The effects of constructing robot-based storytelling system on college students' computational thinking skill and technology comprehension

Chih-Chien Hu*, Ming-Hsien Chen*, Imam Yuadi**, Nian-Shing Chen***

*Department of Information Management, Tatung University, No.40, Sec. 3, Zhongshan N. Rd., Taipei City 104, Taiwan
**Department of Information and Library Science, Airlangga University, Jl. Airlangga 4-6 Surabaya, Indonesia 60286
***Institute for Research Excellence in Learning Sciences and Program of Learning Sciences, National Taiwan Normal University, 162, Section 1, Heping E. Rd., Taipei City 106, Taiwan

holdenhu@gm.ttu.edu.tw, mhchen@gm.ttu.edu.tw, imam.yuadi@fsip.unair.ac.id, nianshing@gmail.com

Abstract—Recent college students have been observed to be motivated and engaged in acquiring information and communication technology (ICT) knowledge and skills with robots and digital media. The purpose of this study is to develop students’ technology comprehension through a learning activity by constructing robot-based storytelling systems. A sample of 15 college students participated in the program. Data collected include the pre- and post- computational thinking tests (CTt) and computational thinking skill (CTS) tests for evaluating their learning effects of technology comprehension (TC) in terms of computational thinking knowledge and skills and their perceptions toward the robot-based storytelling development environment and learning activities. The results show that the learning activities were an effective approach for enhancing the students’ TC as shown in the post-test. The differences between the students’ CT and perceptions were also confirmed. The results revealed that the learning activities with the robot-based storytelling development environment could improve the students’ TC knowledge and skills, and learning perceptions.

Keyword—Technology comprehension; Computational thinking; Robot-based storytelling; Information and communication technology

CHIH-CHIEN HU is an Assistant Professor in the Department of Information Management, Tatung University, Taiwan. He was a researcher in the Industrial Technology Research Institute in 2009-2019. His current professional interests focus on technology enhanced learning, digital game-based learning, educational data mining, optimization technique, context-aware systems, and multi-criteria decision-making methods.

MING-HSIEH CHEN is an Assistant Professor in the Department of Information Management, Tatung University, Taiwan. His current professional interests focus on data warehouse, business intelligence, and institutional research.

IMAM YUADI is an Assistant Professor at the Department of Information and Library Science, Airlangga University, Indonesia. His doctoral degree was from Information Management, National Chiao Tung University Taiwan in 2017. He has been conducting several kinds of research about digital forensics, data science, digital library, and bibliometric analysis.

NIAN-SHING CHEN is a Chair Professor in the Institute for Research Excellence in Learning Sciences and Program of Learning Sciences, National Taiwan Normal University, Taiwan. Prof. Chen has received the national outstanding research awards for three times from the National Science Council in 2008, 2011-2013 and the Ministry of Science and Technology in 2015-2017. His current research interests include educational robot; technology-enhanced language learning; mobile & ubiquitous learning; embodied cognition & game-based learning. His email is nianshing@gmail.com