

The Influence of Cognitive Style and Computer Self-efficacy on Web-based EFL Writing Performance

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ABSTRACT

Cognitive styles and computer self-efficacy have been found to be a major factor influencing students' Web-based learning achievements, as seen in previous studies. This study aims to further investigate learners' cognitive styles and computer self-efficacy on their online writing performance and attitude toward English writing in online learning environments. Seventy participants were chosen from one university located in central Taiwan. The experiment was conducted using quantitative methods to collect data. The instruments used in the study included the Group Embedded Figure Test (GEFT), a Computer Self-efficacy Scale, and an Attitude Questionnaire. The results of the present study revealed that there was no interactive effect between cognitive styles and computer self-efficacy on the writing performance and attitude toward online writing experience of the student learners. Also, cognitive style was found to be the main factor influencing participants' writing achievement and attitude toward online writing. Field independent students outperformed field dependent students and more positively considered learning English writing in a Web-based environment. They also had more positive attitudes toward the online English writing experience. From these study findings, several recommendations can be made to improve current education practices in Web-based learning environments. First, online instructors should prepare pre-instructional activities so novice online learners or field dependent learners can acquire minimum competencies for learning through technology devices. Second, a variety of learning content presentation methods in connection with learners' different cognitive styles with well-guided instructions and structuring activities, such as visuals, video, audio, interactive exercises, etc. might be employed. In addition, preparing a paper-based review that highlights the importance of online content may be more time effective.

Keywords : cognitive styles ; field independence ; field dependence ; computer self-efficacy ; Web-based EFL writing

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REFERENCES

- Abraham, R. (1985). Field dependence-independence and the teaching of grammar. *TESOL Quarterly*, 20, 689-702.
- Ayersman, D. J. (1993). An overview of the research on learning styles and hypermedia environments. Annual convention of the Eastern Educational Research Association, Clearwater Beach, 16.
- Banrura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 27, 122-147.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Blin, F. (1999). CALL and the Development of Learner Autonomy. In J. Egbert & E. Hanson-Smith (Eds.), *CALL Environments: Research, Practice, and Critical Issues*, 113-147. TESOL Inc.
- Bovair, S., Kieras, D., & Polson, P. (1990). The acquisition and performance of text-editing skills: A cognitive complexity analysis. *Human-Computer Interaction*, 5(1), 1-48.
- Braine, G. (1997). Beyond word processing: Network computers in ESL writing class. *Computers and Composition*, 14, 45-58.
- Brenner, J. (1997). Student 's cognitive styles in asynchronous distance education courses at a community college. Paper presented at the meeting of the 3rd International Conference on Asynchronous Learning Networks, New York.
- Burton, J. K., Moore, D. M., & Holmes, G. A. (1995). Hypermedia concepts and research: An overview. *Computers in Human Behavior*, 11(3/4), 345-369.
- Chapelle, C. A. (2001). *Computer applications in second language acquisition: foundations for teaching, testing, and research*. Cambridge: Cambridge University Press.
- Chen, S. Y., & Macredie, R. D. (2002). Cognitive styles and hypermedia navigation development of a learning mode. *Journal of the American Society for Information Science and Technology*, 53(1), 3-15.
- Chen, S. (2000). A cognitive model of non-linear learning in hypermedia programs. *British Journal of Educational Technology*, 33(4), 449-460.
- Chinien, C., & Boutin, F. (1993). Cognitive Style FD/I: An important learner characteristic for educational technologists. *Journal of Educational Technology Systems*, 21(4), 303-311.
- Chinien, C. A., & Boutin, F. (1992). Cognitive style FD/I as a learner selection criterion in formative evaluation: A qualitative analysis. *Performance Improvement Quarterly*, 5(2), 24-33.
- Chou, C. (1999). Developing hypertext-based learning courseware for computer network: The macro and micro stages. *IEEE Transactions on Education*, 42, 39-44.
- Chou, H. W. (2001). Influences of cognitive style and training method on training effectiveness. *Computers and Education*, 3, 11-25.
- Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189-211.
- Cunningham, K. (2000). Integrating CALL into the writing curriculum. *The Internet TESL Journal*, 5(5), Retrieved October 13, 2006, from <http://iteslj.org/Articles/Cunningham-CALLWriting>
- Davis, J. K. (1991). Educational implications of field dependence-independence. In S. Wapner & J. Demick (Eds.), *Field dependence-independence: Cognitive style across the lifespan* (pp.149-175). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Daniels, H. L., & Moore, D. M. (2000). Interaction of cognitive style and learner control in a hypermedia environment. *International Journal of Instructional Media*, 27(4), 369-382.
- Debski, R., & Levy, M. (1999). *WORLDCALL: Global perspectives on computer-assisted language learning*. The Netherlands: Swets & Zeitlinger.
- Dent, C. (2001). Stud: classification v. categorization. Retrieved October 13, 2006, from <http://www.burningchrome.com:8000/%7Ecdent/fiaarts/docs/1005018884:23962.html>
- Ford, N., & Chen, S. (2000). Individual differences, hypermedia navigation, and learning: An empirical study. *Journal of Education Multimedia and Hypermedia*, 9(4), 281-311.
- Fox, G. (1998). The Internet: Making it work in the ESL classroom. *The Internet TESL Journal*, 6(9), September 1998. Retrieved October 13, 2006, from <http://iteslj.org/Articles/Fox-Internet.html>
- Fritz, R. L. (1994). Gender differences in field-dependence and educational style. *Journal of Vocational Education Research*, 19(1), 1-21.
- Gail, E. F., & Louis, P. S. (1997). Hypermediated learning; learning styles, path analysis and knowledge outcomes. Retrieved October 13, 2006, from <http://tiger.coe.missouri.edu/vrcbd/pdf/edmed97.pdf>
- Gist, M., & Mitchell, T. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *Academy of Management Review*, 17, 183-211.
- Gist, M. E., Schwoerer, C., & Rosen, B. (1989). Effects of alternative training methods on self-efficacy and performance in computer software training. *Journal of Applied Psychology*, 74, 884-891.
- Graff, M. (2003a). Assessing learning from hypertext: An individual differences perspective. *Journal of Interactive Learning Research*, 14(4), 425-438.
- Graff, M. (2003b). Learning from Web-based instructional systems and cognitive style. *British Journal of Educational Technology*, 34(4), 407-418.
- Guinan, T., & Stephens, L. (1988). Factors affecting the achievement of high school students in beginning computer science courses. *Journal of Computer in Mathematics and Science Teaching*, 8(1), 61-64.
- Gu, P., & Xu, Z. (1999). Improving EFL learning environment through networking. In R. Debski & M. Levy (Eds.), *WORLDCALL: Global Perspectives on Computer-Assisted Language Learning*, 169-84. The Netherlands: Swets & Zeitlinger.
- Griffin, R., & Franklin, G. (1995). Can college academic performance be predicted using a measure of cognitive style? *Journal of Educational Technology Systems*, 24(4), 375-379.
- Harris, L. D. (1996). The Internet-based composition classroom: A study in pedagogy. *Computers and Composition*, 13, 355-371.
- Harrison, A.W., & Ranier, K. (1992). An examination of the factor structures and concurrent validities for computer attitude scale, the computer anxiety rating scale, and computer self-efficacy scale. *Educational and Psychological Measurement*, 52(3), 735-745.
- Hariston, M. (1982). The winds of change: The revolution in the teaching of writing. *College Composition and Communication*, 33, 76-88.
- Hill, T., Smith, D. S., & Mann, M. F. (1986). Communicating innovations: Convincing computer phobics to adopt innovative technologies. *Advance in Consumer Research*, 13, 419-422.
- Hyland, K. (2002). *Teaching and researching writing*. London: Pearson Education.
- Hyland, K. (2003). *Second language writing*. Cambridge: Cambridge University Press.
- Jarvis, D. J. (2002). The process writing method. *The Internet TESL Journal*, 3(7), Retrieved October 16, 2006, from <http://iteslj.org/Techniques/Jarvis-Writing.html>
- Jonassen, D. H., & Graviwski, B. (1993). *Individual differences and instruction*. New York: Allen & Bacon.
- Jones, S. (1993). *Cognitive learning styles: Does awareness*

help? A review of selected literature. *Language Awareness*, 2(4), 195-207. Karsten, R., & Roth, M. R. (1998). The relationship of computer experience and computer self-efficacy to performance in introductory computer literacy courses. *Journal of Research on Computing in Education*, 31(1), 11-24. Keefe, J.W. (1979), " Learning style: An overview " , in *Student learning styles: Diagnosing and prescribing programs*, National Association of Secondary School Principals, Reston, VA. Kern, R., & Warschauer, M. (2000). *Network-based language teaching: Concepts and practice*. Cambridge, UL: Cambridge University Press. Kini, A. S. (1994, April). Effects of cognitive style and verbal and visual presentation modes on concept learning in CBI. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA. Kinzie, M. B., Decourt, M. A. B., & Powers, S. M. (1994). Computer technologies: Attitudes and self-efficacy across undergraduate disciplines. *Research in Higher Education*, 35, 745-768. Kramsch, C., A ' Ness, D., & Lam, W. H. E. (2000). Authenticity and authorship in the computer-mediated acquisition of L2 literacy. *Language Learning & Technology*, 4(2) Retrieved October 13, 2006, from <http://llt.msu.edu/vol4num2/kramsch/default.html> Leader, L. F. (1996). The effects of search tool type and cognitive style on performance during hypermedia database searches. *Educational Technology Research and Development*, 44(2), 5-15. Leidner, D. E., & Jarvenpaa, S. L. (1995). The use of information technology to enhance management school education: A theoretical view. *MIS Quarterly*, 19(2), 222-231. Leventhal, G., & Sisco, H. (1996). Correlations among field dependence/independence, locus of control, and self-monitoring. *Perceptual and Motor Skills*, 83, 604-606. Lim, K. H., & Benbasat, I. (1997). An empirical study of computer system learning: comparison of co-discovery and self-discovery methods. *Information Systems Research*, 8(3), 154-272. Liu, M., & Reed, W. M. (1994). The relationship between the learning strategies and learning styles in a hypermedia environment. *Computer in Human Behavior*, 10(4), 429-434. Lyons-Lawrence, C. L. (1994). Effect of learning style on performance in using computer based instruction in office systems. *The Delta Pi Epsilon Journal*, 36(3), 166-175. Manochehri, N., & Young, J. I. (2006). The impact of student learning styles with Web-based learning or instructor-based learning on student knowledge and satisfaction. *The Quarterly Review of Distance Education*, 7(3), 313-316. Messick, S. (1976), *Personality consistencies in cognition and creativity*, In Messick, S. & associates (Eds), *Individuality in learning*, Jossey-Bass, San Francisco, CA. Messick, S. (1984). The nature of cognitive styles: problems and promises in educational research. *Education Psychologist*, 19, 59-74. Messick, S. (1993). *The matter of style: Manifestations of personality in cognition, learning, and teaching*. Princeton, NJ: Educational Testing Service. Miura, I. T. (1987). The relationship of computer self-efficacy expectations to computer interest and course enrollment in college. *Sex Roles*, 16, 303-311. Montague, N. (1995). The process oriented approach to teaching writing to second language learners. *New York State Association for Bilingual Education Journal*, 10, 13-24. Moran, C. (1990). The computer writing room: Authority and control. *Computer and Composition*, 7(2), 61-69. Muehleisen, V. (1997). Projects using the Internet in college English classes. *The Internet TESL Journal*, 3(6), Retrieved, July 15th 2006, from <http://iteslj.org/Lessons/Muehleisen-Projects.html> Oughton, J. M., & Reed, W. M. (1999). The influence of individual differences on the construction of hypermedia concepts: A case study. *Computers in Human Behavior*, 11, 11-50. Paulsen, M. F. (2002). *Online education systems: discussion and definition of terms*. Norway: NKI Distance Education Press. Pennington, M. C. (1993). A critical examination of word processing effects in relation to L2 writhers. *Journal of Second Languge Writing*, 2, 227-255. Raimes, A. (1992). *Exploring through writing: A process approach to ESL composition*. New York: St. Martins Press Raimes, A. (1983). *Techniques in teaching writing*. Oxford: Oxford University Press. Reid, J. M. (1993). *Teaching ESL Writing*. Englewood Cliffs: Prentice Hall. Reiff, J. (1996). At-risk middle level students or field dependent learners. *Clearing House*, 69(4), 231-234. Riding, R., & Cheema, I. (1991). *Cognitive styles : On overview and integration*. *Educational Psychology*, 11(3/4), 193-215. Roblyer, M. (2003). *Integrating educational technology into teaching*. Columbus, Ohio: Person Education. Sadler-Smith, E. (2001). The relationship between learning style and cognitive style. *Personality and Individual Differences*, 30, 609-616. Saracho, O. N. (1998). Research directions for cognitive style and education. *International Journal of Educational Research*, 29, 287-290. Silva, T. (1990). Second language composition instruction: Developments, issues, and directions in ESL. In B. Kroll (Ed.), *Second language writing*. Cambridge: Cambridge University Press. Singhal, M. (1997). The Internet and foreign language education: Benefits and challenges. *The Internet TESL Journal*, 3(6), Retrieved October 16, 2006, from <http://iteslj.org/Articles/Singhal-Internet.html>. Singhal, J. (1997). Reading hypertext: Order and coherence in a new medium. *College English*, 52, 870-883. Sloane, A. (1997). Learning with the web: Experience of using the world wide web in a learning environment. *Computers and Education*, 28(4), 207-212. Takayoshi, P. (1996). The shape of electronic writing: Evaluation and accessing computer-assisted writing process and product. *Computers and Composition*, 13, 245-257. Taylor, H. G., & Mounfield, L. C. (1991). An analysis of success factors in college computer science: High school methodology in a key element. *Journal of Research on Computing in Education*, 24(2), 240-250. Torzkadeh, G., & Koufteros, X. (1994). Factorial validity of a computer self-efficacy scale and the impact of computer training. *Educational and Psychological Measurement*, 54(3), 813-821. Triantafillou, E., Pomportsis, A., & Demetriadis, S. (2003). The design and the formative evaluation of an adaptive educational systems based on cognitive styles. *Computers and Education*, 41, 87-103. Truell, A. D. (2001). Student attitudes toward evaluation. *The Delta Phi Epsilon Journal*, 43(1), 40-49. Urzua, C. (1987). " You stopped too soon " : Second language children composing and revising. *TESOL Quarterly*, 21, 179-304. Webster, J., & Martocchio, J. J. (1993). Turning work into play: Implication for microcomputer software training. *Journal of Management*, 19, 1127-1146. White, R., & Arndt, V. (1991). *Process writing*. London: Longman. Whyte, M., Karolick, D., & Taylor, M. D. (1996). *Cognitive learning styles and their impact on curriculum development and instruction*. Proceedings of the National Convention of the Association for Educational Communications and Technology, 1996, 783-799. Wilson, B. G. (1996). *Constructivist learning environments: Case studies in instructional design*. Englewood Cliff, N J: Technology Publications. Witkin, H. A, Oltman P. K., Raskin, E., & Karp, S. A. (1971). *A manual for the group embedded figures test*. Palo Alto, CA: Consulting Psychology Press. Witkin, H. A. (1950). Individual differences in ease of perception of embedded figures. *Journal of Personality*,

19(1), 1-15. Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. *Review of Education Research*, 47, 1-64. Witkin, H. A., & Goodenough, D. R. (1979). Cognitive styles: Essence and origins. *Psychological Issues, Monograph 51*. Wu, M. L. (2003). SPSS統計應用學習實務:問卷分析與應用統計。台北市:之城 數位科技。 Wu, Y. Y. (1987). 認知能力與認知型態個別差異現象之探討。 *高雄師範學院教育學*, 7, 51-98