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Retaining Women in Technology

Uncovering and Measuring Key Dimensions of Daily Work Experiences

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Abstract—In spite of many initiatives to attract and retain women in technology, the numbers are sobering. One contributing factor is a mismatch between the expectations and needs of women in technology and workplace realities in technology companies. Through qualitative and quantitative studies, we identified key factors necessary in the daily work experience within a technology company and also of women's self-perception in this environment. We developed the @Work Experiences Measure and showed that its dimensions can differentiate the experiential quality of different work environments in technology firms. Using the measure, we demonstrated that the number of women in the team is related to a more positive work experience. We also showed that employees "thinking of leaving their job" have significantly lower scores on the measure. Using this measure companies can identify what to focus on to help create success for women. Future research will further calibrate the measure on additional populations, within and between companies and develop effective recommendations for interventions.

Keywords—women and STEM; organizational climate; gender; empirical study.

I. INTRODUCTION

Technology continues to be a sector where job opportunities exist, and where positions go unfilled [1, 2]. At the same time, women continue to be underrepresented in technology as compared to their numbers in the overall workforce [3]. Moreover, although women make up half of the population, and they are certainly a key consumer base for technology products, they are glaringly absent from tech jobs, especially in North America, Western Europe, and Australia. Consider the following:

- In the US in 2016, only 26% of the professional computing workforce consisted of women. Three percent of the computing workforce were African-American women, 5% were Asian women, and 2% were Hispanic women [4].
- In Canada, women represent a quarter of the high tech workforce, a statistic that has not changed in 10 years [5].
- According to a 2017 Australian report, less than 15% of engineers were women, the estimate suggests that the status quo with respect to the number of women engineers continues. The unemployment rates for women were

generally significantly higher than men irrespective of qualifications [6].

- In the European Union, women represented only 16% (1.2 million) of all ICT specialists employed in the EU [7]. Across the EU, among women aged 30 who graduated with a degree in information and communications technology (ICT), only 20% still work in the field. By age 45, just 9% are left [8].

The number of women impact innovation and profitability too. Research shows that a diverse and inclusive workforce, especially in IT, is correlated with higher innovation, creativity, revenue, and profits [9-13].

II. RELATION TO EXISTING THEORIES AND WORK

A. Corporate Response to Increase Diversity: Filling the Pipeline

In response to these studies and reports documenting the underrepresentation of women — and highly critical press reports — many high tech companies have committed resources to creating a pipeline of underrepresented workers from which they can recruit. For example, Intel budgeted \$300 million for workplace diversity. Pinterest first announced goals for increasing the number of women and minority engineers [14], and then created apprenticeship and internships programs [15]. Apple committed more than \$50 million to diversity efforts for gender, race, and sexual orientation. Apple is also partnering with historically black colleges and universities [16]. Organizations are becoming involved with Girls Who Code and historically black colleges and universities (HBCUs) in order to encourage participation in STEM (Science, Technology, Engineering, and Math), as well being as a recruiting source [17]. Finally, several high tech companies — both established enterprises and startups — have created new C-level positions for Diversity and Inclusion to focus on the issue [5].

Despite these efforts, diversity number stay the same (e.g. [18-21]), accusations of gender discrimination and sexual harassment have gone up (e.g. [22-25]) and retention and advancement are largely overlooked [26, 27].

B. Beyond Filling the Pipeline: Retention

The focus of these efforts has been to recruit and increase the number of women in the organization — to create a

pipeline. These are critical first steps which have been the focus of Human Resources departments, university STEM recruiting, and organizations like Anita Borg Institute for years. But with the number of women who enter the field dropping or stagnating, clearly more is needed beyond simply encouraging women to choose technology as a career.

The most disturbing findings are that women who enter the field leave more often than men. Here are a few examples:

- The Anita Borg Institute cited a study showing that 56% of women in high technology careers left over time with a quit rate double that for men [28, 29].
- A scorecard from the National Center for Women & Information Technology reported that women leave computing at twice the rate of male peers [30]
- A 2013 study reported that 50% of women in STEM careers leave the field for other occupations in the first 12 years of their career, compared to 20% of professional women in non-STEM fields [31].
- The 2017 Tech Leavers Study, an analysis of why people voluntarily left their jobs in tech, shows that unfairness is the key driver for tech employees to leave — and women of all backgrounds experienced and observed significantly more unfair treatment overall than men [12].

These findings are disheartening since they work against the explicit goals that companies have set for themselves. Technology companies incur a significant cost when women leave a company, whether to go to another company or abandon the field. For example the Tech Leavers Study estimates that tech employees leaving due to unfairness, will cost tech companies \$16B per year in employee replacement costs [12].

Not only are corporate goals to increase the number of women impacted, companies also lose the investment they made in the person's training and support. More importantly, they lose potential women leaders. Since companies are now being judged by their overall number of women and the percent of women leaders, this is a significant cost. This impact plus the findings that teams with a diversity of perspective also improve innovation and financial performance, the cost of losing women is substantial. Focusing on retention with the same vigor companies have applied to creating a pipeline is in the best interest of technology companies [32].

C. Challenges Faced by Women Working in High Tech

Why are women leaving technology companies? Research indicates that workplace factors and cultural values contribute most significantly to the phenomena of women leaving tech careers. Studies depict a set of challenges:

- Level Playing Field Institute found that IT workplace experiences vary significantly by race and gender, and that women and people of color have significantly more negative workplace experiences [33].
- The Tech Leavers Study showed that stereotyping is negatively related to length of employment in tech. The

more stereotyping and bullying experienced, the shorter the length of time that employees remained at their previous company [12].

- A report from Anita Borg Institute described cultural values specific to high tech companies that worked against women [34, 35]. Similarly, Singh, Suar, & Leiter described a hostile work climate in which role ambiguity, erosion of community, absence of fairness, and interpersonal conflict are not uncommon [36].
- The 2018 Pew Research Center report showed that 50% of women in STEM jobs say they have experienced gender-related discrimination in the workplace, more than women in non-STEM jobs (41%) and far more than men in STEM positions (19%) [26].
- Several studies found that the “ethos of competition” and aggression and the mismatch between expectations, ideals, and workplace realities in engineering companies are often more harmful to women compared to men [37-40].

These reports talk about the implicit culture and values of technology companies and their apparent impact on sustaining a diverse workforce. For example, in the Anita Borg report executives talk about the “hero” culture, where employees are expected to work long hours to save projects. The hero engineer who saves the project at the 11th hour is rewarded, not the employees who work to prevent the problem. This “ethos of competition” alienates women and undermines a collaborative environment [37]. A competitive hero culture can contradict the espoused company culture, which often cites collaboration as a key value. Yet it is the hero individual who is recognized. So current research has described and documented women's negative experiences but offer little in the way of techniques to foster change.

Often we turn to the issue of home-work balance as a recognizable fix. The hero mindset is translated into a 24/7 job availability workplace culture. This engineering culture is thought to be discriminating against working women with family responsibilities, who can't devote 24/7 to the job. As a result, some companies report that women are self-selecting themselves out of jobs. In response, corporations are starting to create support programs for new parents [41]. Many of these approaches were tried in the 1980s at companies like Hewlett Packard which offered — and still offers — job sharing and other types of support. But recent studies show that family issues are not the primary reason for women leaving engineering occupations [34, 42, 43]. And research suggests that men depend on work-family balance more than women; women are more resilient regarding work-family balance issues [44]. As Joan Acker has argued, organizational attempts to reduce inequality by introducing family-friendly policies “for women” might work against perceiving the woman as an equally capable worker, i.e., she needs special treatment. As such this reinforces traditional expectations for women [45].

All of this suggests that the core issues for women lie in what is going on in daily work life and the culture of the workplace. As such, a larger pipeline and parental support will not address core issues affecting why women stay or leave a

company or the field. Unfortunately, beyond documenting the problem, the literature sheds little light on the day-to-day life of women in high tech companies or how they deal with the typical culture within these companies. We know how women feel and what they report but we know little about what practices, interactions, relationships and personal strategies help women succeed and thrive. Companies, providers, and researchers have talked about, researched, and offered seminars on issues of unconscious bias since the late 1970s. Yet the conclusion drawn from reviews regarding whether existing interventions work is sobering [46]. Forty years later too many women do not thrive and leave their job and the technology industry. New approaches should ensure gender equality by design by focusing on using relevant metrics and develop evidence-based interventions based on what works [47].

Successful retention and promotion for women call for a deeper understanding of what works and what gets in the way in the daily life of working teams. That is the purpose of our research: to understand and measure daily work experience in order to identify where intervention can make real change. And then to develop workable and effective interventions.

III. RESEARCH APPROACH

A. *Qualitative Research: Identifying Key Factors*

Recognizing the lack of deep, field research into women's experiences at work, and to create a framework for action, an initial field study was launched by Karen Holtzblatt in collaboration with students at Stanford University and professionals at InContext Design. Using Contextual Design techniques [48] this research revealed the core experiences (factors) that characterize the daily work lives of successful women in technology. These factors suggest what women need to thrive in technology companies.

A total of 20 field interviews were conducted in two stages. The initial interviews were with ten successful women from ages late 20s to 50s working in engineering, user experience (research and design), product management, or related occupations in high tech companies. The second set of ten women expanded the numbers in the different job categories and added developers, people managers, and several women who left the field completely. Across the sample each of the women interviewed had left a job for another position at some point in their career. All women were living and working in the United States and employed in various kinds of high tech companies. A cross section of marital status, family compositions, and ethnicities were represented.

We began by focusing on successful women to understand what draws women to technology and keeps them engaged at work. The emerging factors then helped us see if these are the missing experiences underlying why women leave a job — or if there are more. Since all women interviewed had changed jobs we were able to see if these experiences also underlay decisions to leave one job for another. Two-hour field interviews were structured to follow each woman's life story starting with their interest in technology and moving through their experiences in college, first and subsequent jobs, and ending with their current job. The interview was an unstructured dialogue taking a 360° inquiry into daily life and

work looking for success factors, influencers and supporters — or the lack there of. It included looking for critical incidents that affected their decisions and experiences throughout their lives and career.

The discussion of daily work experience focused on their projects, teamwork, meetings, management interactions, support, promotion, corporate culture, and interactions with men. To get contextual data and detail, we asked the women to focus on the last two weeks of experiences at their current job and critical incidents in previous jobs. For managers, we also asked about their philosophy of management and to give three stories of where they thought they did a great job and where they thought they failed or needed to improve. The women drove the discussion within the interview framework depending on their experiences. The interviewer probed for understanding, impact, and motivations as necessary. Interviewers were mindful of time and sought to cover the areas of the interview framework.

The overall intent of the interviews was to understand what contributes to success for women and if the lack of those same things nudge them to leave a job. As applied researchers, we sought to understand and find the most powerful intervention points — areas where companies might change their practice, policy, programs or management approaches. As such, we spent time understanding practices of product development, management, evaluation, promotion, and the like. We did not focus on issues related to recruiting and pipeline nor family benefits unless the women raised them as a critical issue.

Interviews were interpreted using Contextual Design methods [48]. Key stories and observations were captured within 24 hours. Following each phase of 10 interviews, we built and extended an affinity diagram (cf. [48], p. 127). The affinity diagrams revealed key themes that characterize women's experiences across their lives, what women love about work and what gets in their way. Affinity diagrams group together similar ideas inductively to create a hierarchy revealing the themes.

These key factors highlight aspects of work life within a technology company and also of women's self-perception. These factors, The @Work Framework [49, 50], cover the following areas that were identified as relevant for the women that were interviewed:

- **Dynamic, Valuing Team:** Women thrive in a dynamic work-focused team and/or partnerships. They lead, follow, feel valued, and can talk about life outside of work.
- **Stimulating Project:** Women love working on challenging technical problems, products, or research questions important to the company, the industry, or the world. They switch jobs when bored.
- **“The Push” — With Support:** Women may not feel qualified for the next challenge. But when pushed by trusted managers, colleagues, or family they take it on and succeed — if they have support, to strategize with others, ask questions, and falter.

- **Local Role Models:** Women need coaching relationships in their organization to help them navigate work and advancement. They may seek promotion if the lives of senior people look desirable — but often those lives don't.
- **Nonjudgmental Flexibility:** Women with children thrive if the team and managers flex to everyone's life commitments. These women too often feel judged. Being given flexibility shows they are valued.
- **Personal Power:** Women can have self-doubt about their skills, readiness, and value. Self-esteem increases with positive feedback, helpful critique, clear expectations, and good coaching.

B. Pilot Study for the @Work Experience Measure

To strengthen and expand our understanding and to validate the factors in the @Work Framework we constructed a survey. We developed the items based on the field research, using techniques from Contextual Design to analyze the affinity diagrams, similar to the way we had previously created metrics based on qualitative data [51]. Several HCI professionals conducted a Wall Walk (cf. [48], p. 253) of the initial affinity diagram representing the themes and generated ideas for statements that would measure the experience represented in the data. This initial collection of statements was then reduced into a set for each factor and any other critical area that appeared in the affinity diagram. This produced a balanced set of 124 questions plus questions about demographics. Two kinds of items were used: 1.) Statements where the participants had to express their agreement on a 4-point Likert scale (1-strongly agree, 2-agree, 3-disagree, 4-strongly disagree) and 2) sliders that presented two opposing experiences with a 10-point scale. We tested all statements for clarity, readability, and confusion by having outsiders take the test and provide feedback.

The first survey was a pilot exploring how well (and which) questions worked and whether the questions clustered into the factors. The pilot survey took about 30 minutes to complete. Using a call for participants through social media, we created an open link for people to take the survey. We received responses from 225 women world-wide but skewed to women from the West Coast of the United States. About half of them were younger than 35 years old; approximately 80% were younger than 45 years. Roughly two-thirds were married or living with a partner; the remaining one-third had children living at home. Developer/software engineers, project managers, user experience researchers, and user experience designers each made up about one-fifth of the sample, the remaining one-fifth had other IT professions. Approximately a quarter had been in their current job for less than a year, one-third were in their current job for one to three years. Three quarters worked in a large company with more than 10,000 employees, the remaining worked in small companies and medium companies. One-third of the respondents had a female manager or supervisor.

We used cluster analysis to evaluate the results. Cluster analysis is an exploratory tool designed to reveal natural groupings (or clusters) within a data set that would otherwise

not be apparent. Based on hierarchical agglomerative clustering methods, we used dendrograms to graphically represent the cluster solution. The interpretation of the dendrograms supported the dimensions identified in the fieldwork. We then used these indicators to reduce and focus the questions to create a 10-minute survey.

C. Creating the @Work Experience Measure: The Current Metric

To validate the @Work Experience Measure we studied a stratified sample of women and men in tech to confirm the validity of the measures and to create a metric that can be used to assess how companies are doing and analyze trends over time. This new survey included items related to overall experience, along with the factors and perceptions of working with men as was done in the pilot. But because we were also sampling men in this second survey, we added items about working with the opposite gender in language appropriate to each gender. We also included items answered only by participants who were managers to start assessing their experience as a manager. For data collection, we made use of an online panel provider.

Participants and Procedure—Participants had to fulfill specific criteria: age (25-45 years), employment status (full-time or contract / freelance / temporary employee), industry (a broad range of tech companies was included), and IT-related job role (developer/software engineer, manager of people on technology teams, product manager or equivalent, user researcher/UX designer/interaction or visual designer). They also needed to be working in their job for at least nine months but no more than 16 years. Quotas were set for gender (75% women, 25% men) and 100 people per job role category. We collected completed surveys from 403 participants. The survey was active in the field from September 27 to October 11, 2017. Respondents received an industry-standard compensation for their time to complete the survey based on the panel provider's normal business operating model. Participants provided consent by opting in and then completed the survey anonymously.

Participants were 303 women (75%) and 100 men (25%). The participants ranged in age from 25 to 45 years, with 252 (63%) between 25-35 and 151 (37%) between 36-45 years. Ninety three (93) (23%) were single, 269 (67%) were married or living with a partner, 31 (8%) were living with children younger than 12 years, and 10 (2%) were living with children between the ages of 13-18. All participants were working in the United States. For 342 (85%) the US was their country of origin and 61 (15%) were born outside the US. In terms of ethnicity, 64 (16%) identified as Asian Indians, 27 (7%) as Black/African American, 28 (7%) as Chinese, 32 (8%) as Hispanic/Latino, 5 (1%) as Japanese, 3 (1%) as Pacific Islander, 232 (57%) as white/Caucasian, and 12 (3%) identified with another ethnic group. Forty two (42) participants (10%) identified as LGBTQ (Lesbian, Gay, Bi-sexual, Transgender, Queer).

Principal Component Analysis—To validate the measurement instrument, we examined if the variables we had used in the survey correspond to the postulated dimensions. We used principal component analysis (PCA) — a statistical

technique for identifying structural properties of multidimensional data — to investigate if the latent dimensions of the data coincide with the factors that we had derived. In addition, PCA allowed us to determine which items best represented the respective factors. Such a selection can contribute to a significant reduction of the number of items required for determining the @Work Experiences on all relevant dimensions. The Kaiser–Meyer–Olkin measure verified the sampling adequacy, $KMO = .941$, and Bartlett’s test of sphericity ($\text{Chi-square}(1378) = 100783.75, p < .001$) indicated that the correlation between items were sufficiently large for PCA. We performed PCA with Oblimin rotation. Nine components emerged with eigenvalues over Kaiser’s criterion of 1 and explained 58.69% of the variance. To further increase the quality of our measurement model, items were removed based on two criteria: 1.) Items with low factor loadings and low squared multiple correlations were removed to improve model fit, 2.) Items similar in phrasing to better performing items and items that were too similar to other constructs regarding the content were removed. Three to seven items remained in each scale that represent the dimensions of the @Work Experience Measure.

Analysis of Variance—We conducted a first series of analysis of variance (ANOVAs) with the @Work Experience Measure. We used gender diversity of the team as the independent variable, measured with the question “Considering the team of people you work with on a daily basis, what is the gender balance?” and divided in four levels: no women, only one woman, several women, a significant number of women. The scales of the @Work Experience Measure were used as dependent variables, each as a separate outcome.

IV. FINDINGS

A. Description of the Resulting Scales

The components of the analysis were in line with the postulated dimensions based on the qualitative research and the pilot study. They represent the following scales to describe @Work Experiences:

- **Overall experience:** The scale assesses the way participants evaluate the crucial aspects of their overall workplace experience (e.g. “A valued and an important part of my team and company”).
- **Team:** The scale assesses the way participants characterize their work experience with their team and whether they feel they have a dynamic, valuing team (e.g. “A tight knit group of people up to something that matters”).
- **Projects:** The scale assesses the extent to which participants feel the projects they are working on are stimulating and impactful (e.g. “The work I do is influential, affecting the company, industry, or future of technology”).
- **Push and support to challenges:** The scale assesses the experiences regarding the challenges and the support the participants receive at work from their team and their manager (e.g. “I’m pushed by my manager, so I take on a challenge — even if I doubt myself”).

- **Local role models:** The scale assesses the extent to which the participants have people to talk to about work challenges and if they aspire to taking on the life and work of a manager. (e.g. “I can see myself living the career life of my role models; mentors, or manager above me”; “I do not have enough people in my company I can really talk to about my career aspirations”).
- **Becoming a manager:** The scale assesses the extent to which it seems attractive to become a manager (e.g. “The life of a manager isn’t appealing: too much work, travel and politics” versus “I want to be a manager so I can influence direction. I like the responsibility of a leader.”).
- **Nonjudgmental flexibility:** The scale assesses the extent to which the team and the organization flexes to needs of balancing home and work commitments (e.g. “I’m comfortable talking to my manager about home/work balance issues”).
- **Personal power:** The scale assesses the extent to which the participants feel they know and can fulfill the expectations they are confronted with (e.g. “I know what is expected of my role so I can be successful.”).

To determine the consistency of the scales, we calculated Cronbach’s Alpha for each scale. For the z-transformed data, the Alpha values are between .70 and .90, meaning that the scales appear to be consistent, i.e., the measures of the respective dimensions consistently measure the same construct. One component from the PCA did not match the factors identified in previous work and did not constitute a coherent scale in terms of content or reliability; thus the items were excluded from the scales and stand by themselves (e.g. “I am thinking about leaving my job”).

TABLE I. RELIABILITY OF SCALES

Scales	Number of Items	Cronbach’s Alpha
Overall experience	7	.85
Team	6	.90
Projects	6	.86
Push & support	6	.80
Role models	3	.70
Becoming a manager	3	.82
Nonjudgmental flexibility	3	.73
Personal power	6	.76

The scores from these scales can be used to assess the @Work Experience. A higher score represents a more positive experience for that work experience. A lower score indicates areas of weakness and therefore intervention opportunities for companies.

B. Findings Regarding Gender Diversity of Teams

Gender diversity of the participants’ teams was found to be related to different scores on most of the scales developed to measure @Work Experience. The ANOVAs with the four levels regarding the number of women on the team (no women, only one woman, several women, a significant number of

women) yielded significant results in six of the eight scales (see Table II).

TABLE II. RESULTS OF ANOVAS REGARDING THE NUMBER OF WOMEN ON PARTICIPANTS' TEAM^a

Scales	F ^b	p ^c
Overall experience	8.955	***
Team	8.479	***
Projects	4.044	**
Push & support	4.669	**
Role models	1.374	n.s.
Becoming a manager	1.106	n.s.
Nonjudgmental flexibility	6.777	***
Personal power	9.323	***

^a N=403, 4 levels of independent variable "Gender Diversity" with "no women in team" (n=12), "only one woman" (n=79), "several women" (n=210), "a significant number of women" (n=102)

^b Degrees of freedom were (399, 3) for all F-tests.

^c Significance: *p<.05, **p<.01, ***p<.001, n.s.= not significant

In all the scales that showed a significant result regarding the gender diversity of the team, the relationship between the number of women in the team and the experience at work had the same direction. For all these scales, more women were correlated with a more positive @Work Experience (see Fig. 1 for an example of this relationship).

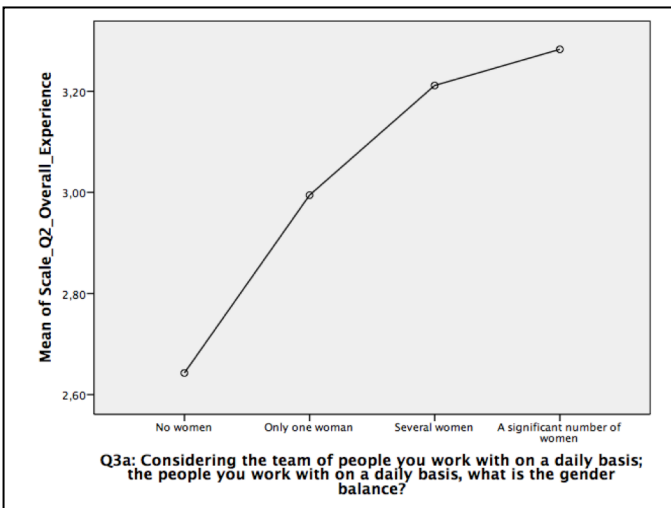


Fig. 1. Scores for the scale "Overall experience" based on number of women in team

To check if the factors differentiate between those tech professionals who want to leave their job and those who do not, we conducted an ANOVA with "Thinking about leaving my job" as an independent variable: Those who (strongly) agreed to this item were compared to those who (strongly) disagreed. Dependent variables were the scales of the @Work Experiences Measure. Regarding the independent variable, 110 women (36.3%) and 40 men (40%) said they (strongly) agree to be thinking about leaving their job.

RESULTS OF ANOVAS REGARDING "THINKING ABOUT LEAVING MY JOB"^a

Scales	M (strongly disagree)	M (strongly agree)	F ^b	p ^c
Overall experience	3.25	3.04	14.490	***
Team	3.26	2.79	62.212	***
Projects	3.21	2.97	16.632	***
Push & support	3.14	2.93	15.579	***
Role models	2.99	2.83	6.108	*
Becoming a manager	2.98	2.87	1.847	n.s.
Nonjudgmental flexibility	2.72	2.95	0.374	n.s.
Personal power	3.25	3.04	16.155	***

^d N=403, 2 levels of independent variable "Thinking about leaving my job" with n=253 who (strongly) disagree and n=150 who (strongly) agree

^e Degrees of freedom were (401, 1) for all F-tests.

^f Significance: *p<.05, **p<.01, ***p<.001, n.s.= not significant

Six of the eight scales yielded significant differences between the participants who said they were thinking about leaving their job vs. those who said they were not thinking about leaving. For all those scales, thinking about leaving was correlated to a lower score, i.e., to a more negative rating in this scale (see Table III).

V. CONCLUSION

We uncovered and measured key dimensions of daily work experiences within technology companies. We conducted a qualitative field study with women in technology and identified key factors that affect women's experiences at work related to retention. One factor also characterizes women's self-perception in this environment. Based on the field study a pilot survey was conducted to measure the experiences found in the @Work Framework and identify items to describe each factor. From this pilot we selected the best questions in each cluster to create a shorter survey. The latest measure described here tested the efficacy of this measure. In this US-based study, we used a stratified sample of 403 tech professionals to confirm the validity of the scales found in our research. We found eight scales that describe the range of experiences of daily work. The scales were shown to be reliable and valid with regard to the underlying dimensions that we had discovered.

We demonstrated that the eight scales of the @Work Experiences Measure can differentiate experiential quality of different work environments. We measured the impact that the number of women in the team had on the experience of the team members and could show that the scales measure how the experiences vary. For both men and women, a higher number of women in the team, i.e., more gender diversity, was related to six of the eight factors: a more positive overall experience; a stronger feeling of being part of a dynamic, valuing team; the impression that the projects they were working on are stimulating and impactful; a sense that they are both pushed and supported in their work environment; the feeling that there was a team that flexes to needs of balancing home and work commitments; and the extent to which they felt they know and can fulfill the expectations they are confronted with.

We also showed that the scales differentiated as to whether professionals in technology were “thinking about leaving their job” or not. Employees who were thinking of leaving had significantly lower scores on the @Work Experiences Measure regarding the following factors: their overall and team experience was more negative; they felt their projects were less stimulating and impactful; they had less of a sense of being pushed and supported; they did not see as many people they could talk to about work challenges; they did not feel they knew and could fulfill the expectations they were confronted with compared to participants who were not thinking about leaving their job.

In addition, our qualitative data suggests that all factors matter to the experience of thriving. As such a low score — or even a midway score — is cause for concern. It suggests that the overall experience of women makes them vulnerable to attrition.

Further validation studies are currently ongoing or planned. One major focus of an ongoing study is to investigate how the factors hold up in an international sample of professionals in tech. Upcoming studies will then investigate the use of the @Work Experience Measure as a diagnostic tool in the industry.

With its focus on specific behaviors the @Work Experience Measure is different from measures of job satisfaction in that it points to specific behaviors rather than generalized emotional state. Scores per scale can be used to differentiate within and between companies. Also, team or division scores that are lower than the overall company score can highlight areas of concern. The scores of the scales and the results of single items can be consulted to get an insight into what is happening within the organization. Finally, the @Work Experience Measure can be used to analyze trends over time.

Through our studies presented here we gained an insight into what matters to women in technology and the nature of the day-to-day work experiences that will help them thrive and succeed. The @Work Framework helps us understand the dimensions of work that we must pay attention to if we are going to retain women. The @Work Experience Measure allows us to measure the health of an organization against these factors in a 7-10 minute survey. These scores help us understand the organizational and team environment in which professionals in technology find themselves. The scores are the basis for identifying recommendations and interventions to improve work experiences within the organization.

The purpose of the overall Women in Tech project is not only to understand and assess work experience but also to create workable interventions. Parallel work is ongoing to develop management, team, and interpersonal techniques and practices that organizations may adopt and iterate. In addition, we have developed a board game to help tech workers think about work issues, foster awareness, and create a shared understanding of the challenging situations faced by women in technology [52]. All of these solutions are informed by our data and experiences with product teams. Once the @Work Experience Measure identifies areas of strength and weakness in an organization we will have the insight and direction we

need to recommend specific interventions to help create success for women.

Since the scales build upon each other, a 360-whole experience approach will be needed to stem the drain of women from our field. By understanding women we may have discovered overall factors of why anyone — men and women — thrive. Perhaps these are the aspects of work that truly matter to all people. When they are present professionals in technology thrive; when several or all of the factors are missing people vote on the culture of the company and the field with their feet. It may be that the real differences between the genders is that mainstream men are more likely to receive these experiences as part of work but women and other diverse workers do not. We are continuing to analyze our data to understand gender differences.

Having uncovered and validated the factors in the @Work Framework we have begun to understand where intervention and change in any company is needed. Our work points the way for us to develop recommendations and interventions to improve daily work experience for all workers in technology companies.

ACKNOWLEDGMENT

The authors thank their participants. This work was partially funded by the Federal Ministry of Education and Research, Germany (BMBF), as part of the project "Gender. Wissen, Informatik. Netzwerk zum Forschungstransfer des interdisziplinären Wissens zu Gender und Informatik (GEWINN)", grant numbers 01FP1603, 01FP1604, and 01FP1605 and by the University of Maryland College Park Foundation. The responsibility for all content supplied lies with the authors.

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