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INTRODUCTION

Augmenting communication in and among those in the academic, business, and military communities, the exponential advancement of science and technology has availed vast amounts of information to virtually millions of people around the globe. In conjunction with this knowledge explosion has been a growing concern for the democratization of the learning process, with constructivism driving much of the educational agenda, most particularly in online distance education. This article examines the resurgence of the constructivist approach to teaching and learning, its convergence with rapidly changing technological advances, and its relationship to future trends in online pedagogy.

BACKGROUND

While the constructivist method has been highly emphasized in the recent literature for online distance education (Brown, L. 2014; Bryant & Bates, 2015; Holzweiss, Joyner, Fuller, Henderson, & Young, 2014; Lê & Lê, 2012; "Learning Theories", 2014; Mbati & Minnaar, 2015; Symeonides & Childs, 2015; Thorne, 2013), it is not a new approach to learning. Presenting an early example, Socrates facilitated discourse with students asking directed questions to assist them in realizing the weaknesses in their logic and critical thinking. This enabled learners to share in the responsibility of their learning through active participation while negotiating meaning in the creation of shared understanding. In contrast, medieval professors in later Western culture most often served as primary repositories of information along with the scrolls and velum texts found in the limited number of physical libraries available to educators. With the lecture serving as the quickest and easiest way to disseminate information to both small and large groups of individuals, it was both an efficient and effective delivery method in the shaping and forming of student knowledge, quickly becoming the standard for traditional education.

MAIN FOCUS OF THE ARTICLE

Resurgence of Constructivism

While the lecture method was the norm of information delivery for centuries in Western culture, the knowledge explosion arising from the latter part of the 20th century demanded more active learner participation. In light of this constant and rapid flux of information and knowledge, students became life-long learners compelled to use metacognitive skills to constantly evaluate and assimilate new material into their respective disciplines. As this implies, knowledge was no longer viewed as a fixed object; rather, learners constructed it as they experienced and co-created an understanding of various phenomena by collaborating and working with peers and professors as well as with the information. Now, rather than strictly acquir-

ing information, Duffy and Cunningham (1996) explicated that "learning is an active process of constructing … knowledge and … instruction is a process of supporting that construction" (p. 171).

Based on the work of Kidd (1973), Long (1983), Moore (1989), and Palmer (1993), Grooms' (2000) *Learner Interaction Model* (see Figure 1) illustrates that in the constructivist culture, the learner perpetually interacts with these three components of learning--content, facilitator or professor, and peers--each mutually and non-discriminately influencing the other.

Critical in this process is recognizing the shifting role of the professor who becomes the *guide on the side* or content facilitator and is no longer the proverbial *sage on the stage* or content provider. The student's role also has changed from being a passive receiver of information to an active participant in the knowledge-making process (Weller, 1988), aligning with Bandura's (1977, 1994) concept of the autonomous learner, an important dimension of the constructivist model. Table 1, based upon an earlier model from Reid-Martinez, Grooms, and Bocarnea (2009) and Reid-Martinez and Grooms (2015), delineates these two approaches to learning.

Of special interest in the above listing is the role of community. The constructivist approach recognizes that students do not learn strictly within the limited confines of a local educational institution, but rather within the broader international and global context of their personal lives extended through social media and multiple technologies. Consequently, the boundaries between the educational institution and the larger community become blurred creating its own unique set of opportunities and challenges.

As people work collaboratively in the learning activities and new technologies, they bring multiple worldviews and experiences to each situation often creating a plethora of perspectives. During this collaborative learning process, they must negotiate and generate meaning and solutions to problems through shared understanding. Thus, education moves from a single, solitary pursuit of knowledge to a collaborative learning community that shapes and informs responses to the environment. As noted by Fuller and Söderlund (2002), this challenges the common metaphor of the university as a self-contained village.

Rapidly Changing Distance Learning Technologies

Over the years, educators have experimented with and successfully employed multiple media for
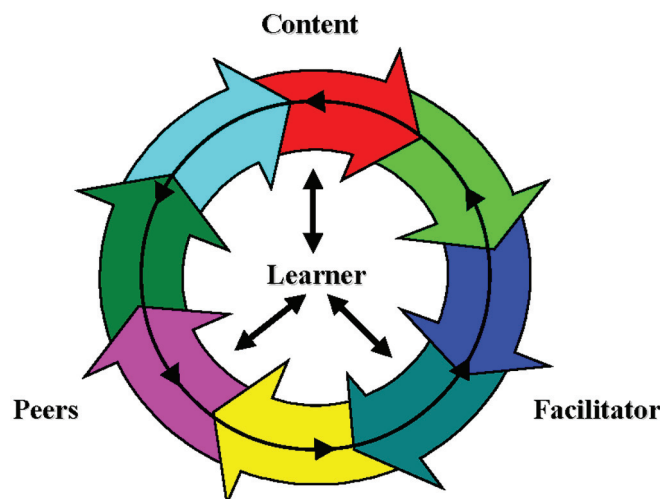
Figure 1.
2000 Grooms, L. D.

Table 1.

Approaches to Learning		
	Traditional	**Constructivist**
Professor	Sage on the Stage	Guide on the Side
	Content Provider	Content Facilitator
Learner	Passive Recipient	Active Participant
Knowledge	Fixed Object	Fluid
Organization of Learning	Ordered & Structured	Open & Often Chaotic
Communication	Uni-directional	Multi-directional
Primary Resource	Text & Professor	Multiple Sources
Method	Lecture	Active Process
Media	Print	Blended
Format	Structured & Individualized	Adaptive & Collaborative
Activities	Goal-Oriented	Problem-Centered
Focus of Learning	Knowledge & Understanding	Application, Analysis, Synthesis, & Evaluation
Assessment	Recall	Alternative Assessment
Community	Local Educational Institution	Integrated with Life in Global Contexts

distance learning, and today, as much as in the past, they continue to stress that pedagogy must drive technology (Rourke & Coleman, 2011). As early as the 18th century, print material was used and even today still serves an important role in distance education even as it gives way to more reliance on technology and web-based resources for collaborative development of knowledge that incorporates the diversity of learners and their contexts. After the 1930s, other media became significant with audio--including radio and audiotapes--and video--including film, public broadcasting, and cable--dominating much of the 20th century.

Much of this education was one-way based on a mass communication or one-to-many educational model. Basically, it was a rigid structure with information flowing in one direction, from the powerful and knowledgeable instructor reaching to the individual or even the larger group of students. It included elements of limited feedback through the use of such things as the penny post in the 19th century and the addition of the telephone and fax in the 20th century. Limited opportunities for face-to-face interaction were also incorporated with some programs. Thus much of distance learning during these times remained mainly non-interactive.

By the 1990s, the advent of the Internet presented new opportunities in distance education. The result was the evolution of a new type of collaborative learning, in which the potential for interaction between the professor and the learner increased exponentially with wide-area networks accommodating synchronous and asynchronous communication. While exploring computer-mediated activities of the online learning environment, Santoro (1996) highlighted three broad categories: (a) computer-assisted instruction, which allows the computer to serve as "teacher" by structuring information delivered to the human user; (b) computer-based conferencing, which includes e-mail, interactive messaging, and group conference support systems; and (c) informatics, which refers to online public access libraries and interactive remote databases. This proliferation of the Internet unlocked the door for educational institutions to reach beyond their four walls making services accessible to students around the world through online activities.

Although the communication technologies of the 21ˢᵗ century--print, audio, video, digital, and the Internet--cover a broad spectrum of distance education mediums, this exponential growth in science and technology has catapulted the Internet into rapidly becoming the preferred delivery platform. Since 1995, researchers such as Cotton (1995) and others have been tracking this information along with scholars such as Bocarnea, Grooms, and Reid-Martinez (2006), Grooms and Reid-Martinez (2013), and Reid-Martinez and Grooms (2012, 2015). They continue to explore not only the trends in distance education but also the understanding of and the issues involved in aligning the environment with student needs. Typical factors include (a) the characteristics of the discipline, (b) the degree of interactivity sought in the distance learning process, (c) learner characteristics, (d) instructor traits, (e) the expansiveness of the distance education initiative, (f) the desired level of accessibility and flexibility related the delivery capacity of learning platforms and smart mobile devices as well as other methods of dissemination, and lastly (g) the availability of technical support.

In addition to the global reach of the Internet, the lines *among* communication technologies have swiftly blurred. Today in the convergence of technologies, computers, telephones, and cameras are no longer distinct entities, but can be found bundled into one small handheld gadget through the fusion of technology (McCain & Jukes, 2001). These smaller fused devices create more mobility and simultaneously provide mixed realities through virtual immersive environments embedded within traditional spaces. Continuing advances, such as that found in interactive optical sensory technology, feed this growing world that fuses the virtual with the physical (Rolf, 2012). Through this fusion, communicating with students and colleagues has become more instantaneous, integrated and complex. While vastly expanding the means of interaction and feedback, it demands greater capacity and understanding of the multiple communication modalities.

Connected to these new technologies is the capacity to enhance adaptive individualized learning. As noted by Allen and Seaman (2013), adaptive learning helps overcome the barriers to online learning, a common concern of many academic leaders. As we see in the research of such scholars as Yang, Gamble, Hung, and Lin (2014), critical thinking can be enhanced through adaptive learning in the online environment. These new adaptive learning technologies accelerate and enhance learners' problem solving ability. The fusion of technological capacity for adaptive learning with collaborative technology platforms results in individuals operating at a more advanced level and collectively harnessing greater learning and problem solving abilities from all participants.

With such rapid technological advances, today's educators are dropped into what Jacque Ellul (1964) described as the intersection of tension between humanity and technology. This struggle with the latent and manifest, intended and unintended consequences of technology exists as students and professors wrestle with cloud computing, three-dimensional immersive learning environments, and other rapidly expanding web opportunities.

Such technology facilitates greater flexibility and customization in the learning process. Lead Learning Designer at IBM, Don Morrison (2004) demonstrated how the learning process can be established within parameters and policies that most appropriately align with the primary strengths and weaknesses of each medium. He noted that among others, cost, time constraints, delivery speed, and infrastructure help determine appropriate application. Morrison's work also pointed to ways in which educational models can be designed to marry traditional and online means of moving from the simple to the more complex methods of learning.

As the above suggests, these new electronic forms of communication have forced a paradigm shift in education. This move is most avidly seen in distance learning, where even the terminology has shifted from distance education to words such

as online or e-learning. Such terms more clearly indicate the way in which learners can use multiple media to easily collaborate through a continuous integration of knowledge and social capital.

FUTURE RESEARCH DIRECTIONS

As previously discussed, the rapid growth of technology continues to herald unprecedented opportunity for distance learning, and when wed to a constructivist approach, it presents opportunities for online pedagogy that can transcend traditional modes of education. From this marriage emerges three primary factors that define the new online pedagogy: (a) *community* development--the ability to build networks and communities that cross time and geographic boundaries, (b) s*tructure*--the technological ability to manage vast amounts of information, and (c) *collaborative* opportunities--for shared knowledge and wisdom building in response to the complexities of a global society (Reid-Martinez, 2006).

Community

As Bocarnea et al. (2006) note, today's technologies launch a new paradigm of online learning and pedagogy, which has the potential to be communal in nature. Primarily, these technologies allow for interaction between students and professors, students and peers, and the broader community in unprecedented ways. For example, students today have greater instructor and peer access through social media and e-learning platforms. Indeed the study of mobile technology for learning in environments of high action and great distance as found in the work of Black and Hawkes (2011) points to the now even more ubiquitous capacity of mobile learning (m-learning). In turn, this poses the question of expectation--whether conscious or not--regarding ubiquity of instructor presence and community development. It also enhances the ubiquity of the student in the learning process. Indeed, learning is no longer "just in time," but

with adaptive learning and other capacities that allow for learning that is "just for you" and "just with you" through wearable smart devices and other advancing technologies. This contemporary and developing technology now allows learning to be fluid with the learner in a simultaneous and continuous nature (Reid-Martinez, 2015).

These new technological advances raise the question of boundaries in the learning process. While advancing technologies provide unprecedented opportunities for networking and building strong virtual learning communities, they do transcend geographical boundaries and normal hours of operation as well as far beyond the duration of students' formal education. As early as 2002, Young highlighted the differences between the boundaries embedded in his traditional face-to-face class and that which he encountered online. This suggests that guidelines following best practices to manage the continuous nature of virtual learning experiences are essential to prevent online instructors and students from feeling overwhelmed by the 24-7, ubiquitous opportunity for interaction.

In addition, this communal nature of the virtual learning environment provides opportunities for students to bring their local community contexts into the learning experience in direct ways as well as immediately allowing them to apply what they have learned through their study. For example, students in leadership programs can be employed full-time in leadership positions and take their learning experiences directly into their work environment through well-designed course assignments. The professor is no longer someone whom the student must wait to see in class later in the week, but rather is readily available in e-learning and m-learning platforms to serve as consultant and mentor as the student applies the principles studied that week. The professor has become the *guide on the side.* This triangulation of student-professor-content points to the need for well-designed learning experiences developed from a constructivist perspective to meet the challenges and needs of today's students. Indeed, unit-

ing the new technology with this approach meets the needs of contemporary students working in rapidly changing and highly demanding global environments.

Additionally, rapid advancement of technology creates a moving target challenge for course developers who often find themselves reacting to the technological advances rather than proactively establishing the technology's relationship to the learning process. While scholars such as Schweizer (1999) noted unsound pedagogy and inadequate design in early online courses, others such as Wang and Newlin (2002) reinforced the importance of incorporating the opposite as critical predictors of successful student performance. Just a short time later, others such as Beetham and Sharpe (2007) and Rourke and Coleman (2011) continued to reinforce the critical role of pedagogy in using technology. Such approaches assure that good pedagogy is the driver of learning, not new technologies. This helps resolve Bocarnea et al.'s (2006) observation and concern that theory typically "follows technology in desperate attempts to describe the impact of an already existing and rapidly fading … technological reality" (p. 385).

This posits that staying focused on strategy and content design remains the dominant challenge. Online pedagogy, the science *of* and *about* online education, provides perspective to assist in focusing and maintaining the balance necessary for creating excellent online learning experiences.

Structure

Heralded just over 20 years ago by Negroponte (1995), the information age is collapsing on itself as the amount of online information is becoming unbearable. After the scramble to have everything digitized, the primary challenge today is how to create meaningful knowledge from such massive amounts of data. Quality of knowledge, in contrast to quantity, drives the heart of this concern. In light of this overload, *structure* is essential to online knowledge development.

Related to structure, is the development of open-source initiatives. While most often understood as the software that is open for use and modification by the public, the phrase has become a recognized attribute ascribed to multiple endeavors, such as knowledge-building. The open-source nature of online initiatives pushes a new model for managing learning and knowledge-building through the communal process. It allows diverse individuals from various locations to combine information from multiple sources into distributed knowledge networks. Through this open-source structure, participants interact to share experiences and knowledge, thereby expanding their awareness of new concepts and differing approaches to problem-solving as they modify the information in the open-source environment and re-distribute it back to fellow participants (Bocarnea et al., 2006).

As this suggests, through interaction, participants build complex webs of knowledge in the open-source cyberspace. The technology provides the structure to create and maintain webs of knowledge, and it also grants ease of access globally to those interested in that knowledge. In the process, knowledge is given away to others who in turn begin to use it in multiple ways while beginning the next evolution of knowledge development as they add to and transform the knowledge base they accessed through the open-source structure. With this transformation through this structural capacity is the transference of power and control that becomes less centrist and more distributed globally.

Collaborative Knowledge-Building

As noted above, interaction is the key for the development of open-source knowledge-building. While scholars such as Cederbom and Paulsen (2001) posited learning as a behavioral change, others hold that it is simply when learners meet needs and establish goals for attaining knowledge (Ponton & Carr, 2000). Referring to this process as an implied contract, Keirns (1999), along with the above scholars, suggested that if online learn-

ing is used, structure is critical to allow students to advance in their knowledge.

Because "engaging the learner in reflective and collaborative thought processes … results in the most effective learning, whether the setting is a traditional classroom or an online environment" (Cox & Cox, 2008), the design of the online course becomes the principal structure to assure learners' goals are achieved. In that course design, one way of attaining the collaborative thought processes is to incorporate structured interaction. Not only does this interaction provide for collaborative thoughts and knowledge development, it provides multiple opportunities for faculty to prompt students' critical thinking. In keeping with this, researchers such as Pelech and Pieper (2010) went so far as to clearly lay out, among other approaches, the roles of visual literacy, bridging questioning, and kinesthetic activities in applying Bloom's taxonomy for constructivist learning.

While these dimensions of critical thinking undergird contemporary collaborative capacity in online learning, other psychological dimensions are becoming more prevalent in understanding how critical thinking and collaboration can increase. For example, Rolf (2012) surfaced the complexities of virtual collaboration in his study of contemporary technologies' role in creating mixed realities. Another example is Mabrito's (2011) study of vicarious interaction--that is, observing not participating in peer as well as faculty-peer online interaction--which can generate more idea awareness in a constructivist learning environment and has potential impact on how collaboration occurs.

A common way to collaborate in the online environment is through interaction. Blair (2002) suggested that stronger relationships are forged through increased interaction frequency. Increased interaction relates to higher learner commitment due to the socialization the learner experiences as a participant in the knowledge-building process. Thus, learner perception of interaction plays an important role in student achievement, satisfaction, and quality of learning.

Again, in the collaborative nature of the constructivist online culture, interaction perpetually occurs between learners and content, learners and instructors, learners and peers, and learners and external experts with each type of interaction reinforcing and fostering collaborative knowledge-building. Teaching disappears and "communication of information rules, where information is available to all and in abundance" (Brown, T. H., 2015, p, 228). With this in mind, online course design must include best structures to capitalize on this collaborative interaction.

CONCLUSION

As the above suggests, the advent of online learning education has not just provided opportunity to disseminate information in a new medium, it has radically adjusted the distance learning paradigm in terms of distribution methods, community building, knowledge development, and learning. The use of 21st century technology is rapidly closing the gap of the communication immediacy essential in developing communities of practice for knowledge-building. With their open-source networks, these new technologies encourage and actively support constructivist pedagogy in the distance education paradigm. Most of all, distance education through its constructivist pedagogy and contemporary technologies has the technical capacity to fulfill its greatest potential, which is to reach every learner who desires to participate in the knowledge-building process. The result can be a democratization of education not previously seen, allowing for shifts in power and control throughout societies.

REFERENCES

Allen, I. E., & Seaman, J. (2013). *Grade Change: Tracking Online Education in the United States.* Babson Survey Research Group and Quahog Research Group. Retrieved from http://www.onlinelearningsurvey.com/reports/gradechange.pdf

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 77–81). New York: Academic Press.

Beetham, H., & Sharpe, R. (Eds.). (2007). *Rethinking pedagogy for a digital age: Designing and delivering e-learning.* London: Routledge.

Black, J., & Hawkes, L. W. (2011). Making the case for mobile collaborative learning for reading comprehension on handheld computers. In A. Rourke & K. Coleman (Eds.), *Pedagogy leads technology: Online learning and teaching in higher education: New technologies, new pedagogies* (pp. 143–158). Champaign, IL: Common Ground Publishing.

Blair, J. (2002). The virtual teaching life. *Education Week*, *21*, 31–35.

Bocarnea, M. C., Grooms, L. D., & Reid-Martinez, K. (2006). Technological and pedagogical considerations in online learning. In A. Schorr & S. Seltmann (Eds.), Changing media markets in Europe and abroad: New ways of handling information and entertainment content (pp. 379-392). Pabst Science Publishers.

Brown, L. (2014). Constructivist learning environments and defining the online learning community. *Journal of Science Education and Technology*, *9*(4), 1–6.

Brown, T. H. (2015). A reflection on Barber, Donnelly, and Rizvi (2013): "An avalanche is coming: Higher education and the revolution ahead". *International Review of Research in Open and Distributed Learning*, *16*(4), 227–234. doi:10.19173/irrodl.v16i4.1952

Bryant, J., & Bates, A. J. (2015). Creating a constructivist online instructional environment. Tech Trends. *Linking Research & Practice to Improve Learning*, *59*(2), 17–22. doi:10.1007/s11528-015-0834-1

Cederblom, J., & Paulsen, D. W. (2001). *Critical reasoning: Understanding and criticizing arguments and theories* (5th ed.). Belmont, CA: Wadsworth.

Cotton, C. (1995). Time-and-place independent learning: The higher education market for distance learning emerges. *Syllabus*, *8*(5), 37–39.

Cox, B., & Cox, B. (2008). Developing interpersonal and group dynamics through asynchronous threaded discussions: The use of discussion board in collaborative learning. *Education*, *128*(4), 553–565.

Duffy, T. M., & Cunningham, D. J. (1996). Constructivism: Implications for the design and delivery of instruction. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 170–198). New York: Simon Schuster Macmillan.

Ellul, J. (1964). *The technological society* (J. Wilkinson, Trans.). New York: Vintage Books.

Fuller, T., & Söderlund, S. (2002). Academic practices of virtual learning by interaction. *Futures*, *34*(8), 745–760. doi:10.1016/S0016-3287(02)00018-6

Grooms, L. D. (2000). Interaction in the computer-mediated adult distance learning environment: Leadership development through online education. *Dissertation Abstracts International*, *61*(12), 4692A.

Grooms, L. D., & Reid-Martinez, K. (2013, November). *Cross-Cultural Learning for Leadership Resilience and Sustainability.* Presented at the 15th annual International Leadership Association Conference, Montreal, Canada.

E

Holzweiss, P. C., Joyner, S. A., Fuller, M. B., Henderson, S., & Young, R. (2014). Online graduate students perceptions of best learning experiences. *Distance Education*, *35*(3), 311–323. doi:10.1080/01587919.2015.955262

Keirns, J. (1999). *Designs for self-instruction: Principles, processes, and issues in developing self-directed learning*. Needham Heights, MA: Allyn & Bacon.

Kidd, J. R. (1973). *How adults learn*. Chicago: Follett Publishing.

Lê, Q., & Lê, M. (2012). New challenges in web-based education. In T. Lê & Q. Lê (Eds.), *Technologies for enhancing pedagogy, engagement and empowerment in education: Creating learning-friendly environments* (pp. 58–65). Hershey, PA: IGI Global. doi:10.4018/978-1-61350-074-3.ch005

Long, H. B. (1983). Adult learning: Research and practice. New York: Cambridge.

Mabrito, M. (2011). Lurking and learning: A study of vicarious interaction in the online classroom. In A. Rourke & K. Coleman (Eds.), *Pedagogy leads technology: Online learning and teaching in higher education: New technologies, new pedagogies* (pp. 105–116). Champaign, IL: Common Ground Publishing.

Mbati, L., & Minnaar, A. (2015). Guidelines towards the facilitation of interactive online learning programmes in higher education. *International Review of Research in Open and Distributed Learning*, *16*(2), 272–287. doi:10.19173/irrodl.v16i2.2019

McCain, T., & Jukes, I. (2001). *Windows in the future: Education in the age of technology*. Thousand Oaks, CA: Corwin Press.

Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education*, *3*(2), 1–7. doi:10.1080/08923648909526659

Morrison, D. (2004). *What do instructional designers design?* Retrieved from http://www.morrisonco.com

Negroponte, N. (1995). *Being digital*. New York: Alfred A. Knopf.

Palmer, P. J. (1993). *To know as we are known: Education as a spiritual journey*. San Francisco: Harper Collins.

Pelech, J., & Pieper, G. (2010). *The comprehensive handbook of constructivist teaching: From theory to practice*. Charlotte, NC: Information Age.

Ponton, M. K., & Carr, P. B. (2000). Understanding and promoting autonomy in self-directed learning. *Current Research in Social Psychology*, *5*(19). Retrieved from http://www.uiowa.edu/~grpproc/crisp/crisp.5.19.htm

Reid-Martinez, K. (2006). *What's that in your hand?* Presented at the 2006 General Assembly, International Conference of Educators, Indianapolis, IN.

Reid-Martinez, K., & Grooms, L. D. (2012, November). *Building a community of leaders through communication using a constructivist approach.* Presented at the annual convention of the National Communication Association, Orlando, FL.

Reid-Martinez, K., & Grooms, L. D. (2015). Constructivism as the driver of 21st century online distance education. In M. Khosrow-Pour (Ed.), *Encyclopedia of Information Science and Technology* (3rd ed.; pp. 2229–2238). Hershey, PA: IGI Global; doi:10.4018/978-1-4666-5888-2.ch216

Reid-Martinez, K., Grooms, L. D., & Bocarnea, M. C. (2009). Constructivism in online distance education. In *Encyclopedia of Information Science and Technology* (2nd ed.; Vol. 2, pp. 701–707). Hershey, PA: IGI Global. doi:10.4018/978-1-60566-026-4.ch114

Rolf, D. (2012). Mixed realities: Human interaction technologies. In T. Lê & Q. Lê (Eds.), *Technologies for enhancing pedagogy, engagement and empowerment in education: Creating learning-friendly environments* (pp. 209–216). Hershey, PA: IGI Global. doi:10.4018/978-1-61350-074-3.ch018

Rourke, A., & Coleman, K. (Eds.). (2011). *Pedagogy leads technology: Online learning and teaching in higher education: New technologies, new pedagogies*. Champaign, IL: Common Ground Publishing.

Santoro, G. M. (1996). What is computer-mediated communication? In Z. L. Berge & M. P. Collins (Eds.), *Computer mediated communication and the on-line classroom* (Vol. 1, pp. 11–27). Cresskill, NY: Hampton Press.

Schweizer, H. (1999). *Designing and teaching an on-line course: Spinning your web classroom*. Boston: Ally & Bacon.

Symeonides, R., & Childs, C. (2015). The personal experience of online learning: An interpretive phenomenological analysis. *Computers in Human Behavior*, *51*, 539–545. doi:10.1016/j.chb.2015.05.015

Theories, L., & Engagement, S. (2014). Article. *ASHE Higher Education Report*, *40*(6), 15–36. doi:10.1002/aehe.20018

Thorne, J. A. (2013). Biblical online education: Contributions from constructivism. *Christian Education Journal*, *10*(1), 99–109.

Wang, A., & Newlin, M. (2002). Predictors of performance in the virtual classroom. *T. H. E. Journal Online, 29*(10), 21-22, 26-28.

Weller, H. G. (1988). Interactivity in microcomputer-based instruction: Its essential components and how it can be enhanced. *Educational Technology*, *28*(2), 23–27.

Yang, Y.-T. C., Gamble, J. H., Hung, Y.-W., & Lin, T.-Y. (2014). An online adaptive learning environment for critical-thinking-infused English literacy instruction. *British Journal of Educational Technology*, *45*(4), 723–747. doi:10.1111/bjet.12080

Young, J. R. (2002). The 24-hour professor: Online teaching redefines faculty members' schedules, duties, and relationships with students. *The Chronicle of Higher Education*, *48*(38), A31–A33.

ADDITIONAL READING

Burge, E., Gibson, C. C., & Gibson, T. (Eds.). (2011). *Flexible pedagogy, flexible practice: Notes from the trenches of distance education*. Edmonton, Alberta: Athabasca University.

Denton, D. W. (2012, July/August). Enhancing instruction through constructivism, cooperative learning, and cloud computing. *TechTrends*, *56*(4), 34–41. doi:10.1007/s11528-012-0585-1

Fosnot, C. (1996). *Constructivism: Theory, perspectives, and practice*. New York, NY: Teachers College Press.

Gazi, Z., & Aksai, F. (2011). *Handbook of online pedagogy*. Saarbrucken, Germany: LAP LAMBERT Academic Publishing.

Gülseçen, S. (2012). Digital learning environments and student centered curriculum in a university context. In T. Lê & Q. Lê (Eds.), *Technologies for enhancing pedagogy, engagement and empowerment in education: Creating learning-friendly environments* (pp. 209–216). Hershey, PA: IGI Global. doi:10.4018/978-1-61350-074-3.ch009

Hai-Jew, S. (2012). *Constructing self-discovery learning spaces online: Scaffolding and decision making technologies*. Hershey, PA: Information Science Reference. doi:10.4018/978-1-61350-320-1

McHaney, R. W. (2012). Knowledge spaced for online discovery learning. In S. Hai-Jew (Ed.), *Constructing self-discovery learning spaces online: Scaffolding and decision making technologies* (pp. 72–94). Hershey, PA: IGI Global. doi:10.4018/978-1-61350-320-1.ch005

Shi, Y., Fan, S., & Yue, Y. (2012). Empowering students in computer-supported education. In T. Lê & Q. Lê (Eds.), *Technologies for enhancing pedagogy, engagement and empowerment in education: Creating learning-friendly environments* (pp. 198–207). Hershey, PA: IGI Global. doi:10.4018/978-1-61350-074-3.ch017

Trifonas, P. P. (2012). *Learning the virtual life: Public pedagogy in a digital world*. New York: Routledge.

KEY TERMS AND DEFINITIONS

Autonomous Learner: An individual who takes responsibility for his or her learning.

Collaborative Learning: The process in which individuals negotiate and generate meaning and solutions to problems through shared understanding.

Computer-Assisted Instruction: The computer serves as the "teacher" by structuring information delivered to the human user.

Computer-Based Conferencing: E-mail, interactive messaging, and group conference support systems.

Constructivism: An approach in which students share responsibility for their learning while negotiating meaning through active participation in the co-creation of shared understanding within the learning context.

Distributed Knowledge: Information dispersed throughout a community of practice and not held by any one individual.

Informatics: Online public access libraries and interactive remote databases.

Interaction: mutual communicative exchange between individuals.