Career Transitions: Exploration of Women's Trajectories into a Computing Role

JIA ZHU, Florida International University, United States
STEPHANIE LUNN, Georgia Institute of Technology, United States
MONIQUE S. ROSS, Florida International University, United States

Background and Context: Women remain minoritized in the global digital labor market [4], which is problematic since technology innovation requires a diverse set of employees with computing skills [7]. Existing studies have primarily focused on examining female students at the K-12 and/or post-secondary levels [1–3], but less is known about women who are in the workforce and choose to enter a computing program or who transition into a computing role after obtaining an initial undergraduate degree(s) in a non-computing field. It is critical to learn more about the unique trajectories taken by those with non-traditional backgrounds to encourage the participation and retention of additional women in computing.

Objectives: This poster presents a pilot study conducted to characterize the types and features of alternative pathways commonly chosen by women in the United States (U.S.). We use Super's Life Span and Life Space framework [6] to guide our inquiry as we consider the correlation between life spaces for women and their career transitions into computing from other fields. This theory addresses different career development paths as a consequence of career development at distinct stages through progressive efforts in pursuing career growth [5, 6]. It considers factors which may influence career development, such as social learning experiences, personality development, and one's values, needs, and abilities. We use this theory to explore women's life roles and the potential impact on career aspirations.

Method: Data collection involved leveraging publicly available job profiles for women who entered computing later in their educational and/or career paths and who are currently working in computing-related positions. To characterize the women's trajectories, we conducted a content analysis, with a focus on their education, computing-related job information, and organizational affiliations.

Findings: The exact alternative pathway programs selected by women from the targeted population varied on a case-by-case basis. We observed that women may obtain additional degrees in computing from higher education institutions, although they may also hone their skills through coding bootcamps and via self-learning through online resources. In particular, women switchers often have a background in mathematics, statistics, and electronic engineering. Moreover, we discovered that the majority of women, despite the field of their undergraduate majors, experienced exposure to computing through serving as research assistants.

Implications: Exploring the backgrounds of these women, who may enter the field through alternative pathways, furthers our understanding of potential avenues to attract and retain an untapped talent pool. By examining different pathways, we seek to provide insight into ways to better support these women's transitions and to find additional ways to encourage more women to join this profession in demand. We recommend offering increased flexibility in coursework for learners and increased opportunities to gain exposure through undergraduate research. The results could not only be of interest to program administrators but could also offer suggestions for computing educators looking to make their lessons more inclusive.

CCS Concepts: • **Social and professional topics** → **Computing education**.

Manuscript submitted to ACM

ACM Reference Format:
Jia Zhu, Stephanie Lunn, and Monique S. Ross. 2022. Career Transitions: Exploration of Women's Trajectories into a Computing Role. In *ICER '22: ACM Conference on International Computing Education Research, August 07–11, 2022, Lugano, Switzerland.* ACM, New York, NY, USA, 2 pages. https://doi.org/XXXXXXX.XXXXXXX

References

[1] Maral Kargarmoakhar, Stephanie Jill Lunn, Monique S Ross, Zahra Hazari, Mark A Weiss, Michael Georgiopoulos, Ken Christensen, and Tiana Solis. 2021. Impact of Social and Programmatic Experiences on Students' Interest in Pursuing a Graduate Degree in a Computing Field. In *2021 ASEE Virtual Annual Conference Content Access*.

[2] Stacy Kastner, Sarah B. Lee, and Tori Holifield. 2016. An Investigation of Pathways to Computing for Middle and High Schoolers in the U.S. South. https://peer.asee.org/an-investigation-of-pathways-to-computing-for-middle-and-high-schoolers-in-the-u-s-south ISSN: 2153-5965.

[3] Kathleen J. Lehman, Annie M. Wofford, Michelle Sendowski, Kaitlin N. S. Newhouse, and Linda J. Sax. 2020. Better Late Than Never: Exploring Students' Pathways to Computing in Later Stages of College. In *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*. Association for Computing Machinery, New York, NY, USA, 1075–1081. https://doi.org/10.1145/3328778.3366814

[4] Jane Margolis and Allan Fisher. 2002. *Unlocking the clubhouse: Women in computing*. MIT press.

[5] Wendy Patton and Mary McMahon. 2006. The systems theory framework of career development and counseling: Connecting theory and practice. *International journal for the advancement of counselling* 28, 2 (2006), 153–166.

[6] Donald E Super. 1980. A life-span, life-space approach to career development. *Journal of Vocational Behavior* 16, 3 (June 1980), 282–298. https://doi.org/10.1016/0001-8791(80)90056-1

[7] UNESCO. 2021. UNESCO Science Report: the race against time for smarter development - UNESCO Digital Library. https://unesdoc.unesco.org/ark:/48223/pf0000377433