Correction to: Problem-based gaming via an augmented reality mobile game and a printed game in foreign language education

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Published online: 16 December 2020

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Correction to: Education and Information Technologies <https://doi.org/10.1007/s10639-020-10391-1>

In the original publication, some of the Tables entries at the last column of Table 1 were mistakenly shifted to the 1st column during typesetting. The correct Table is presented in this Erratum.

The online version of the original article can be found at <https://doi.org/10.1007/s10639-020-10391-1>

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Table 1 Summary of studies using augmented reality technologies in foreign language education

Study	Participants & settings	Research design	AR time (length of study)	Technologies & name of the game	Measures	Findings
Chen et al. (2020)	EFL junior high school learners in Taiwan (N = 196)	Experiment/three caption groups (non-caption vs. English vs. Chinese)	70 min	Marker-based (researcher-created AR) <i>Travelling around the USA</i>	Questionnaires An English achievement test (including vocabulary & structures)	Captions did not influence knowledge comprehension, but English proficiency played a role in the knowledge application. Students showed positive motivation and attitude toward AR learning.
Redondo et al. (2020)	EFL young children in Spain (N = 102)	Experiment/two groups (AR vs. traditional teaching)	135 min	Marker-based (researcher-created AR)	Questionnaires A vocabulary test	AR group showed significantly higher scores than the control group in terms of vocabulary, motivation, and socio-affective relationships.
Yeh & Tseng (2020)	EFL university students in Taiwan (N = 52)	Case study/one group	Not specified (18 weeks)	Location-based (student-created AR)	Multimodal literacy surveys Reflection essays	Creating the content in the AR app significantly enhanced students' multimodal literacy.
Wu (2019)	EFL adult learners in Taiwan (N = 61)	Experiment/two groups (AR vs. traditional instruction)	Not specified	Location-based <i>Pokemon Go</i>	Questionnaire Interviews	AR group showed significantly better performance than the control group in terms of learning attitudes, satisfaction, and Pokemon words.
Taskiran (2019)	EFL university students in Turkey (N = 83)	Case study/one group	Not specified	Marker-based (researcher-created AR)	Questionnaire	Most participants perceived AR-based activities as highly motivating and enjoyable.
Ji & Shin (2019)	EFL elementary school students in Korea (N = 38)	Experiment/two groups (AR vs. picture-based group)	15 min	Marker-based <i>Quiver</i>	Questionnaire Interviews	AR group demonstrated significantly higher scores than the picture-based group in terms of interest and curiosity, but not in terms of attention and control over learning.
Hoang & Nguyen (2019)	EFL university students in Vietnam (N = 29)	Case study/one group	Not specified (15 weeks)		Questionnaire Interviews	Students reported creating and watching peers' products via

Table 1 (continued)

Study	Participants & settings	Research design	AR time (length of study)	Technologies & name of the game	Measures	Findings
Hsu (2017)	EFL elementary school students in Taiwan (N = 38)	Experiment/two groups (self-directed AR vs. task-based AR)	80 min (200 min)	Marker-based (student-created AR) Marker-based (researcher-created AR)	Questionnaire Vocabulary tests	AR as motivating and felt responsible for their own learning. Self-directed and task-based AR groups showed similar levels of learning effectiveness, although the self-directed group was higher than the task-based group in the flow state.
Alsowat (2017)	EFL university students in Saudi Arabia (N = 59)	Experiment/two groups (AR-based reading vs. traditional teaching)	8 weeks	Marker-based (researcher-created AR)	Questionnaire Reading comprehension tests	AR group showed more significant improvement in reading comprehension than the control group, and achieved significant gains from pre-to-post surveys of self-efficacy, autonomy, and attitudes.
Ho et al. (2017)	EFL adult learners in Taiwan (N = 90)	Experiment/three style groups (field dependent vs. mixed field vs. field independent)	60 min	Marker-based (researcher-created AR)	Questionnaire In-app English tests	Learning strategies and cognitive styles influenced learners' performance in terms of speaking and listening proficiency.
Liu, Holden & Zheng (2016)	ESL university students in the United States (N = 3)	Case study/one group	Not specified	Location-based (ARIS) <i>Guardians of the Mo'o</i>	Interviews Video recordings	AR technologies provided a dynamic learning experience for ESL students.
Perry (2015)	University learners of French in Canada (N = 11)	Case study/one group	150 min	Location-based (ARIS) & <i>Explorez</i>	Questionnaire Interviews	Participants reported positive feedback on <i>Explorez</i> , as well as several limitations of the AR game.
Solak & Cakir (2015)	EFL university students in Turkey (N = 130)	Case study/one group	3 weeks	Marker-based (researcher-created AR)	Questionnaire	AR technologies increased student motivation toward learning vocabulary.

Table 1 (continued)

Study	Participants & settings	Research design	AR time (length of study)	Technologies & name of the game	Measures	Findings
Mahadzir & Phung (2013)	ESL elementary school students in Malaysia (N = 5)	Case study/one group	10 min (Not specified)	Marker-based <i>ZooBurst</i>	Observations (checklist) Interviews	Teachers perceived that AR pop-up books improved student motivation.
Liu & Tsai (2013)	EFL university students in Taiwan (N = 5)	Case study/one group	Not specified	Location-based (researcher-created AR)	Questionnaire Essays	AR mobile materials helped learners write English essays about scenic locations on campus.
Barreira et al. (2012)	EFL elementary school students in Portugal (N = 26)	Experiment/two groups (AR vs. traditional instruction)	45 min	Marker-based <i>MOW</i> (Matching Objects and Words)	Questionnaire Writing tests	AR group showed significant improvement in English writing tests, compared to the traditional instruction group.
Holden & Sykes (2011)	University learners of Spanish in the United States (N = 68)	Case study/three groups played the same game	Varied (4 weeks)	Location-based (ARIS) & <i>Mentira</i>	Gameplay data collected through the ARIS engine	Findings showed the playability of the AR mobile game and patterns of game play.
Liu, Tan, & Chu (2010)	EFL university students in Taiwan (N = 20)	Case study/one group	Not specified (4 weeks)	Location-based (researcher-produced PDA materials) & <i>HELLO</i>	Questionnaire Interviews	Participants perceived the HELLO system as interesting and reported high levels of ease, usefulness, and positive attitudes toward using AR technologies in learning.
Liu (2009)	EFL junior high school students in Taiwan (N = 64)	Experiment/two groups (AR group vs. traditional teaching)	6 weeks (8 weeks)	Location-based (researcher-produced PDA materials) & <i>HELLO</i>	Questionnaire Interviews Listening and speaking tests	AR group showed significantly improved listening and speaking skills compared to the traditional learning group (using printed materials and CD/MP3 players).

Note. AR = augmented reality; EFL = English as a foreign language; ESL = English as a second language; PDA = personal digital assistant

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