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Article 59

Using Virtual Reality Environments to Improve the Career Self-Efficacyof Minority Students: An Introduction

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Abstract

Social Cognitive Career Theory proposes that self-efficacy, outcome expectations, and interests influence career choice and development. Many minority students do not pursue certain careers solely due to their perception that they may not be successful. This highlights the need for interventions that increase exposure to careers while improving the career self-efficacy and outcome expectations of students. This article describes how virtual reality environments can be used to increase the career self-efficacy of minority students.

Although there exists a myriad of career opportunities, many students shy away from certain careers due to a lack of career self-efficacy and low anticipated outcomes (Feldt & Woelfel, 2009; Mei, Wei, & Newmeyer, 2008). Minority populations remain underrepresented in many professional occupations and several theorists have offered propositions in an effort to understand what maintains this trend. Generally, these explanations point to a lack of career self-efficacy which stems from little to no exposure to these occupations (Walsh, Bingham, Brown, & Ward, 2001). One's perceived ability to perform in a career greatly influences the career decision-making process (Lent, 1994).

Mei et al. (2008) argued that learning experiences and self-efficacy are the two most critical determinants of high school students' career development. They recommended career development interventions by school counselors that provide meaningful learning experiences, improve outcome expectations and self-efficacy, and stimulate interest in several careers. Virtual reality offers a cost-effective way of achieving these goals and introducing students to careers they would otherwise not be exposed to (Greenidge & Daire, 2005).

Social Significance

Many students fail to pursue certain careers mainly because they do not perceive themselves as having the ability to be successful (Constantine, Kindaichi, & Miville, 2007). This perception is fueled by several variables including a lack of exposure to the career, lack of role models who are successful in these careers, and other personal

variables such as socioeconomic status, age, gender, and culture (Gloria & Hird, 1999). However, external barriers are not as influential as self-efficacy in the career decision making of high school students (Tien, Wang, & Liu, 2009). Higher levels of career self-efficacy are also associated with a more differentiated career identity and greater engagement with career exploration tasks in Latino high school students (Gushue, Clarke, Pantzer, & Scanlan, 2006). In this technologically advanced era, it is the responsibility of the professional school counselor and career counselors to offer students novel and creative ways to increase their career self-efficacy.

Career Self-Efficacy

Self-efficacy describes an individual's beliefs about his or her own ability to successfully engage in a task in order to obtain a desired outcome (Bandura, 1977). One's level of efficacy impacts the choices made, the level of effort invested, level of perseverance, and whether tasks are approached with hesitation, confidence, or approached at all. Perceptions of efficacy originate from four main avenues: (1) performance accomplishments, (2) vicarious learning, (3) verbal persuasion and support from others and (4) emotional arousal (Bandura, 1986). These interact reciprocally and in turn affect one's performance judgments which then influence actions and decisions (Stickel & Bonett, 1991).

Spokane and Hawks (1990) identified some other constraints which may influence the career self-efficacy of students. These are limited consideration of certain careers, reduced expectations that stated aspirations will be attained, increased salience of external factors in career choice, need for structured interventions to overcome social constraints, and increased stress for women and minority group members (p. 106).

Social Cognitive Career Theory (SCCT) provides us with a useful framework for understanding the career decision-making patterns of students. According to Chronister and McWhirter (2003), there are three sets of influences which are thought to indirectly impact career interest formation and translation of these interests into goals and achievement. These are (1) background and proximal contextual influences (e.g., opportunities for task and role model exposure), (2) person inputs such as socioeconomic status, ethnicity, gender, age, etc. and (3) learning experiences (Lent, 1994). The use of virtual reality technology can be the medium used to maximize variables one and three in an effort to help the individual transcend any barriers characterized by variable two.

There is now an increasing reliance on the use of technology to not only accomplish core program objectives but also to increase the level of interactivity between students and educators. The counseling profession also experienced an increase in the use of technology over the last few years (Berry, Srebalus, Cromer, & Takacs, 2003; Granello, 2000; Greenidge & Daire, 2005; McFadden & Jencius, 2000). Despite this, the use of virtual reality (VR) environments in career counseling education and practice has not been extensively explored.

Virtual Reality Environments

Most individuals have encountered some form of gaming in their lifetime. The Entertainment Software Association reports that, in 2012, Americans spent $20.77 billion

on video games, hardware, and accessories (The Entertainment Software Association, 2012). Simulations, which essentially model physical or social systems through another system such as a computer interface, play a pivotal role in most of these games (Squire, 2003). The most common types of simulations include *realism-based simulation* (such as contemporary car racing games, business simulations, sports, combats, and civilization development games), and *abstract simulation* (such as space battle games, fantasy and adventure). Other types of simulations include puzzle games and conversions of traditional games (Greenidge & Daire, 2005; Kirriermuir, 2002).

Virtual Reality (VR) is one application that introduces the mental health profession to simulations. VR can be described as "a collection of technological devices" which includes a computer with 3D capabilities, a head mounted display, and input devices such as joysticks, hand-held wands, and data gloves with position trackers which allow the user to navigate through a virtual environment and interact with virtual objects. Typically the trackers are used to detect the position and orientation of the user and relays that to the computer that updates (in real time) the images being displayed (Riva, 2003). VR allows people to interact efficiently with 3D computerized databases in real time using their natural senses and skills (Mantovani, Gaggiolo, Castelnuovo, & Riva, 2003). It allows the user to become immersed in advanced simulations of real-life environments.

In the past decade the use of virtual reality (VR) technology in the medical and counseling professions expanded tremendously. VR transformed from a primary use in research settings to more clinical applications. In most instances, VR is used to simulate the real world and allows the user full access to these environments. Users are no longer merely observers of computer-generated images but rather become active participants within a three-dimensional virtual world. Virtual reality offers several advantages with the more attractive ones being the high level of control and interaction it affords the user (Mantovani et al., 2003).

There are several other unique features of VR which make it appealing to career counseling settings as well. Some of these include the flexibility and full control over what is being presented to the user, the ability to tailor environments and situations to the needs of the user, the ability to expose the user to a wide range of conditions which may be unsafe or impractical in reality, and the ability to maintain confidentiality by not exposing the user to in-vitro and other forms of therapy (Mantovani et al., 2003).

Virtual reality was first introduced to the field of psychotherapy to treat specific phobias. It is used to treat phobias such as agoraphobia (Emmelkamp et al., 2002), fear of flying (Rothbaum, Hodges, Anderson, Price, & Smith, 2002) and fear of driving (Walshe, Lewis, Kim, O'Sullivan, & Wiederhold, 2003) to name a few.

Other successful clinical applications of VR include post-traumatic stress disorder (Rothbaum, Hodges, Ready, Graap, & Alarcon, 2001), eating disorders (Riva, Bacchetta, Cesa, Conti, & Molinari, 2004), sexual dysfunction (Optale et al, 2004), attention deficit disorder (Rizzo, Bowerly, Buckwalter, Schultheis, & Matheis, 2002), schizophrenia (Nowak, 2002), addictions (Lee, Ku, & Kim, 2003), and pain management (Steele et al., 2003). It is also used to improve social skills in children and adolescents diagnosed with autism or who were severely mentally retarded (Standen & Brown, 2005). Virtual reality is also currently used in education to improve the academic performance of students. Some programs which have demonstrated student success across the nation, include "Virtual Geography," "Art History: A Journey Through Time," "Virtual Chemistry: The

Periodic Table," "Fundamentals of Math," "The Virtual Constitution," "Ancient Egyptian Structures," "Shakespeare's Globe Theater," and "Solar System Explorer."

A common recommendation of researchers and clinicians who use VR is that the quality of interaction should be increased by enhancing the realism of the scenes and adding sensorial cues to the virtual environments (Mantovani et al., 2003). Immersive virtual reality is now offered to remedy this situation. Until recently, VR was used to merely simulate physical environments; however, through the creation of avatars (virtual personas), one's social environment can also be simulated. As a result, the user can now create characters that simulate his or her family of origin, professors, friends, supervisors, feared situations, etc. These characters have the potential to not only look like familiar faces but also to sound and behave similarly. Directional sound, tactile and force feedback devices, voice recognition, and other technologies are also employed to enrich the immersive experience and to create more "sensualized" interfaces (University of Michigan Virtual Reality Laboratory, 2008).

Virtual reality has the potential of increasing students' performance accomplishments and affording vicarious learning. These applications can also be used to challenge students' perceptions of inefficacy and thus reduce maladaptive assumptions. Additionally, VR can be used as an empowerment tool for students. Being exposed to a profession and recognizing that one can become competent at it, has the power to heighten one's self-esteem and widen career choices.

The literature on empowerment outlines three main functions that virtual reality encapsulates. These functions are *perceived control* which includes one's beliefs about decision-making skills, authority, availability of resources, and autonomy in the scheduling and performance of work; *perceived competence* which reflects role-mastery and requires successful coping with non-routine role-related situations; and *goal internalization which* captures the energizing property of a worthy cause or exciting vision provided by the organizational leadership (Riva, 2005, p. 226).

Virtual Reality in Students' Career Development

The role of self-efficacy and adequate learning opportunities in shaping one's career interests and choices have long been established (Bandura, 1986; Mei, Wei, & Newmeyer, 2008). This is further complicated by the realization that minorities remain underrepresented in several careers due to the lack of exposure, lack of adequate knowledge, perceived inabilities, and lack of role models. Career counselors and professional school counselors can assist by (1) providing interventions that allow the student to explore professional careers that they would otherwise not be exposed to, (2) providing interventions which allow the student to safely become immersed into several careers, and (3) by affording the student a great level of control and flexibility over the desired outcomes.

Our students possess advanced technological skills and spend vast amounts of time immersed in virtual reality environments through video games, computer games, and social media. They are already equipped with the skills needed to be successful with virtual reality and have proven so. As counselors we are charged with the responsibility of providing creative interventions that not only appeal to our students but are also empirically sound. Immersive VR offers a possible solution to the presenting concerns.

Through this innovative technology, students can experiment, explore, feel, observe, live, and experience the day-to-day running of various careers. For instance, a student may become exposed to the duties and responsibilities of an astronaut. Through the virtual environment, this student is now able to navigate several days in the life of an astronaut. The student also increases his knowledge about this career, discovers what skills are needed and learns of the main duties and responsibilities. In short, all aspects of the American School Counselor Association's (ASCA) National Standards in terms of career development can be accomplished through the use of virtual reality (ASCA, 2004)

The University of Michigan's Virtual Reality Laboratory developed the *Virtual Football Training* using immersive technologies. This is designed to help train football players for specific aspects of the game. These concepts can be applied to career counseling as well. With virtual environments and simulations of various careers, students get to interact with others in the field, to hear, touch, and feel others. By successfully exposing and immersing students into a wide array of careers, this has the potential of increasing their perceived competence or career decision-making self-efficacy (University of Michigan Virtual Reality Laboratory, 2008).

Gifford (1991) identified several attributes that make gaming both fun and effective learning tools. These attributes also describe why gaming technology is a great fit for counseling practice. Games are without limitations of space, time, or gravity and they allow the user to move with ease between electronic micro-worlds, and from one graphical environment to another. These attributes sharply contrast with the methods used in conventional classrooms. Games also encourage risk taking and can provide an instant replay of users' performances, allowing them to study, edit, or try again in an environment safe for risk-taking. Games facilitate mastery of skills as feelings of control are encouraged by the ease with which players can repeat an activity until it has been mastered. Even when users struggle to learn a complex game, they usually feel they are in control. This also has the potential of increasing one's self-efficacy, a key component of career choice and development.

According to Gifford (1991), gaming also facilitates *interaction* as users tend to experience computers as partners in learning. They relish this non-hierarchical relationship in which the roles of teacher and student are blurred or altered. Working towards the clear objectives of electronic games is encouraging, and this can be different from classroom objectives where students cannot always see the point of learning math, science, or social studies. Compelling games give players high levels of motivation. Likewise, short attention spans and poor impulse control frequently disappear with effective computer interventions, supporting the notion that changing the environment, not the child, can support individual success (Gifford, 1991, p.7).

There are many times when immersing students in certain careers is not practical or feasible (such as Space Shuttle Flight). Virtual reality environments provide us with realism-based simulations that can be used to introduce students to such careers and others. This technology provides a cost effective way of exposing students to a wide array of career options.

Using Virtual Reality Programs in Counseling Practice

Using virtual reality programs is a relatively pain-free process as most recent computers are already set up to run these programs. Virtual reality programs are completely computer-based, and they utilize low-cost hardware equipment such as headsets, gloves, and tracking. The software is installed directly onto the school computers and is easily integrated into counselors' learning objectives (SUNRISE Virtual Reality, 2013). Some institutions already have virtual reality labs; for others the software can be installed in strategic classrooms or on computers in the counselor's office.

Career counselors and professional school counselors may also capitalize on the use of grants and other funding to introduce this concept into their schools. There are many grants which focus specifically on the use of technology to increase educational pedagogy and practice. There are also many companies that collaborate with educational institutions to create virtual reality programs that excite learning and improve academic performance.

Virtual Reality environments can be incorporated into school counseling programs at many levels. They can be implemented during individual or group career counseling or education sessions, or during classroom guidance periods. The American College of Emergency Physicians created an online video game called "Disaster Hero" which aims to help children prepare for emergency situations and common disasters. All that is required for successful implementation of this game is a computer. Similarly, to help treat a client who was diagnosed with a specific phobia (driving type), one counselor used a Nintendo video game system, a LCD wall projection unit, and a driving simulation game (*Beetle Adventure Racing*; Protivnak, 2005). Counselors who may not have access to virtual reality labs may also immediately begin successfully utilizing virtual reality environments through the use of appropriate computer and video games.

Technology Needed

To incorporate virtual reality environments into career education and counseling programs, counselors will need a basic computer system that includes speakers and headphones. Gaming hardware such as the Nintendo Wii, Nintendo DS, Microsoft Xbox or Sony Play Station will also be needed. For career simulations, counselors may choose among available educational games that utilize virtual reality environments to expose the player to different careers. Many are available at no cost while others range from $.99—$30.

For instance, to expose students to engineering careers, a professional school counselor may choose existing games such as *Kerbal Space Program, Minecraft, World of Goo, Amazing Alex, Fantastic Contraption,* and *Banjo Kazooie—Nuts and Bolts*. The game *Time Engineers* exposes players to engineering, science, and math.

For space flight simulations, counselors may choose from *The Space Game*, *Space Shuttle Mission,* and *Orbiter;* and for firefighting the following games can be used: *Firefighters* and *Firehouse Rescue*.

Other career related simulations include: *Dream: Teacher; Imagine: Teacher*; *Imagine: Animal Doctor Care Center; Imagine: Detective*; *Imagine: Family Doctor*;

Imagine: Fashion Designer; *Imagine: Gymnast*; *Imagine: Party Planner*; and *Imagine: Resort Owner.*

Using Virtual Reality Environments with Minority Students

Exposure to Careers & Identifying Interests

Virtual reality, in the form of gaming simulations, can be used to assist minority students in expanding their career options. The games help to ignite interests in several occupations that they would not have been exposed to without this unique opportunity. These simulations use visually rich 3D experiences which immerse the player into the desired career. This technology can be incorporated during individual, group or classroom sessions. Many of these games can be explored individually, or in teams using 2-4 players.

Confirming Interests

Some students may verbalize an interest in certain careers yet are tentative or not very knowledgeable about the career or what it entails. Virtual reality can present these students with realistic simulations of the responsibilities and duties associated with each career, as well as the knowledge and skills needed to be effective in these positions.

Identifying Career Beliefs

Virtual reality environments may also be used to determine the student's beliefs about certain careers, to identify any anxiety, fears, concerns, fear of failure, maladaptive behaviors, and dysfunctional thinking that may negatively affect their career self-efficacy.

Identifying Skills, Proficiencies, and Abilities Needed

Many of the games available also allow students to engage in role-play by allowing them to control the actions of the characters and outcomes of the scenarios. This feature enables students to "perform" many of the responsibilities and duties associated with the career. Since they are immersed into the virtual worlds, and control the actions of the characters, they experience many of the same emotions that individuals in those jobs experience as they navigate through the demands of the job. Students obtain a realistic impression of what the career entails and what a typical day looks like for individuals employed in these careers. They also become equipped with the knowledge needed to further confirm interest, and ability to realistically perform these tasks.

Identifying Values

While navigating through the virtual environments, students also learn about the values associated with job success and satisfaction. Through further discussion, they process whether these work values are aligned with their personal values.

Further Recommendations

For successful implementation, counselors should first become familiar with the technologies and the games before using them with clients. As with any other assessment,

it is advisable that the counselor plays the game to ascertain whether it will be appropriate for a particular client. This will also help the counselor to design follow-up process questions to supplement the gaming experience, and will increase the probability of successful implementation. Self-efficacy is weakened when there are repeated failures and so counselors should ensure that the activity is set up to maximize the number of successful experiences within each career.

Counselors should also pay particular attention to the intended age group for which the game is suitable. The instructions for implementation should also be adhered to. Counselors should remain in the room as students navigate through the games to monitor them as they play. Paying specific attention to nonverbals can provide equally valuable information as what is verbalized. Are students intrigued by the game? Are they hesitant at first but then seem to enjoy it? Do students seem uninterested after exploring the game? All of these observations will guide the processing of the activity.

After students have completed the game, it is essential that the counselor processes the activity with them. Discuss reactions to the career in question and provide any additional information they may need. One unique way to obtain their reaction to the career, is to have them complete a card sort after finishing the game. Card sorts are designed to determine career interests by asking clients to sort cards according to their level of interest (Zunker, 2012). Typically, clients would be given cards with different careers written on them and asked to sort these into three categories "*Would not choose*," "*Would choose*," and "*No Opinion*." It is important to process all three options to ascertain that they do have correct and realistic information about the career, and also to determine whether there are any perceived barriers that are causing them to be "unsure" or totally opposed to a career. Virtual card sorts may also be used.

Career self-efficacy is also influenced by one's perceived barriers. To help students overcome barriers to choice and success, the counselor may then invite them to create a list of both positive and negative consequences for the career that was just introduced to them. An alternative is to ask students to simply list all perceived barriers, fears, and concerns they have about the career. Next, students are asked to develop strategies to overcome the barriers listed. This can be done in collaboration with the counselor as students may be unaware of possible resources or strategies. Many times, the counselor can assist the individual in recognizing that his or her perceived barriers can be overcome. All of these discussions increase students' knowledge and exposure about certain careers and, by extension, heightens their career self-efficacy as well. Students will be more likely to now consider these options because they were exposed to them, and have realistic information.

It is important to note that the use of virtual reality environments in career counseling should not be used without the guidance of a professional counselor. Session outcomes need to be fully processed and this requires the experience, knowledge and skills of a trained counselor. School counselors also need to be available to provide students with any additional resources needed. VR technologies should be used to supplement career counseling services and not to replace professional counselors.

Implications for Career and Professional School Counselors

With the increasing reliance on technology, counselors need to ensure that they remain competent in the use of these technologies (Greenidge & Daire, 2005; McFadden & Jencius, 2000). The Association for Counselor Education and Supervision (ACES) outlined twelve technology competencies; one of which is the ability to use computerized testing, diagnostic, and career decision-making programs with clients. With the diverse learning styles and needs of students and the bombardment of technology at every level, counselors need to offer creative interventions to meet the needs and interests of all students (ACES, 1999).

Students in traditional classrooms generally have little control over their learning. They function as recipients of materials and activities chosen by their instructors who must then adapt to the ability level of their group. In addition, feedback on performance is in many areas shallow, imprecise, and normative (Bowman, 1982). The use of VR technologies can challenge students, increase their career decision-making self-efficacy, promote collaboration, accommodate varying learning styles, and hence enhance student learning (Bowman, 1982; Greenidge & Daire, 2005; Squire, 2003).

It is essential that school and career counselors adopt more unique ways to address the low representation of minorities in certain careers. Zunker (2012) suggests that to help expand career interests, counseling programs should implement programs that develop interests, values, and talents and also provide opportunities to resolve any maladaptive thinking. Using virtual reality environments is an excellent, innovative and inexpensive method for achieving all of these goals. Many minority students do not explore certain careers primarily because they have not been exposed to them and do not perceive themselves as competent. Career interests also fail to develop when individuals expect weak and negative outcomes from the activity (Zunker, 2012). Counselors can assist with increasing the career self-efficacy of minority students by planning and implementing activities (such as those discussed here) that will ignite interests and reshape their career self-efficacy.

Counselors who work with students from minority groups also need to account for cultural differences in the programs that they implement. The student's level of acculturation, cultural norms, and work-related values (such as work role perceptions) are examples of variables that must be addressed. Some cultural groups harbor negative attitudes towards professional counseling and members may be resistant to attending traditional career counseling programs. Greenidge (2010) stated that many minority groups also report lower level levels of emotional openness and do not respond well to traditional talk-therapy. It is the responsibility of the counselor who works with these populations to design creative, yet effective, interventions. The use of virtual reality environments, in lieu of traditional counseling approaches, offers a unique and exciting avenue that may lessen the resistance and heighten participation in counseling programs (Greenidge, 2010). This technique also has the advantage of expanding the career options of minority students and increasing their career-efficacy.

Conclusion

Although virtual reality is extensively used in career training programs, it has not been explored for use in career counseling practice. Virtual reality environments offer an exciting technique to help improve the career self-efficacy of minority students. Research consistently shows that many minority students avoid certain careers due to their perceived inability to be successful. School counselors are charged with the responsibility of providing students with the resources needed to increase exposure to and self-confidence in certain careers. While the use of internships and apprenticeships may be utilized for this purpose, these are not always feasible and available to all students. Virtual reality environments offer a cost effective way of exposing minority students to a variety of careers that they would otherwise not have the opportunity to explore.

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Note: This paper is part of the annual VISTAS project sponsored by the American Counseling Association. Find more information on the project at: http://counselingoutfitters.com/vistas/VISTAS_Home.htm