


Vocational Psychology and the Future: The Role of Telepsychology in Shaping Research

Journal of Career Development
2020, Vol. 47(4) 363-379
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DOI: 10.1177/0894845319831081
journals.sagepub.com/home/jcd


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Abstract

Vocational psychologists have predicted the utilization of telepsychology in career interventions, yet vocational research have not capitalized on this modality. The purpose of this article is to describe how telepsychology could be used effectively in vocational psychology research to expand the reach and application of the field's scholarship to real-world practice. We discuss challenges and ethical issues of this modality and the limitations of vocational psychology scholarship. We argue that telepsychology can overcome current challenges in the field by allowing vocational psychology research to extend to underserved populations, to produce scholarship that might better fill the research to practice gap, and to have practical application to better meet the challenges of the rapidly transforming world of work. In this article, each of these research areas is explored and potential research questions are highlighted.

Keywords

vocational psychology, technology, telepsychology, career counseling, future

Over 70% of people worldwide have a cell phone, and there will likely be more smartphone users than any other phone subscribers by 2020 (Ericsson, 2018). Such widespread access to communication is shaping work as seen in the recent growth of jobs driven by telecommunication devices (e.g., Uber; Manyika et al., 2016). Given this, telepsychology may be useful in understanding work and career concerns and potentially advancing vocational psychology research. The purpose of this article is to describe the potential uses of telepsychology for innovative vocational psychology research to expand the field's access to diverse populations, support the discipline's contribution for research that translates to practice, and assist the field in conducting innovative research in the rapidly changing nature of work.

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According to the American Psychological Association (APA, 2013) Guidelines for the Delivery of Telepsychological Services, telepsychology is “the provision of psychological services using telecommunication technologies” (p. 791). This definition is broad and includes “the preparation, transmission, communication, or related processing of information by electrical, electromagnetic, electromechanical, electro-optical, or electronic means” (APA, 2013, p. 792). Thus, telepsychology may include web-based interventions, electronic assessment, mobile applications, videoconferencing, and other technologies (APA, 2013).

Technology is changing the nature of vocations, it should likewise change the nature of vocational research. Brynjolfsson and McAfee (July 2017, p. 4), the director of Massachusetts Institute of Technology’s initiative on the Digital Economy, asserted that artificial intelligence, and specifically machine learning, “the machine’s ability to keep improving its performance without humans having to explain exactly how to accomplish all the tasks it’s given” (p. 4) is the most important technological advancement of this time period. Artificial intelligence (AI) is being utilized in multiple fields; AI-directed drones are now taking the duties of security guards, while AI-driven medical equipment is capable of observing and identifying skin cancer (Brynjolfsson & McAfee, 2017), with abilities at a level with cancer experts (Esteva et al., 2017). Companies utilize AI to monitor people at work in order to further automate their jobs; these technological applications are possible because AI is now able to exceed human levels of visual recognition (Brynjolfsson & McAfee, 2017). AI is changing work, while telepsychology is changing communication with workers. For example, increasingly people in the workforce telemeet rather than meet in person, and these interactions are different than face-to-face interactions. By utilizing telepsychology to understand work, vocational psychology can be relevant to a world where workers are displaced by AI, but can be reached through telepsychology for career interventions to meet the challenges of the new age of work.

Lent (2001) asserted that vocational psychology will incorporate telepsychology, yet published research in the field has not kept pace with technological advancements. Recent literature searches with the terms “technology” and “career counseling” yielded just 86 peer-reviewed articles from PsycINFO since 2001, and less than 5 of these articles provide empirical data on actual career interventions using technology. The terms “Online Counseling” and “Career” and terms “apps” with either “career counseling” or “vocational psychology” yielded zero articles. Further, a manual examination of approximately 300 publication titles for the last 2.5 years (2016 through May 2018) in the *Journal of Career Development*, *Journal of Career Assessment*, and *Journal of Vocational Behavior* demonstrated not only a dearth of articles on technology but very few published literature existed on career interventions in general and even fewer on less accessible groups such as those with disability, rural populations, and criminal justice populations. Yet, career and job information is increasingly disseminated via technology and, in some places, websites provide the only available information on employment (Brown, 2015). Thus, technology is being used in career interventions for clients.

Few studies on career interventions exist, especially with diverse populations (Whiston, Li, Mitts, & Wright, 2017). Further, Whiston et al. (2017, p. 179) meta-analysis found that in-person interventions had better outcomes than “computer guided,” but only four studies using “computer-guided” interventions were analyzed and these were not described. Evidence exists that career counseling through technology is effective in career decision-making of high school students (Syakir, Mahmud, & Achmad, 2016) and those with disabilities. Forty-three percent of visually impaired youth used web-based telecommunications, and these youth had better vocational outcomes (Kelly & Wolffe, 2012). Yet, vocational psychologists have not utilized telepsychology, possibly due to challenges or ethical concerns in providing such services, which we turn to next.

Challenges and Ethical Issues in Using Telepsychology

Warf (2013) indicates that a “digital divide” (p. 1) exists characterized by racial, class, and geographic privileges. Often individuals who live in high-poverty areas deal with inaccessibility of reliable Internet, a lack of technical skills, and no computer at home (Warf, 2013). Further, many current, experienced vocational psychologists may be digital immigrants, in other words technology is less familiar to them than for recent generations, and thus they may be hesitant to use telepsychology (Zur, 2012). Very little research within vocational psychology exists addressing issues of the digital divide and how that may influence employment and access to quality career services. This is a potential area of growth for the field that could inform public policy efforts to increase Internet access to poor urban and rural communities and could inform best practices in how to better deliver career services to underserved populations.

Further, telepsychology interventions may pose unique ethical concerns related to confidentiality. For example, information could be intercepted without awareness by the client or therapist (McCrickard & Butler, 2005). Care should also be taken that the actual client, not an imposter, is served, and suitable services are provided by qualified counselors (McCrickard & Butler, 2005). Other concerns of using telepsychology modalities include providing appropriate services for clients in crisis and potential boundary issues with clients this form of service delivery poses (Drum & Littleton, 2014) and the competence of the clinician in using the technology (Gamble, Boyle, & Morris, 2015).

Need for Telepsychology

Many of these barriers have parallels to face-to-face therapy. For example, those with no access to the Internet due to income likely cannot afford a face-to-face counselor either. Issues surrounding confidentiality, qualifications, and training remain important in face-to-face therapy; however, there are even more barriers in reaching people face-to-face because it continues to be likely that most people in the world do not have access to qualified career counselors, something Savickas (2003) suggested 15 years ago. Career information is already being utilized through websites and having support from a counselor is better than using the computer alone (Whiston et al., 2017). Telepsychology can allow for a qualified counselor remotely. Finally, encryption technology is increasingly becoming a viable way to keep information safe from others (Gamble et al., 2015).

Vocational psychology interventions are uniquely suited for telepsychology. The assessment information in vocational psychology is focused on work attitudes, behaviors, and interests; information that is often less sensitive than information obtained in personality or mental health assessment which might include past trauma and mental health symptoms. Crisis interventions are also less likely to occur during career interventions as the content is less emotionally intense than interventions such as trauma-focused therapy. Although more evidence may be needed for telepsychology, the APA (2013) guidelines for practice of telepsychology notes that this is not a reason to withhold services from a client, but documenting the reason for telepsychology is recommended. Nolan, Lindeman, and Varghese (2018) recommend appropriate measures with new technologies to track outcomes for emerging research.

Fifteen years ago, Savickas (2003) stated that more career process research is needed and that technology should be utilized for career interventions. In 2011, Savickas asserted that vocational scholarship did not cover the needs of 21st-century work realities. Unfortunately, today the gap in these research areas remain (Brown, 2017; Whiston et al., 2017). The lack of studies using telepsychology in career interventions is problematic as some have asserted that the world is undergoing a “Fourth Industrial Revolution” where technology and the Internet will change the nature of work (Schwab, 2016). The research, expertise, and guidance of vocational psychologists are needed to help workers adjust to the changing nature of work, develop employable skills, and find work that is satisfying. Ali

and Brown (2017) argue that the psychological adjustment facing manufacturing workers who will need to find reemployment in the 21st-century workforce cannot be underestimated and that vocational psychologists need to use tools at their disposal to assist workers who do not traditionally seek career counseling.

By evolving alongside technological innovations and incorporating their use into research, vocational psychology research can benefit in multiple ways. Specifically, by using telepsychology for service delivery and technological innovations for data gathering, the researcher could (1) access more individuals including diverse and marginalized populations; (2) allow for further investigations on career interventions, especially by harnessing technology to study the process and implementation of career interventions; and (3) conduct relevant research on the rapidly changing world of work to make it beneficial to the worker. In this article, we demonstrate how the use of telepsychology and technological innovations in research can be useful for these three areas.

In the following section, we describe several underserved populations in vocational psychology research and provide examples of how research using telepsychology can increase accessibility and practically applicable research to better meet the career needs of hard to reach populations. In the second section, we define process research and implementation science and how using telepsychology in vocational psychology research can better investigate the process of career counseling and study the real-time implementation of evidenced-based career interventions. In the third section, we discuss the usefulness of telepsychology to study the transformations occurring in the workplace and ways to capitalize on telepsychology and big data analytics to investigate how people might adapt to this new world of work.

Accessibility

Technology can go where people cannot. Many marginalized populations, such as immigrants, rural residents, the incarcerated, individuals with a disability, and global communities, do not have access to appropriate career services (see Diemer & Ali, 2009; Savickas, 2011; Varghese & Cummings, 2013). Fouad (2013) warns that unless there is a deliberate effort by researchers to overcome barriers to access marginalized groups in their research samples, counseling and vocational psychology research are destined to study the same limited populations. Telepsychology will allow for samples to span to national and international populations. By further examining the viability of telepsychology interventions through research, the accessibility gap may be closed considerably. In the following sections, we outline several diverse populations that can benefit from telepsychology and relevant research studies.

Immigrants. Blustein (2008) asserted that vocational psychologists historically had assisted immigrants and other marginalized groups in society. Yet, research on career interventions for immigrant populations is lacking, despite the importance of this group in the U.S. work force and their critical role in foundational vocational psychology research (Flores, Hseih, & Chiao, 2011). Considering that immigrants face numerous barriers to work including language barriers, social capital, and employment skills (Flores et al., 2011), research on career interventions using telepsychology for this population is needed. Telepsychology offers a way to investigate the concerns of immigrants difficult to reach due to language or other barriers. For example, research might investigate the effectiveness of same language counselors or translators provided through videoconferencing. Better research on how to use telepsychology to help immigrant workers acquire workforce skills and the effectiveness of this approach might also be an important area of scholarship.

Rural. Immigration has brought about demographic changes in rural areas (Pew Charitable Trusts, 2014). These changing demographics suggest changing needs related to career interventions and

access to bilingual career counseling services. Those in rural areas generally lack access to career development programs due to geographical isolation (Ali & Saunders, 2006; Hutchins & Akos, 2013). More specifically, there is a high need for bilingual school counselors to provide career counseling and guidance (Peters, Sawyer, Guzman, & Graziani, 2014). Telepsychological bilingual career counseling may be a viable method for such counseling to immigrants in rural areas, but is in need of further research.

Access to career-related information for K–12 students and innovative ways to bring career information to rural schools are needed. For example, tele-driven Science Technology Engineering and Mathematics (STEM) career programs have become increasingly popular. Students are paired with STEM professionals to learn more about STEM disciplines using various telecommunication platforms. One recent example is an initiative with the State Hygienic Laboratory at the University of Iowa. The lab conducts a tele-career intervention focused on increasing students' interests in limnology careers and pairs limnologists in the state lab with middle school students. During the intervention, limnologists use telecommunications platforms to work with the students on science projects and answer career-related questions. Specifically, students learn to test water samples in their local communities, a main activity of a limnology career. These students then use videoconferencing to discuss with the limnologist how to test the water samples and discuss what they find. Thus, students learn about the ways that limnologists test water sample findings in different communities and communicate with the public about potential concerns or dangers. Vocational psychologists conducting quasi-experimental research evaluation of the program showed that students' interests in lab science careers increased over time (Hochstedler, 2017). These types of career interventions allow for scientists and others to work with students and provide career-related information in real time without leaving work, which is cost-efficient. These interventions can provide access to rural students to have contact with such specialized careers.

Another common problem in rural areas is that often reliable Internet connections are located within public spaces such as public libraries, making public libraries the de facto employment counseling agencies for these areas (Fourie & Loe, 2016), as they may be the only places where rural residents can access career information through the Internet. Often librarians are asked to help rural patrons with job searching or career development assistance (Bertot, McDermott, Lincoln, Real, & Peterson, 2012). The National Career Development Association is currently offering librarians the opportunity to become certified career development facilitators through specialized credentialing. Training for the credential is delivered face-to-face and online. This credentialing process provides information on how to help patrons access career resources such as labor market information. Given that a large number of rural librarians may opt for online training, this may be a good avenue for partnerships with vocational psychologists. This may be an avenue for practicum students to work with librarians to offer career counseling for patrons who may need more specialized assistance with their career development process. Research partnerships may also emerge that evaluate the services that patrons receive. For example, the Public Library of Youngstown, Ohio, opened a job and career center, and their library staff are participating in the NCDA credentialing process to become career development facilitators (Nelson, 2017). Given the myriad of public universities in Ohio, vocational psychology researchers and librarians could create mutually beneficial relationships to serve rural residents via telepsychological services. For example, they may be able to create a career/job information laboratory that both expands services through tele counseling and researches the effectiveness of such services (Ali & Brown, 2017).

People with disability. The majority of people with a disability desire to work (Ali, Schur, & Blanck, 2011). Vocational psychology research could further benefit this population by examining how technology could enhance career development for individuals with a disability, particularly individuals with a physical disability. For example, research has suggested that providing vocational interventions within the first few months after an individual acquires a disability could increase their employment

rate (Middleton et al., 2015). Telepsychology could allow for such early and effective career interventions. Hendricks et al. (2015) reported on Project Career, a telepsychology program using an iPad, relevant apps, and cognitive psychology to promote career development for those with traumatic brain injury. After being referred to Project Career, the student completes assessments from an assigned "Technology and Employment Coordinator" (p. 452) located at the university (Hendricks et al., 2015). The assessments allow for personalized interventions in career programming, mentoring, and cognitive enhancement activities through the iPad (Hendricks et al., 2015). More research on how telepsychology can aid in the acquisition and maintenance of work for persons with a disability can be helpful in meeting this population's employment needs.

Criminal justice. Career counseling with criminal justice populations is significantly lacking (Varghese & Cummings, 2013). Incarceration, risk of re-offense, issues of safety for counselors, and access to cost-effective care are barriers to care for this population. Telepsychology could provide career interventions for criminal justice populations from a distance, meeting the needs of inmates, and combatting some of these barriers. For example, Batastini and Morgan (2016) studied telepsychology, through video, by providing cognitive behavioral therapy to segregated inmate populations in a group therapy format. The inmates were in separate rooms but with videos in each room that allowed them to see each other. The sessions occurred for 6 weeks for 1 hr each week. Batastini and Morgan (2016) found that inmates who received in-person therapy reported greater working alliance, but, given that prison systems are generally limited in providing such services, research on how to increase working alliance with telepsychology for inmates could be useful for career interventions. Use of mobile technology may be especially helpful for women offenders whose career needs are still in need of more study. Scott, Johnson, and Dennis's (2013) findings suggested that cell phones could be useful in providing services for women offenders as 83% of the women offenders released into the community use cell phones, with some used for accessing social support. The use of cell phones for reentry to employment could be a cost-effective way of providing employment services and better understanding the needs of the offender population, but research is needed. Telepsychology is useful not only in studying populations nationally, but also useful for research with global populations, which we cover in the next section.

Global. The world is increasingly connected through technology. Vocational psychology is especially poised to advance global research partnerships. The field already has long-standing international partnerships (e.g., international conferences by the Society of Vocational Psychology). Vocational psychologists and scholars affirm the importance of a more global perspective in research and practice (Fouad, 2013; Lent, 2001; Savickas, 2011; Sloan, 2005), and international research on vocational theories is already taking place (Sheu & Bordon, 2017).

Accessibility and cost-effectiveness are crucial components of international research (Reardon, Lenz, Sampson Jr, & Peterson, 2011), thus the use of telepsychology for career issues globally seem especially relevant. Research could be done to see how telepsychology be used to provide workers who travel abroad access to supports to overcome career barriers. Already, within the wider world of therapy, mobile platforms such as "Talkspace" exist, which allow for cost-effective access to a qualified therapist at any time from any location. The therapy is in text form, with assessments and intervention videos sent through the Internet, but allows for a low-cost alternative to face-to-face and video forms of therapy and for therapy to occur even without scheduled meetings (Talkspace, 2018). Global communities also use text and given that time zones are different across the globe, being able to text without scheduled meetings may make things flexible for providing services internationally. Considering that diverse and marginalized populations could benefit from telepsychology, there is a need to better study the process of career counseling and how evidenced-based career interventions could effectively be implemented for these and other groups. We believe telepsychology could aid in such research. We describe how in the next section.

Telepsychology for Process and Implementation Research

Increased accessibility through telepsychology provides new opportunities for career interventions with underserved populations. However, research on successfully implementing telepsychology interventions as well as understanding which components of these interventions contribute to client change is needed. Process and implementation research can help with such investigations, but represent existing deficits in the field of vocational psychology and mirror the deficit in the wider field of counseling psychology and psychology at large.

Scholars have indicated the need for more research in counseling psychology that facilitates an understanding of the key components of interventions that contribute to client change, termed process research (Scheel et al., 2011). There is also a need for more research on the enactment of evidenced-based practices into the real world, often described as implementation research (Brownson, Colditz, & Proctor, 2012). Vocational psychologists assert that research in counseling and vocational psychology does not effectively translate into practice (e.g., Fouad, 2013), and calls have been made to close the gap between research and practice in numerous fields (National Institutes of Health, 2016). The following sections will outline how process and implementation research address these contemporary issues in the field, how the use of technology and telepsychology can help to facilitate the research process, and how telepsychology interventions raise new questions in these research areas.

Process. Process research involves investigating factors such as the therapeutic alliance, client motivation, and therapist factors to help gain an understanding of what occurs during therapy (Scheel et al., 2011). Although meta-analytic research has been conducted and established that career interventions are effective overall, specific factors and processes have been shown to contribute differentially to the effectiveness of career interventions (Whiston & Rahardja, 2008). For instance, factors such as client demographics as well as counselor and site characteristics influence effectiveness (Whiston & Rahardja, 2008). The following five critical factors have been identified by Brown and Krane (2000) as contributing to effective vocational counseling: written exercise, modeling, building supports, individualized feedback, and knowledge of the real world of work. Recently, Whiston et al. (2017) found that counselor support was an important component for successful vocational interventions. Yet, more research is still needed on the process of career interventions, particularly, “how, why, and for whom” (p. 740) they work (Brown & Krane, 2000). More is still needed in understanding what variables contribute to better vocational counseling outcomes (Whiston & Rahardja, 2008). Telepsychology can aid in answering these questions.

Telepsychology interventions may allow for more effective measurement and examination of process variables. Process variables include working alliance, client factors such as attitudes and motivation, and observable actions of the client and therapist (Scheel et al., 2011). This type of research would be useful because it would allow researchers to understand the most effective attitudes and behaviors in counseling, how they might differ between groups, and then teach these factors to replicate in practice. As such, observable thoughts, feelings, and behaviors can be effectively captured through the recording of telepsychology interventions using videoconferencing. High-tech telepsychology equipment may also be capable of replicating the session, so that hidden thoughts, feelings, and behaviors might at least be inferred. Post hoc examinations of targeted behaviors during interventions may then be examined by researchers and linked with outcomes.

Further, considering the rapid innovations in counseling, process research on newly developed technologies and how it can be effective for career counseling will be needed. For example, researchers at the University of California, Los Angeles, are developing an AI therapist able to read human facial expressions and physical movements (i.e., body language) to deliver therapeutic services to clients (Tieu, 2015). The researchers claim that this AI therapist will be able to provide better counseling services than an actual person (Tieu, 2015). These advances raise process research questions relevant to

career counselors. Such questions might include how the therapeutic alliance is built through AI and what process factors contributed to effective career counseling with AI. These questions could be answered by telepsychology research that can allow the researcher to enter the therapy room without being noticed by the client to experience how process factors such as trust and cohesion might be developed with the AI therapist.

Implementation. Implementation science is a new and growing research field developed to better understand and address the reasons why evidenced-based research does not translate to practice as measured by the perspective and behaviors of providers, clients, and others (National Institute of Health, 2016). Implementation research approaches this goal through an examination of the fidelity, acceptability, feasibility, and barriers of interventions when they are implemented in real-world settings (Rabin & Brownson, 2012). Implementation science, although a young field, is currently used in many disciplines, including medicine and mental health care, to help move evidenced-based methods into the real world of practice.

Implementation science has implications for vocational research. Research on the effectiveness of evidenced-based vocational telepsychology interventions in real-world career counseling practice is still needed. Currently, no studies appear to exist regarding the components of successful large-scale implementation of evidenced-based career counseling. Yet, such implementation research has been done for electronically delivered mental health services more generally (Gros et al., 2013; Vassilev et al., 2015). Identified factors for successful implementation include the ability of the telehealth modality to help the clinician establish relationships with the client and the fit of the telehealth modality for the specific health problem (Vassilev et al., 2015).

Vocational psychology research could study how evidenced-based career intervention could be implemented through telepsychology. For example, an implementation study might examine the acceptability (i.e., satisfaction) and appropriateness (i.e., relevance) of a career intervention using telepsychology for the staff, population, and setting before it is adopted by an agency. Another research path might investigate the feasibility and costs of using a particular telepsychology career intervention (e.g., a smartphone app, videoconferencing) compared to other types of intervention. As stated earlier, numerous vocational psychologists for decades have called for more research on finding out “what vocational treatment work best for which clients” (see Whiston, Brecheisen, & Stephens, 2003, p. 391). Without implementation research that investigates the barriers and facilitators in delivering career services, understanding which treatments work for which population would be limited.

Further, telepsychology interventions allow for therapeutic services to be recorded, thus demonstrating how the therapy was implemented. Gros et al. (2013) mention the ideal nature of electronically delivered interventions for research purposes as these “treatments require thorough preparation of equipment, protocols, and treatment materials, as is typical of most well-planned research” (p. 516). As such, an important component of implementation, fidelity in following the intervention protocol, can be investigated to ultimately enhance the validity and reliability of the findings. The ability to watch sessions would also allow researchers to examine the extent to which counselors followed the relevant protocols of the vocational intervention, thus establishing treatment fidelity and its relation to outcomes.

Process and implementation research would benefit from telepsychology to better study the factors for effective career counseling and in effectively implementing technology into practice. Such research is needed, given not only innovations in technology, but given the rapid transformation of the world of work that will require the best of science to be most useful to workers. In the next section, we discuss how the world of work is changing in terms of automation and on-demand jobs. We then discuss the role of telepsychology in vocational psychology research to better train workers for the new world of work. We also discuss the need for vocational psychologists to conduct research using big data analytics to conduct research that is applicable to serve the large body of workers.

Transformation of Work and the Role of Telepsychology

Automation and AI as well as on-demand labor (i.e., gig jobs such as Uber) are prevalent in today's world of work and will continue to grow. On December 6, 2017, McKinsey and Company released a report indicating that automation is leading to major workforce transitions for "75 million to 375 million" (p. vi) people, which will substantially increase the need for transition support and skill development in the future (Manyika et al., 2017). Vocational psychology research utilizing telepsychology can provide needed research for such transition and skill development for practical relevance to workers. We now explore the changing landscape of the work and potential challenges faced by workers and then explore potential avenues for telepsychology research that capitalize on these changes.

Types of work changes

Automation and AI. As mentioned, automation will have a profound impact on the way work is done and the availability of employment in the future. Tasks often reserved for experts can one day be automated, including routine medical procedures and legal research (Manyika et al., 2017). The new economy will require a set of skills that AI will have a hard time miming (Manyika et al., 2017). These skills may include emotional intelligence (Beck & Libert, 2017), creativity, and social skills (Manyika et al., 2017). For example, management jobs may change as administrative tasks become automated, allowing managers to focus on tasks that involve decision-making, creativity, and collaboration (Beck & Libert, 2017; Kolbjornsrud, Amico, & Thomas, 2016). The future of work worldwide will require people to learn to work together with automated machines (Manyika et al., 2017). Satisfaction and fulfillment in such jobs, including ways technology might be utilized to enhance the quality of work, will be relevant (Dodgson & Gann, 2017). Vocational psychology research with telepsychology will allow for real-time data on attitudinal, behavioral, and environmental factors to examine how people can experience satisfaction while working in conjunction with AI.

Manyika et al. (2017) assert that the growth of automation will lead to increasing job displacement. People will likely be making career transitions at a faster pace, and telepsychology using mobile technology may be one way to keep in step with the transition by capturing data automatically to understand factors that aid in such transitions. Such a future will demand vocational research that helps people make smooth transitions from displaced jobs to available jobs, as work transitions can profoundly influence the life and psychological health of a person (Fouad & Bynner, 2008). Vocational psychology research has investigated school-to-work transitions (Blustein et al., 2002) and mid-career work transitions (Motulsky, 2010). Therefore, the field, aided by telepsychology, could study transitions of displaced workers from automated jobs.

As mentioned previously, many unemployed people may not visit a career counselor in person, so new ways to reach such people will need to be investigated. Most unemployed people will likely still have mobile technology (e.g., smartphones) and thus could be reached anywhere at any time. Further, telepsychology may be one avenue to reach the worker to investigate meaning and purpose after being displaced by machines. Telepsychology could investigate factors that might influence the motivation of displaced workers in learning new skills for jobs they had not considered. Providing assessments in real time to study the attitudes of displaced workers and investigate the effectiveness of smartphone interventions to help workers access social support for the stress of displacement could be useful in developing practically applicable interventions. Manyika et al. (2017) indicate that not only will workers need to learn new skills to match the new working environment, but they will need social support during such job transitions. Vocational psychology research, using telepsychology, will allow researchers to study how social support might be provided through chat, text, and live video, especially in work places with minimal employees and more AI. Further, given the growth of wearable technology and its implications for health assessment, vocational psychology could investigate the implications of work transitions not

only on emotional stress but the physical health of the worker. Researchers could study how career interventions could influence health outcomes.

On-demand labor. The rise of automation of work is likely to lead to even more on-demand labor or “gig” work, which is already changing the world of work by creating more independent workers (see Zaino, 2017). The gig economy is evidenced by the rise of companies that utilize mobile apps, such as Uber and TaskRabbit, allowing people to work any time and any place (Loo, 2017; Mulcahy, 2017). In the United States alone, 34% of workers currently take part in such labor, and the number is expected to grow to over 40% by 2020 (Gillespie, 2017). Companies are capitalizing on technology in the form of smartphones to provide contract work and allow for new options for the everyday worker. The rise in technology and gig jobs will clearly demand a different type of worker. Yet, research on the type of worker attracted to such jobs is still needed. Attempts at research have been made outside the field by Manyika et al. (2016). These researchers reported that different types of workers take part in the gig economy, including “free agents” who choose such work full time and “casual workers” who use the job for supplemental income. Free agents in the gig economy were found to have greater job satisfaction than those who have typical jobs, which may suggest that satisfaction is likely outside of monetary gain (see Manyika et al., 2016).

Considering the mobility of workers, research should examine those individuals attracted to gig work as well as those who may feel confined to this type of labor. This type of research can be useful in helping those who find these jobs unsatisfying to find more fulfilling work environments as well as assisting those interested in gig work to develop the attitudes and skills that fit into such environments. For example, flexibility, social skills, and the ability to endure risk and uncertainty are helpful job skills in gig work (Torpey & Hogan, 2016). Research using telepsychology may be especially useful in studying mobile work that relies heavily on smartphones. Vocational research can investigate how such technology can support the worker and capture relevant factors to aid mobile workers in real time. Further, the automatic capturing of data through smartphones might allow for large data collection and thus the need for big data analytics. The following sections will discuss two areas of research considering the changes in the workplace, research on developing new skills and big data analytics.

Future research areas given the transformation of work

Skills training with technology. Considering the growth of automation, AI, and on-demand labor, there is a need for more research on the type of skills required and the most effective means to develop these skills to prepare workers for these changes. Indeed, people will need to develop attitudes and skills for jobs that they have never worked before and for jobs that currently do not exist. Clearly, some of the skills needed for the worker will be related to technology, thus using technology to research how the worker might develop skills would be helpful. More research is essential to demonstrate how to utilize technology to train clients for available jobs and better access such clients, not only in the convenience of their homes but also across the world where automation is likely to take over jobs as well (Manyika et al., 2017). Telepsychology may be invaluable for such training. Currently, phone technology is allowing impoverished persons to gain access and assistance in their work. For example, rural farmers in India can obtain advice on agriculture from experts in other places in their own language through “Interactive Voice Response” using their cell phones (Awaaz.De, 2015). More research on the effectiveness of such technology in training workers is still needed.

Furthermore, the future may allow for vocational psychology research to help workers obtain training in simulation and virtual reality settings that can imitate the actual work environment. For example, research has examined virtual reality in the training of surgeons (Gallagher et al., 2005), social skills training for individuals with autism and schizophrenia (Park et al., 2011; Parsons & Mitchell, 2002), and exposure therapy for the treatment of specific phobias (Parsons & Rizzo, 2008). Considering the projected importance of effective social skills for future employment (Schwab, 2016), basic social

skills and communication training with virtual reality programs could be useful for vocational psychologists to supplement career interventions. Virtual reality technology could assist clients in developing the skills and attitudes needed for both gaining and sustaining employment.

Big data and analytics. With the growth of smartphone apps, social media, and automation, much data are available (Aggarwal, 2011), in what would be termed “big data”. Online career assessment has been immensely popular (Whiston, 2011) and continues to be so. Swaths of data can be collected from online assessments and provide valuable information for researchers knowledgeable in big data analytics.

One of the goals of research in general is to find out “what works for many people” (Fouad, 2013, p. 230). Big data and analytics allow for such research questions to be answered. Many fields such as medicine, higher education, and business are already utilizing big data to provide better and more relevant services to the public. For example, one university used big data analytics to intervene before students drop out and was able to increase retention rates, including for low income students and those in STEM majors (McMurtrie, 2018). Vocational psychologists have yet to capitalize on big data. A simple PsychINFO search with key words “Vocational Psychology” and “big data” yields zero hits. Yet, big data analytics by vocational psychologists may be useful. Henke et al. (2016) have noted a need to use big data analytics to provide important information for workers on the type of skills needed to be competitive for the workplace. Further, telepsychology’s advancement into the realm of mobile applications for smartphones will also likely create large sets of data that will need to be mined for patterns of use. For example, the use of app-driven work is growing globally in places such as Malaysia (Loo, 2017). Thus, with the use of big data, vocational psychologists could analyze how workers in non-Western countries might use such on-demand jobs compared to those in western countries. Vocational psychologists willing to gain the skills and conduct research with the big data available on these jobs could inform career counselors on how to help diverse workers in such jobs. Big data analytics can allow vocational psychologists to notice patterns in peoples’ work habits, interests, and other career factors and utilize such information in the development of career theories, interventions, and assessments. Big data are a burgeoning field and with potential for good, comes potential for harm, especially for marginalized populations with little social capital. By understanding big data analytics, vocational psychologists could consult with policy makers and provide advice, so that such data can be used ethically to better the work lives of all people, without harming the marginalized.

Conclusion

Technology is changing the nature of work; it should therefore change the way scholars study work. Vocational psychology research would benefit by incorporating telepsychology. A clear need exists for relevant career interventions that have a positive influence in the lives of people, especially diverse populations that are not easily accessible. There has been multiple calls from vocational psychology scholars for more process research and more research on the actual implementation of career interventions. Further, vocational psychologists have indicated the need for the field to be relevant to the transforming world of work and its effect on the worker. We have demonstrated in this article that telepsychology can help begin to fill the research gap in these areas.

For over a decade, there have been calls for the field of vocational psychology to utilize new methods, and expand its scope to strengthen the field and its relevance to the changing nature of work (see Savickas, 2003). We have argued in this article that utilizing telepsychology and related technologies can help maintain the field’s relevance. For example, due to the less emotional nature of career counseling versus the nature of other types of counseling such as for trauma, vocational psychology research has much potential in capitalizing on telepsychology to access marginalized populations needing career interventions and to even become a leader in the use of telepsychology. Further, by

tapping into telepsychology and using the technology to inform process and implementation research, vocational psychologists could better translate research into practice. Given that telepsychology is fitting for career interventions, if vocational psychologists would increase their use of various modalities of telepsychology in research, the field could be increasingly relevant to tackle social issues such as the problems workers experience in the transforming world of work. Finally, by becoming knowledgeable in the use of telepsychology and related research modalities, such as big data analytics, the field would be better able to advocate for marginalized populations that are left behind in the new world of work.

Like all modalities, challenges and barriers exist in using telepsychology, including ethical issues such as confidentiality and the digital divide. Yet, these barriers should not deter one from utilizing technology to conduct research, but allow the researcher to consider these barriers and find ways to overcome them, such as encryption technology or finding spaces in communities where technology is accessible. Other fields are capitalizing on such technology to improve the lives of people and maintain relevance to society. Vocational psychology would benefit from doing the same.

Acknowledgments

The authors thank Dr. Elson Bihm and Lilli-Ana Baca for their editorial feedback on an earlier version of this article.


Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Jon Nolan is a 5th-year counseling psychology student currently completing his internship at the Syracuse, VA. His research interest include mobile applications, integrated care, and mindfulness. In his free time, he enjoys woodwork, listening to music, and reading fiction.

Saba Rasheed Ali is a professor in counseling psychology and associate dean for Research in the College of Education at the University of Iowa. She has expertise in career development processes for K–16 students. She has coordinated two successful career education program in 12 schools (Future in Iowa Career Education [FICE] and Health science Occupations, Preparation, and Exploration [HOPE]) and has evaluated the effectiveness of these programs (e.g., student outcomes and broader systemic impact). The FICE program was funded by the Roy J. Carver Charitable Trust. Project HOPE was funded by the Roy J. Carver Trust, Greater Muscatine Community Foundation, John Deere Foundation, and the statewide Governor’s STEM scale up initiative. She also serves as principle investigator (PI) along with her colleagues (Susan Assouline and Megan Foley Nicpon) on a federal grant, entitled, *Culturally Responsive Talent Identification and Career Exploration (TICE): An Integrative Model to Broaden the Participation of Underrepresented Students in Talented and Gifted Programs* (sponsored by the U.S. Department of Education, Jacob K. Javits Gifted and Talented Education Act). She is also the PI on another federal grant, entitled, *Integrating Behavioral Health into Rural Medicine* (sponsored by the U.S. Department of Health and Human Services, Health Resources and Services Administration, Behavioral Health Workforce Education and Training Program). In 2009, she was awarded the University of Iowa College of Education’s Audrey Qualls Commitment to Diversity Award for her work with underrepresented K–12 students in helping them to make the connections between career and academics. In 2017, she was awarded the Distinguished Achievement for Publicly Engaged Research at the University of Iowa. She is also the associate editor of the *Journal of Career Assessment* and served as the chair of the Society for Vocational Psychology from 2014 to 2016.

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Ryan Southerland enlisted and served for 4 years in the U.S. Air Force as a computer communications specialist working in Military Intelligence. After separating from the military, he received a bachelor of arts degree in psychology with a minor in philosophy. He attended graduate school to receive a masters of science in psychology and is currently a doctoral candidate nearing the completion of his dissertation for his PhD in counseling psychology. Returning to the Air Force, he has recently received a commission as a captain and will soon be starting a military residency at Malcom Grow Medical Clinics and Surgery Center at Joint Base Andrews in Maryland. His research interests include common factors in improving therapeutic outcomes, client feedback and outcome measures, and the application of treatment modalities commonly utilized within military populations. He enjoys drawing, painting, and swimming and has a black belt in the Japanese martial art of Aiki-jujitsu.

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