

A Vision for Future Wireless Cities: Augmented- and Virtual Reality-based Workforce Development Tools for Low Income Philadelphia Residents

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The relatively high rate of unemployment in the United States at the present time is often considered to be at odds with reports on skilled worker shortage. While there is some disagreement as to the extent of this shortage among business leaders, academics and other experts agree that a significant portion of the unemployed could find work if they possess better skills. U.S. competitiveness hinges on better access to skilled labor¹. Furthermore, it is important that when U.S. employers are asked for reasons for not filling jobs², 55% quote *lack of talent/ no applicants* and 44% quote *lack of experience*. Few U.S. metro areas have experienced the increase in income disparity to the extent that Philadelphia has.

In this presentation, we will present a vision for how high-bandwidth municipal wireless communication networks can be used to deliver virtual- and augmented-reality based training to low income residents in Philadelphia. Furthermore, we will employ this new workforce and these high-capacity networks to facilitate the growth of new industries targeting the digital economy, creating new jobs and training opportunities for entry-level positions in this sector. We envision a unique collaboration between academia, non-profit and for-profit industry, and local government that will leverage our experiences through the Philadelphia-based Freedom Rings partnership³. Philadelphia poses a unique set of opportunities and challenges for such an advanced workforce development vision. While Philadelphia was at the forefront of cities attempting to use public municipal wireless networks to provide broadband access to low income residents, the legacy of this failed effort provided the seeds for “the first large-scale solution for narrowing the digital divide”⁴.

The following example illustrates one vision for how Philadelphia can leverage next generation wireless infrastructure to become a “Future Wireless City”. Drexel University, the lead academic institution in the Freedom Rings partnership, has collaborated to create nearly 80 public computing centers around the city of Philadelphia. These public computing centers, or KeySpots, currently provide Internet access and computer training to low income communities in Philadelphia. They also network together a unique partnership of non-profit humanitarian organizations in Philadelphia who have diverse approaches to technology based training. It is our vision to work with the Freedom Rings partnership to enhance these KeySpots to become information hubs for advanced workforce development applications aligned to initiatives like US IGNITE and UpSkill America. Specifically, through proposed partnership with internet service providers, there will be dedicated high bandwidth fiber connections from Drexel to the KeySpots, allowing them to leverage Drexel connections to Internet2 and NSF GENI networks. Building upon our experiences as a member of the NSF GENI-WiMAX program, the KeySpots can also be further enhanced to have wireless base stations with which to provide high bandwidth connectivity to the local community. We envision cloud based rendering of AR and VR based educational modules delivered through high bandwidth connections to KeySpots. Workforce development training applications can be developed in diverse areas including training of first responders and emergency personnel, advanced manufacturing, remote maintenance and repair, municipal services, nursing and general health care. In this presentation, we will expand on this vision for advanced workforce development in Future Wireless Cities and discuss some of the background as well as non-technical and technical challenges of such an initiative in Philadelphia.

Speaker bio: Kapil R. Dandekar is the Director of the Drexel Wireless Systems Laboratory (wireless.ece.drexel.edu). His primary research is in the area of experimental wireless networks and field testing of new wireless technologies. He was the PI for Drexel participation in the FreedomRings program, PI for a NSF project on deployment of experimental wireless infrastructure through the NSF-GENI WiMAX program, and co-PI on a NSF EAGER grant developing desktop virtual reality tools for advanced workforce development in alternative energy applications. Dandekar is also one of the founders of the Engineering Projects in Community Service (EPICS) in IEEE program which is responsible for the application of service learning projects for humanitarian non-profit organizations in over 50 sites all around the world. He previously also worked as a hardware and software engineer at the U.S. Naval Research Laboratory to develop virtual reality-based training systems.

¹Office of Career, Technical, and Adult Education, U.S. Department of Education, on-line: <http://sites.ed.gov/octae/2015/01/27/creating-a-clear-path-to-better-jobs-for-low-skilled-workers-stuck-in-front-line-positions/>

²Manpower Group Annual Survey of Employers: reasons for difficulty filling jobs, May 29, 2012, on-line: <http://www.manpowergroup.us/campaigns/talent-shortage-2012>.

³<https://www.phillykeyspots.org>

⁴<http://technical.ly/philly/2015/03/04/cities-learn-phillys-failed-municipal-broadband-effort/>