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LEARNING AT WORK IN FEMALE-DOMINATED AND MALE-DOMINATED INDUSTRIES: A PIAAC STUDY

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ABSTRACT

Learning at work has the potential to be an important contributor to employee performance and professional advancement. Yet, gender inequality is prevalent in many workplaces and may influence the types and quality of learning to which employees are exposed. This study's purpose was to examine the relationship between female- and male-dominated industries and learning at work as measured by the Program for the International Assessment of Adult Competencies (PIAAC). For those industry sectors determined to be female- or male-dominated, we used a linear regression model to determine whether a relationship exists between gender dominance and learning at work based on the independent variables gender, education level, and race. Results indicate workers in female-dominated industries engage in more learning at work than those in male-dominated industries. We conclude gender-dominance may influence workplace culture and social interactions, thereby affect learning at work.

Keywords: workforce development, gender, PIAAC, quantitative

INTRODUCTION

The U.S. Bureau of Labor Statistics (2019) reports that women earn 81 cents for every dollar earned by men. While there is some evidence of closing the gap, gender inequity is persistent and more acutely experienced by women of color and low-income women. In the workplace, women must learn from a hidden curriculum that integrates them into a patriarchal workplace culture, thereby placing them at a developmental disadvantage (Bierema, 2001). This study is therefore an investigation into gendered workplaces and the learning that occurs in such workplaces.

LITERATURE REVIEW

Workplace learning scholars have generally reached consensus that employees learn more about how to do their jobs from informal and incidental learning processes than from formal education (Kwakman, 2003; Marsick & Watkins, 2018). As a consequence, the job characteristics and environmental conditions that support a high degree of learning are a key concern (Eraut, 2011; Marsick & Watkins, 2015; Skule, 2014). Workplace learning research emphasizes both social and practice-based theories of learning (Olsen & Tikkanen, 2018) and characterizes workplace learning as self-directed while also leveraging dialogue and collaboration with others (Tikkanen, 2002). As a result, learning at work is directly related to workplace context and the ways in which context supports or constrains learning (Billett, 2004; Schwartz, 2019).

Given society's reliance on work and economic contributions as facets of social equity and inclusion, work structures and job characteristics can reinforce inequality regimes (Acker,

2006), reproducing larger patterns of discrimination with respect to gender, race, and class. Beginning with Acker's (1990) influential work challenging the assumption of organizations as gender-neutral spaces, there has been an abundance of research into the cultures, climates, and experiences of both male-dominated and female-dominated industries and jobs. These industries make particularly good sites for empirical investigations, as they often represent opportunities to explore "provocative exceptions" to gendered norms and rules (Collins, 2015). For example, Collins and Rocco (2015) found that, for gay men working in the male-dominated profession of law enforcement, many often have experiences that subvert the privileges they otherwise enjoy as men. Similarly, Simpson and Stroh (2004) found men working in female-dominated occupations such as teaching often intentionally seek ways to perform and assert their masculinity.

In addition, differences in learning interest and opportunities in the workplace across genders have been documented (Boeren, 2011; Bancheva & Ivanova, 2015). Of particular interest, Boeren (2011) found women's responsibilities outside the workplace may lead to a reduced number of opportunities for work-related training. This strikes us as a "provocative exception" of a sort—that the very employees who may benefit most from additional opportunities for learning and development on the job are not able to access them. Given the polarized cultures of both male-dominated and female-dominated industries and jobs, we believe these may be particularly useful sites to explore gendered differences related to learning on the job.

PURPOSE AND RESEARCH QUESTION

By using the Program for the International Assessment of Adult Competencies (PIAAC) data set to examine these phenomena on a national scale we hope to identify the connections between single gender-majority industries and learning opportunities. More specifically this study aims to answer the research question: What is the relationship between learning opportunities at work and female- and male-dominated industries, while controlling for gender, race, education level and age?

METHOD

The PIAAC dataset by the Organization for Economic Co-operation and Development (OECD, 2016) is the result of an international survey conducted in nations worldwide. The survey includes skills-based assessments of respondents' literacy, numeracy, and problem-solving in technology rich environments proficiencies and demographic background data, including various work-related behaviors and information, including learning activities. The present study used the 2012/2014 United States National Public Data Files from the PIAAC Household Survey.

Female- and male-dominated industries were defined as having 69% or more of one gender among PIAAC respondents. These were chosen because of a seemingly natural cut line in the demographics of PIAAC respondents and because we wanted to focus on industries in which the gender ratio was at least 2:1. In an effort to further confirm our industry selection we examined U.S. Bureau of Labor Statistics (BLS) industry profiles (2020). The analysis showed that the same ten industries met this threshold with Education being the lowest in both at 69.4% and 69.6% in the PIAAC data and BLS, respectively. The seven male-dominated industries were: agriculture, forestry, and fishing; mining and quarrying; manufacturing; electricity, gas, steam and air conditioning; water supply, sewerage, waste management, and remediation; construction; and transportation and storage. The three female-dominated

industries were: education; human health and social work; and households as employers. Table 1 presents the gender percentages for each industry and data set.

Analysis

To investigate the relationship between learning opportunities and female- and male-dominated industries, we ran a linear regression. Learning at work was represented by *LrngWork* which was derived from three questions related to frequency of learning at work: (a) In your own job, how often do you learn new work-related things from co-workers or supervisors? (b) How often does your job involve learning-by-doing from the tasks you perform? and (c) How often does your job involve keeping up to date with new products or services? *LrngWork* had a value from 5 to 15. The control variables were gender, race, education level and age. The following base model was used.

Table 1. Percent of Women in Workforce by Industry and Source

Industry	U.S. BLS	PIAAC
Agriculture, forestry, and fishing	26.2	28.4
Construction	10.3	8.0
Education	69.6	69.4
Electricity, gas, steam and air conditioning	20.3	16.3
Households as employers	91.0	82.9
Human health and social work	78.1	79.7
Mining and quarrying	15.8	18.3
Manufacturing	29.4	26.3
Transportation and storage	24.8	26.0
Water supply, sewerage, waste management, and remediation	18.0	18.5

β_0 designated the intercept value, while *IndDom* was a binary variable representing male-dominated and female-dominated industries with male-dominated industry as the reference category. *Gender* was included in the model as a binary response choice on the PIAAC survey with Male as the reference value. The PIAAC survey design used only a binary variable for gender/sex and did not distinguish between the concepts of gender and sex.

Race was coded with five values with Hispanic being the reference category. *Educ* reflected education level derived and coded into three categories: Less than high school, High school or more (but not a Bachelor’s degree), and Bachelor’s Degree or higher, with Less than high school as the reference category. Last, *Age* was a categorical variable based on age groups 24 years or less, 25-34 years, 35-44 years, 45-54 years, and 55-65 years, with 24 years or less as the reference category. Residual is the error term in the model. The alpha level of .05 determined significance for each variable’s relationship to learning at work.

Participants

We included only participants who had complete response sets ($n=2,139$). 1,073 people worked in male-dominated industries and 1,066 worked in female-dominated industries. All respondents were between 16 and 65 years old and men comprised approximately 51% (1,086) of respondents. 185 respondents had less than a high school (HS) education. 1,247 had more than a HS education but not a Bachelor's degree while 707 had at least a Bachelor's degree.

RESULTS

Results show that frequency of learning at work is related to working in a female- or male-dominated industry. Respondents working in female-dominated industries engage in more learning at work than those in male-dominated industries. The model showed an increase in $LrngWrk$ ($b_1 = 0.36$, $t = 1.98$) for those working in female-dominated industries. Table 2 includes the full results.

Table 2. Linear Regression Coefficients of Learning Opportunities

Variable	b_i	SE	t
Constant	9.89*	0.42	23.50
Industry Dominance – Female	0.36*	0.18	1.98
Female (Gender)	-0.18	0.16	-1.12
Race			
White	0.37	0.25	1.45
Black	0.65	0.35	1.85
Asian/Pacific Islander	0.79	0.43	1.82
Other	0.31	0.59	0.53
Education level			
HS, but no college degree	0.51	0.33	1.54
College degree	0.98*	0.33	2.92
Age			
25-34 years	0.11	0.29	0.39
35-44 years	-0.51	0.27	-1.86
45-54 years	-0.73*	0.33	-2.22
55-65 years	-0.70*	0.31	-2.28

Note: * - $p < 0.05$.

DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

The result that people working in female-dominated industries engage in more learning at work than those in male-dominated industries may relate to workplace culture and social interactions, thereby affect learning at work. For example, some gender-dominated workplaces may exhibit qualities typically associated with masculinity or femininity. An ethos of care typifies some industries classified as female-dominated, such as education and

healthcare. Conversely, a male-dominated workplace may function with a culture of independence or self-reliance, as might be associated with construction or transportation and storage. Gender-normative behaviors may then impact whether workers seek training or ask for help. Similarly, learning at work may be connected to such issues as collaboration (Lopes, Scully-Rus, Zarestky, & Collins, 2019). While Lopes et al. (2019) showed collaboration at work does not necessarily translate to learning at work, gender-dominance may influence the structure of jobs and workplace culture, both of which may then impact learning.

As previously indicated, society's reliance on work and economic status connects directly to issues of equity and inclusion. As a result, work structures and professional contexts can serve to reinforce inequality (Acker, 2006), thereby reproducing or reinforcing societal patterns of bias and discrimination regarding gender, race, and class and numerous other personal qualities. These results have implications for adult educators who wish to support learners in the workplace and seek to navigate the particularities of industries with a dominant gender profile. More work is needed to understand how female- and male-domination in an industry translates to support for workers in the form of learning and educational opportunity. An open question remains regarding the role of mandatory professional development and continuing education. Future studies should explore the role of a culture of learning derived from continuing education in connection to female- or male-dominated industries. Adult educators in workplace contexts have new options to foster individuals' learning at work and navigate and support learning in varying professional spaces and cultures, and ultimately facilitate social change by working to challenge systems that reproduce inequity and bias.

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