
Harnessing and Optimal Utilization of Human Capital in Virtual Workplace Environments

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Abstract

The primary purpose of this article is to demonstrate the role of virtual human resource development (VHRD) in promoting optimal utilization of human capital in virtual workplace settings currently characterized by millennial generation who surf the Internet, Tweet, talk, listen to iTunes, and text-message while working. To achieve the objective of the article, selected review of literature was conducted. The article defines human capital and demonstrates how technology can be positively used to promote virtual learning, workplace learning, and eventually lead to performance improvement in the workforce. Also discussed are the challenges of using Virtual HRD and implications for HRD theory, research, and practice.

Keywords

virtual HRD, human capital, virtual learning, globalization

Only one who devotes himself to a cause with his whole strength and soul can be a true master. For this reason mastery demands all of a person.

Albert Einstein

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Advances in technology have led to a paradigm shift in the instructional processes for workplace learning and performance. New technologies have made it possible for organizations to not only reduce the costs associated with delivery of training but also increase the effectiveness of the learning environment and help the training functions that contribute to organizational goals as well (Noe, 2010).

Virtual workplace learning “is attracting increased attention from individuals, school districts, higher education, providers and for-profit companies” (Donley, 2003, p. 117). According to Bennett (2009), the Internet has become an important tool for work especially in knowledge-based organizations since it enables knowledge workers to access expert knowledge anytime, anyplace, and anywhere. Internet technology has also contributed to the development of electronic networks that integrate video, voice, and data connections among instructors, learners, and experts (Noe, 2010). Thus the Internet has allowed employees in organizations to network and work in virtual teams. Similarly, through Intranets employees in many organizations with branches worldwide are able to communicate internally and perform work tasks without physical travel. In addition, Virtual HRD is predicated on Intranet technology (Bennett, 2009). Intranets are able to manage more forms of knowledge than traditional information systems (Bennett, 2006), which means they may be more reflective of an organization’s human capital.

Virtual HRD is a new area of inquiry in HRD. According to Bennett (2009), “virtual human resource development (VHRD) is a burgeoning concept evolving from the value organizations place on knowledge and technology in the present economy” (p. 362). Nafukho (2009) refers to the present economy as an “intangible economy” (p. 400), which is determined by the value of knowledge assets in organizations. These assets include ideas, expertise, knowledge, and the organizations’ learning capacity. He argued that the real assets that organizations have in an intangible economy can be measured in the form of intellectual capital, using models such as Value Chain Score Card, The Value Explorer, Intellectual Asset Valuation, and Total Value Creation. Additional models of measuring intangible knowledge assets in organizations are provided in Table 1.

It is noted in this article that the main challenge facing organizations that currently rely on virtual human resource development (VHRD) is how to harness and optimally utilize the human capital existing in their organizations. The use of information and communication technologies (ICTs) to improve individual, process, and organizational performance has led to a tremendous shift from the traditional workplace setting to the current state of an ever-evolving virtual environments (Swanson & Holton, 2009). This article demonstrates the role of HRD in ensuring optimal utilization of human capital in virtual workplace settings. In the article, we define human capital, demonstrate how technology can be positively used to promote knowledge assets through virtual workplace learning, which leads to performance improvement in the workforce.

Defining Human Capital for VHRD

The fundamental principle underpinning human capital theory is the belief that employees’ learning capacities are of comparable value to other resources involved in

Table 1. Selected Models for Measuring Intangible Assets in Organizations

Author and year	Measurement model	Utility of the model in measuring assets
Ramirez (2010)	SICAP	Model for measuring intangible assets which utilizes three main components of intellectual capital: public human capital, public structural capital, and public relational capital. A European Union funded project to develop a general Intellectual model specifically designed for public administrations and a technological platform to facilitate efficient management of the public services
Sanchez, Elena, and Castrillo (2009)	ICU report	A result of a European Union funded project to design an intellectual capital report specifically for universities. Has three main parts: vision of the institution, summary of intangible resources and activities, and system of indicators
McCutcheon (2008) ^a	EVVICAETM	A web-based toolkit based on the work of Patrick H. Sullivan (1995/2000) developed by the Intellectual Assets Centre in Scotland to measure intangible assets
Schiuma and Lerro (2008)	Regional Intellectual Capital Index (RICI)	Uses the concept of the Knoware Tree with four perspectives: (hardware, netware, wetware, software) to create a set of indicators for regions
Milost (2007) ^a	Dynamic monetary model	The evaluation of employees is done with analogy from the evaluation of tangible fixed assets. The value of an employee is the sum of the employee's purchase value and the value of investments in an employee, less the value adjustment of an employee
Bontis (2004) ^a	National Intellectual Capital Index	Measures national wealth in terms of financial wealth and intellectual capital (Human capital + structural capital). This is a modified version of the Skandia Navigator for nations
Bossi (2003) ^a	Public sector IC	Measures intellectual capital of the public sector. It also looks at transparency and quality and identifies negative elements, which generate intellectual liability. Intellectual liability refers to the space between ideal management and real management, one of the duties a public entity must fulfill for society
Bonfour (2003) ^a	IC-dVAL T ^M / Dynamic valuation of intellectual capital	Indicators from four dimensions of competitiveness are computed: resources and competencies, processes, outputs, and intangible assets (structural capital and human capital indices)

(continued)

Table 1. (continued)

Author and year	Measurement model	Utility of the model in measuring assets
Rodov and Leliaert (2002) ^a	FiMIAM	Assesses monetary values of intellectual capital components in an organization. Measures both tangible and Intangible assets. The method seeks to link the IC value to market valuation over and above book value
Edvinsson (2002) ^a	IC Rating™	An extension of the Skandia Navigator framework incorporating ideas from the intangible assets monitor; rating efficiency, renewal, and risk
Lev (2001) ^b	Value chain score card	Model utilizes a matrix of nonfinancial indicators based on discovery/learning, implementation, and commercialization
Schiuma and Marr (2001)	Knowledge audit cycle	A method for assessing six knowledge dimensions of an organization's capabilities in four steps. (a) Define key knowledge assets. (b) Identify key knowledge processes. (c) Plan actions on knowledge processes. (d) Implement and monitor improvement, then return to (a). Described in book (2002). <i>Profit With People</i> by Deloitte and Touche
McPherson and Pike (2001) ^b	Inclusive valuation methodology (IVM)	Model utilizes three value categories to measure intangible assets in an organization including intrinsic value which represents the internal effectiveness of the organization, extrinsic value measured by the delivery effectiveness and instrumental value which measures impact of operating in a competitive environment. According to this approach, the true measurement of an organization's value is based on monetary value added combined with intangible value added
Sullivan (2000) ^b	Intellectual asset valuation	Model used to assess the value of intellectual property such as patents and copyrights
Lev (1999) ^b	Knowledge capital earnings	Approach used to calculate the business organization's earnings over beyond the expected earnings accruing to book assets. Also known as knowledge capital earnings
Nash (1998) ^b	Accounting for the future (AFTF)	Model utilized to establish the estimated discounted cash flows of the organization. The value added during a specific year under consideration
Pulic (1997) ^b	Value-added intellectual coefficient (VAIC)	Model measures how much and how efficient intellectual capital and capital employed by the organization create value based on the relationship to capital employed, human capital and structural capital
Stewart (1997) ^b	Calculated intangible value (CIV)	Utilized to calculate the excess return on hard assets then uses this figure as a basis for determining the proportion of return attributable to intangible assets
Stewart (1997) ^b	Economic value added (EVA)	Calculated by adjusting the organization's disclosed profit with charges related to intangibles. Used as a surrogate measure of intellectual capital

(continued)

Table 1. (continued)

Author and year	Measurement model	Utility of the model in measuring assets
Stewart (1997) ^b	Market to book value	Model estimates the organizations worth by determining the difference between the organization's market capitalization and its book value. Thus true market value of the organization will include both tangible and intangible assets
Roos, Roos, Dragonetti, and Edvinsson (1997) ^b	Intellectual Capital Index (IC-Index)	Changes in intellectual capital are correlated with market changes. Uses four indices namely relationship capital, human capital, infrastructure capital, and innovation capital to measure the organization's value. Calculates intellectual properties index of the organization
Sveiby (1997) ^b	Intangible asset monitor	Based on the notion that the true assets that an organization has are people. Thus people's competencies are the key indicators of performance. Using this model, management selects the intangible assets indicators based on the organization's strategic objectives to determine its growth, renewal, efficiency, and stability
Edvinsson and Malone (1997) ^b	Skandia navigator	Model used to measure in a holistic manner intangible knowledge assets such as human capital, structural capital, customer capital, and organizational capital. Measures knowledge assets in organizations by focusing on five key components including financial, customer, process, renewal and development, and people. Utilizes a balanced scored card approach. Main advantage is that the model allows measurement closer to real inputs, processes, and outcomes
Kaplan and Norton, 1996 ^b	Balanced scorecard	Balanced scorecard ensures that there is a balance between external measures for shareholders and customers, and internal measures of the existing business processes, innovation, and of learning and growth. Uses the organization's mission, goals, and strategies to create measureable set of performance indicators for strategic management and measurement. Focuses on financial objectives and building capabilities and acquisition of intangible assets for future growth. Balance is also sought between objective outcome measures and subjective or judgmental measures of performance. Key performance measures include financial perspective, customer perspective, internal process perspective, and learning perspective of the organization. These indicators are generated from the strategic objectives of the organization

(continued)

Table 1. (continued)

Author and year	Measurement model	Utility of the model in measuring assets
Brooking, 1996 ^b	Technology broker	Model utilizes diagnostic analysis by considering intellectual capital as a composite of market assets, knowledge assets, intellectual property, and technology assets. Utilizes both data and qualitative/subjective information
Bontis (1996) ^b	Citation-weighted patents	Model measures intellectual capital and its performance based on the impact of research and development efforts on series of indices such as number of patents and cost of patents to sales turnover
Johansson (1996) ^b	Human resource costing & accounting (HRCA)	Model measures intellectual capital by computing the contribution of human assets owned by the organization divided by capitalized salary expenditures. Thus the hidden impact of human resources related to costs that reduce the organization's profits are calculated
Fitz-Enz (1994) ^b	Human capital intelligence	Model collects a set of human capital indicators and benchmarks them against an existing database
Topin (1969) ^a	Tobin's q	The q is the ratio of the stock market value of the firm divided by the replacement cost of its assets. Changes in q provide a proxy for measuring effective performance or not of a firm's intellectual capital. Developed by the Nobel Laureate economist James Tobin in the 1950s

a. Adapted from Sveiby, E. K. (2001).

b. Adapted from Malhorta (2003).

the production of goods and services (Lucas, 1988, 1990). Cohn and Geske (1990) noted that human capital is a form of investment in education and training that provides both private and social returns. The social return of human capital development may help improve innovation systems (see Bennett, 2010, this issue) by elevating the knowledge-assets of any regions surrounding and interfacing with an organization. For instance, training increases one's ability to obtain higher wages in a free market. More important, some would argue, training also improves knowledge assets and conditions in general society.

In the 21st century, organizations are faced with tremendous challenges, including an uncertain economy, reduced organizational as well as federal budgets, and increased competition in global markets. Globalization adds complexity to human capital theory, creating tension between growing knowledge assets at home versus knowledge assets abroad when an organization outsources functions to lower cost labor areas. Human

capital theory would suggest that outsourcing should provide similar benefits to international societies that receive work from another country. This is a critical area of discussion for VHRD since the same systems that develop employees at home will, to some extent, develop geographically distributed international workers.

With increased demand for learning new skills and competencies, coupled with drastically reduced travel budgets, more and more organizations are now forced to seek out virtual learning solutions (American Society for Training & Development [ASTD], 2009). The success of tomorrow's organizations will be their capacity to utilize their human capital in the virtual workplace to learn, generate new knowledge, and manage new knowledge in both traditional and virtual work environments. Thus human capital is connected to knowledge management, considered by Bennett (2009) to be a foundational perspective for VHRD. Clearly, employees in work places will increasingly need to acquire virtual work environment competencies (Bennett, 2009).

To further the discussion of the challenges of using Virtual HRD (VHRD) as a way of developing human capital in organizations, we will continue to explore human capital tenets. Such challenges may include lack of virtual and technological expertise, limited access of VHRD to those in need, lack of virtual communication skills, threats to individual and organizational privacy (Bierema & Hill, 2005; Kirk & Olinger, 2003). In addition, VHRD should attempt to preserve the benefits of social networking that are often associated with face-to-face HRD interventions. Various new technologies have not been well explored in the field of HRD. Bennett (2009) stated, "Despite how central intranets are to organizations, there has been little research on how they affect HRD practice. How important new technologies have been to HRD is an open question" (p. 1), and, by extension, how the question of how VHRD has assisted in the development and optimal utilization of human capital needs to be addressed.

Human Capital Explored

One of the early definitions in the literature revealed that "human capital represents resources which man [sic] has utilized to augment his personal productivity. Expenditures on information, labor mobility, health, education, and training all are capable of enhancing the productive capacity of a worker—his human capital" (Weisbrod, 1966, p. 6). The term *Human Capital* could sound coldhearted, insensitive, and perhaps unkind. However, society acknowledges that people are a form of capital (Aliaga, 2001; Becker, 1964; Benhabib & Spiegel, 1994; Engelbrecht, 2003; Hendricks, 2002; Nafukho, Hairston, & Brooks, 2004) and, in a collaborative manner, should be developed and utilized to elevate performance and to reward humans' efforts as well as the bottom line for an organization. Accordingly, organizations are eager to recruit and develop employees whose competencies and personal attributes are expected to contribute to elevated levels of economic and social values both for the employee and the organization (Brooks & Nafukho, 2006; Nafukho et al., 2004).

Communities also recognize the societal value frequently attributed to human capital (Becker, 1964). Thus recruiting efforts and educating exemplary performers have been

acceptable practices in the workplace ever since the term “human capital” first became popular in the scholarly literature in the 1950s and 1960s. As revealed by Nafukho et al. (2004), “from this perspective, education and schooling are seen as deliberate investments that prepare the labor force and increase productivity of individuals and organization, as well as encouraging growth and development at the international level” (p. 546).

Today, more and more companies recognize the increased value of their intangible assets or human capital as a way to gain competitive advantage (Noe, 2010). The role of humans in organizational systems is more critical than ever, despite the potential fear that technology devalues human effort. VHRD represents changing paradigms in the workplace, which we discuss in the next section.

Changing Paradigms

It is doubtful that organizations of the early nineties would have grasped the magnitude of change to come in the next two decades. How could they have imagined the extensive use of technology to enhance and extend employees’ abilities to work together regardless of their geographical distance? Collaborative learning platforms like Facebook and Twitter, and other types of mobile devices such as iPods, portable digital assistants (PDAs), and portable computers allow interactive discussions and learning to occur anywhere at any time. While discussing the influence of new technology on training and learning, Noe (2010) noted that 10% of training is delivered in a virtual classroom and 18% is delivered online. He also indicated that communities of practice are the most frequently used collaborative learning tool (22%), followed by podcasts, and mobile learning (14%), blogs (8%) and wikis (7%). This suggests the VHRD will become increasing mobile, yet still collaborative and networked, in the future.

The teacher or trainer as expert is no longer the model for all knowledge and knowledge is now owned by everyone (Wentworth, 2009). Experts are, or could be almost everywhere within the virtual environment. Thus everyone in the workplace is a life-long learner (Brown, Murphy, & Wade, 2006), a leader, teacher, or trainer at various points in their career journey.

Technology Enhances Virtual Learning

Utilizing technology to develop knowledge assets as a form of human capital offers a variety of attractive benefits. For example, electronic learning (e-learning) offers learners flexibility, consistent delivery of curriculum, self-paced learning opportunities, and the possibility to learn at various times and at various locations. Learners may also determine the pace for absorbing content or capitalize on the opportunity to practice a simulation or exercise in a repeated fashion until they have acquired a desired level of competency. Both learners and organizations benefit from reduced travel expenses and the various expenses associated with attending training seminars (Schooley, 2009).

Virtual learning technologies support the virtual office and provide new classrooms for the development of human capital.

Virtual Office and New Classrooms

Schooley (2009) remarked that instructor-led classroom venues for learning “are not realistic in today’s fast-paced global environment . . . [since] technology opens up new learning options” (p. 12). Many employees work as telecommuters—employees who spend most of their work hours in a home office, a car, cyber café, library, or in a customer or client’s office while using a variety of technologies to complete work tasks and projects. The *Telework Trendlines 2009* report by WorldatWork (2009), based on United States Bureau of Labor Statistics data, revealed the percentage of employees maintaining a work schedule from home rose from 76% in 2006 to 87% in 2008. Telecommuters in the United States also increased by 39%, from 12.4 million to 17.2 million in 2008.

Coworking sites are also a growing trend where people meet, work, interact, and collaborate when needed. Furthermore, entrepreneurs and communities are sponsoring these sites to enhance local values and to encourage the expenditure of money for work space, internet usage, copies, faxes, conference rooms, meals, and other telecommuter needs. Fox (2010) indicated that the coworking sites will be fee-based and could be acquired on a monthly basis or by the day. Charles Grantham, executive producer of the research group Work Design Collaborative offered the following information as recorded in Fox (2010) regarding work of the future:

It will not be the norm to go into the office every day . . . you will work at home or at a co-working center or a community business center. Most meetings with headquarters will be conducted on high-definition video conferencing or in virtual worlds like Second Life. (p. 23).

For example, Cisco’s TelePresence® currently offers a videoconferencing environment with high quality eye contact, voice tone, and body language—to video. Because of the elevated costs of high quality systems such as TelePresence®, VHRD practitioners will need to forecast cost-to-benefit ratios and return on investment (ROI) prior to using these newer technologies for training, education, and development of virtual employees. On the positive side, a higher quality system could improve learning retention and lessen fatigue among participants (Fox, 2010), which may increase the return on human capital investment.

The purpose of human resource development is to improve performance (Swanson & Holton, 2009) while the focus of human resource development is learning (Gilley & Eggland, 1989). Obviously, the new VHRD learning environment may not include face-to-face interaction of learner and instructor. In fact, new instructional technologies to facilitate VHRD and develop human capital require instructional designers and

technologists to assist telecommuters with how to use the plethora of interactive tools available. The development of appropriate competencies in this arena is essential to the VHRD practitioner's ability to harness and optimally utilize the human capital of an organization.

VHRD is often accomplished in the new self-paced virtual classrooms with wikis, discussion boards, video conferencing, simulations, and many of the popular Web 2.0 (Wentworth, 2009) features or characteristics available to end users. Learning professionals suggest that Web 2.0 technologies are vital to the new learning environment. Web 2.0 uses user-created social networking features on the Internet, including blogs, Twitter, and wikis (Noe, 2010). Web 2.0 applications are user-centered such that they

facilitate communication and secure information sharing, interoperability, and collaboration on the World Wide Web. Web 2.0 concepts have led to the development and evolution of web-based communities, hosted services, and applications such as web services, blogs, podcasts, and online social networks. (ASTD, 2009, p. 2)

Furthermore, Web 2.0 technologies complement the new training and learning efforts in the global economy and have also transformed the way organizations communicate. The ASTD (2009) study revealed that many organizations are not fully engaged with the Web 2.0 features because of a lack of familiarity. Thus VHRD practitioners should be open to the new paradigm of collaborative learning field by the more advanced Web 2.0 technologies.

Finally, with the newer learning technologies, organizations will be able to codify/sort and capture human expertise in a digitized format for current and future use in developing human capital. A variety of stakeholders can contribute to the creation of knowledge assets, including but not limited to customers, academia, vendors, employees, and subject matter experts. The knowledge assets can be retained by the organization and so are not as vulnerable to loss if an employee leaves. Loss can also occur when current employees forget where data or information is located, which is more likely to happen in this era of information overload (ASTD, 2009). Clearly, an important feature of VHRD is to preserve knowledge assets and also to help develop new approaches to human capital development.

New Approaches to Human Capital Development

It has been argued that knowledge assets promote understanding, establish assessable facts for critical decision making, create metaknowledge essential for change management processes, and provide guidance to virtual workers in leadership positions (Collison & Parcell, 2005; Swart & Kinnie, 2010). Delivery of knowledge to the virtual learner/worker is possible in a variety of ways. Blogs, web sites maintained by an individual or organization to offer regular commentary, microblogging via tweets (short text-based messages) at social networking services, texting, instant messaging, Skype calls, Chat, MySpace, YouTube, Second Life, and Facebook (Matsuda, 2010)

are new media for exchanging multiple forms of data, information, and personal and/or business communications.

One could describe virtual environments as the *21st Century Water Coolers* where virtual workers exchange information while socializing and benefit from incidental and/or informal learning. McDowell (2008) states, "business users, who are also everyday consumers, are insisting on Web 2.0 or Web 2.0-like tools and services in their business lives" (p. 25). Though some organizations are banning the use of social networking sites while on the job, others, such as American Honda Motor Company, indicate users must justify the use of these sites with a business case (Matsuda, 2010), thus requiring employees to identify the relevance access to social networking has for professional work.

According to Kharif (2010), portable media players by Apple such as the iPod, iPod Touch, iPod Nano, and other similar models allow the user to access and download content and learn "on the go". The iPhone can also function as an iPod but is primarily used to communicate voice and e-mail transactions with others. The compact nature and privacy of these devices attract and satisfy many learners who prefer to access personal entertainment and educational materials from the same appliance.

New approaches continue to be introduced. For example, Apple's iPad tablet computer appears to be more diverse than originally thought and it is attracting businesses that see this device as a means to communicate with workers and customers. Apple adapted software for this unit that offers word processing, spreadsheets, and digital presentation capabilities similar to PowerPoint. Furthermore, learners may use the iPad to read books and watch videos. Obviously, with this range of versatility, VHRD practitioners will need to consider this technology for building knowledge assets and promote human capital growth. In addition, VHRD educators have to redesign their training content and delivery systems to be aligned with the virtual work tools.

VHRD Challenges in the Workplace

In today's virtual environment it is not uncommon to have three different generations of team members learning, disseminating knowledge, and supporting one another as they complete objectives and accomplish work goals (Noe, 2010). However, VHRD instructional designers should be aware that generational trends may necessitate different educational and training content. For example, Solomon (2010) suggests that Generation Y, accustomed to the bustle of social networking sites, may be more inclined to enroll in learning modules related to bullying, sexual harassment, and equal employment opportunity. Whereas, Baby Boomers prefer interactive training activities, respond well to group activities and like well organized training materials, Generation Xers are said to prefer self-directed learning environment and like to work at their own pace (Noe, 2010).

Generation X and Generation Y learners prefer flexible access, meaning they may access material for shorter periods of time, log off, and then log on again while traveling or perhaps during the late hours of the evening or during weekend breaks away from work (Solomon, 2010). With the various technologies available at the simple stroke

of a keyboard, there is a real potential that learners, workers, and leaders may have difficulty determining what material is *must know*—the core curriculum versus what material is *nice to know*—the elective curriculum. Obviously, the threat is information overload and perhaps learner fatigue (Capece, Gitto, & Campisi, 2008).

Another risk relates to challenges of collaboration as noted by Paul (2006), tacit knowledge has a personal component that makes it difficult to communicate to others in an understandable form and the reliance on information and communication technologies (ICT) as the primary conduit for such communication significantly increases the difficulty of engaging in collaborative activities. Bennett (2009) noted that the media richness of Web technology increases the likelihood that tacit knowledge can be managed and shared in VHRD. Collaborative activities are social processes requiring a rich, supportive environment; however, such environments are difficult to create and support in the virtual settings made possible by ICT. This community-building aspect is an essential part of Bennett's (2009) definition of VHRD, and we concur that it is important for optimizing human capital.

One other major issue has been the practical integration, and perhaps compatibility, of the various web-based technologies in a manner that allows the end user to access and utilize these tools with efficiency and minimal disruption of productive activities (Bennett, 2009). Both instructors and learners, especially those from the Baby Boomer generation, may resist new learning delivery approaches and may require more encouragement and technical support. Traveling to the virtual worker and offering face-to-face orientation and follow-up support may not only increase upfront costs but also reduce costly risks and losses over the long term. The initial development of the technology infrastructure, creation of content, administration fees, and change management expenses, such as public relations training programs, are key costs.

Web conferencing expenses provided by vendors are also a significant cost consideration. Furthermore, the statement "content is king" is apt (Schooley, 2009, p. 13). VHRD practitioners involved in training and learning processes must use caution when repurposing existing content and delivering the same content virtually. Learners should be provided with engaging content, enticing graphics, and activities that are aligned with learning objectives. As noted by Schooley (2009), organizations "may have wonderful technology but without excellent content, e-learning fails" (p. 13).

Finally, designing for the virtual classroom requires that VHRD practitioners would need to assess learners if possible, consider and apply adult learning principles (Knowles, Holton, & Swanson, 2005) and modify curriculum and delivery approaches accordingly (Solomon, 2010). From the discussion above, we can conclude that developing knowledge assets to elevate human capital in the virtual environment requires creativity, flexibility, innovative thinking, investments, and of course, risk taking.

Implications for HRD Theory, Research, and Practice

According to Lancaster and Stillman (2010), the Millennial generation (those born between 1982 and 2000)—sometimes called Generation Y, GenNext, the Google generation, the Echo Boom, or even the Tech Generation are 76 million in number and make up the

fastest growing segment of workforce in the United States. This is the generation that prefers to work in the virtual environment and so we anticipate that this generation will thrive in VHRD. HRD scholars and practitioners must be prepared to meet the training and work needs of this generation. Their success in meeting the training needs of this generation depends on the ability to understand their cultural values, their preferred ways to learn and recognizing the way they work and communicate.

Empirical research by Lancaster and Stillman (2010) revealed that the millennial generation wants to work in a stimulating environment, but above all they want to find meaning in what they do – the feeling that they are making a difference at their work places.

VHRD demands that workplaces recognize some of the key characteristics of new generations of workers, such as the search for meaning, great expectations, the need for speed, collaboration, and social networking (Lancaster & Stillman, 2010). Thus HRD practitioners have to design virtual training and work environments that address the needs of the millennial generation who will determine and shape the current and future workplace. Designing training for the virtual classroom calls for HRD practitioners to design meaningful and effective instruction that engages the virtual learners, meets both the learners' and business' needs, and fosters collaboration in research and development.

Needs analysis, design, implementation, and evaluation are all critical components of an effective training process (Dobbs, 2006). HRD researchers need to come up with assessment measure(s) that are scientifically developed, and specifically for the virtual world. Work is already being done to develop evaluation practices for virtual environments (see Chapman & Stone, 2010, this issue). Without such measures, we will not know for certain the impact of virtual training on the company's human capital; however, we anticipate that tracking impact of human capital may be easier as employees increasingly engage in virtual work and VHRD.

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