

The regression results also indicate that the four employer-provided, self-directed financial learning media vary in their influence on actual and self-reported financial knowledge. Regarding the two areas of financial knowledge assessed in the present study, evidence was found that reading financial publications has the strongest influence on both knowledge areas. Next in order of influence are financial planning software and newsletters. The use of the Internet influences only retirement-specific knowledge. Interestingly, the Internet plays a rather minor role here compared with the prominent place it has as a result of using family and friends for financial planning information. These results may point toward the challenges of this medium, such as the experience needed for locating documents related to ones interests by browsing the Web with search engines, the difficulty in verifying the reliability of information resources (Cheung, Kao & Lee, 1998; Mayfield & Ali, 1996; Ciccotello & Wood, 2001), or the availability of personal computer and Internet access at home (U.S. Department of Commerce, 2004). We also find that self-reported financial knowledge is

more likely to be improved for those who use the financial planning software. This is followed by the use of the financial newsletter. Both media were made available at the workplace. Financial publications and the Internet, both available at the workplace as well, were limited in their influence on self-reported financial knowledge about retirement needs.

To explain these results, future research might integrate additional aspects of the self-directed learning literature into the analysis of workplace financial education. An assessment of the extent to which individuals perceive themselves to possess skills and attitudes frequently associated with self-directedness in learning might provide further information about the use of the four media we studied (see also Alexander & Nigro, 1998; Fox & Bartholomae, 1999). Guglielmino's (1977) 58-item Self-Directed Learning Readiness Scale and Oddi's 24-item Continuous Learning Inventory could be useful guidelines (Oddi, 1986).

5.2. Gender differences using employer sources of financial planning information, actual financial knowledge, self-reported financial knowledge

The findings of this paper indicate that gender differences exist for several relationships in the model tested in this paper. The regression results suggest that women are less likely than men to use the Internet (lowest rank), financial planning software, and financial publications as a result of using family and friends for gathering financial information. No gender differences are found for the effects of personal information sources on the use of the financial planning newsletter. An explanation for these gender differences might be found in the different level of male and female education reflected by the fact that female respondents mostly work in lower-level white-collar positions whereas male respondents are more likely to be employed in higher-ranking white-collar positions. These findings are also consistent with other studies addressing female reluctance in using computer technology (Bredin, 1999).

With respect to gender differences in actual and self-reported financial knowledge, results show that internet-savvy women are more likely than men to show increased actual and self-reported retirement-specific knowledge. On the other hand, men are more likely than women to gain significantly more retirement-specific knowledge, understanding of how to invest and how to provide for the financial future by using financial planning software. Financial publications prevail as a significant information source for women to learn about investments, whereas men favor them to enhance their understanding about retirement needs.

6. Conclusions

Our finding that family, friends, and co-workers play a role in initiating financial learning suggests that adult financial learning is not restricted to traditional classroom settings nor does it require the continuous involvement of an accredited teacher. However, it does require educational offerings that support self-directed financial study. In particular, our findings show that the educational offerings at the workplace were used by employees and were useful for improving financial knowledge.

As another result of this study, it is suggested that social networks become more

responsive to the idea of providing financial planning information and initiating self-directed financial learning. It is important to recognize the potential of financial information provided by family and friends on self-direction as a way of improving a friend's, family member's or co-worker's financial knowledge. Furthermore, the present study provides evidence that employer-provided self-directed learning sources can meet challenges associated with keeping current on constantly changing financial information. This study shows that using these four popular information sources influences self-reported financial knowledge in a measurable manner. It demonstrates that financially informed individuals feel more confident about their financial management skills. Following Hiemstra (1994), future learners will need to become self-directed throughout their lives just to cope with the enormous amount and variety of information available to them.

Appendix

Items of index variables "General Financial Knowledge" and "Retirement-Specific Financial Knowledge"

"General Financial Knowledge"

1. All credit card companies offer a no interest plan if you pay your bill in 30 days (true);
2. Couples who file a joint tax return where one member is at least 55 years old are eligible for one-time exclusion from the capital gains tax on the sale of a personal residence (up to \$500,000) (true);
3. A high deductible on homeowner's or renter's insurance increases the premium paid (false);
4. There is no sales charge when purchasing "no load funds" (true);
5. When you seek greater returns on an investment, you assume a higher risk (true);
6. The rule of thumb is that you should try to have at least 60% of your income in disability coverage (true);
7. Common stocks pay the same dividends year after year (false);
8. The financial health of the household can be evaluated by looking at the household's net worth statements over time (true).

"Retirement-Specific Financial Knowledge"

1. The average American household needs 70 to 80% of their current income to maintain the same standard of living during retirement (true);
2. Tax law allows taxpayers to contribute up to \$500 per beneficiary into an educational IRA (true);
3. You are allowed a maximum annual contribution of \$2000 for an IRA as long as you've earned income or received alimony up to that amount (true).

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