

Guest Editorial: Learning Analytics in Technology Enhanced Language Learning

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Introduction

In the new era, language learning has become a lifelong issue. From primary school to college and workplace settings, a good command of a foreign language (FL) is highly valued as a requisite for participating competitively in the international community. To echo the trends featured in global FL learning, multiple modalities of technology enhanced language learning (TELL) are offered to satisfy diverse needs of FL learners. The various modalities can be briefly classified based on different perspectives as shown below:

- Formality: formal, informal
- Timeliness: synchronous, asynchronous
- Reality: real world, virtual reality, augmented reality, mixed reality
- Mobility: mobile, ubiquitous, specific location
- Openness: regular class schedule, MOOCs, open courseware

Unquestionably, no matter which perspectives are adopted, competency acquisition of the target language should be the main focus in FL learning. Furthermore, three components in successful FL learning are essential and cannot be omitted: learners, goals, and contexts. Obviously, the information that can assist the FL learners, educators, and researchers in meaningfully taking the above-mentioned components into account simultaneously would be of critical importance to successful FL learning

As is known, specific characteristics of each individual, such as learners' ages, learning styles, nationalities, motivation, learning goals, the experience in foreign language learning, learning behaviors, learners' metacognition (self-regulation, self-estimation, etc.), and available learning time, are what may influence how well a second language can be acquired. Therefore, language educators and researchers definitely need the information to help them take as many learner variables as possible into account for providing FL learners with successful learning opportunities in all possible TELL modalities (Lan, 2009).

In terms of the goal component, learners and educators/researchers should always be discussed at the same time since they are the two sides of FL education. For FL educators/researchers, the information for assisting them to decide whether the goals of pedagogical syllabus are reached is as important as that for the FL learners to be perceptual about their success/failure in FL learning. The techniques of assessment interpretation for supporting decision making by educators/researchers and learners, in the meanwhile, are also important and should definitely be valued whichever the TELL modalities are adopted by the educators/researchers or learners.

The last component, contexts, can be viewed as all the perceived phenomena including the physical surroundings in which a language is used. It can be the learning platforms/systems or environments (real or virtual) in which FL learners receive input or produce output of the target language. Additionally, language input from the environment, including contextual and non-linguistic cues, is easy to be comprehended by an L2 learner because he or she is in a low stress situation (Ray, 2012). Consequently, context-based FL learning is valued and emphasized in the issue of FL education and research in recent years (Lan, Chen, Li, & Grant, 2015; Lan, Kan, Sung, & Chang, 2016; Lan & Lin, 2016). However, the increasingly authentic learning environment makes it more challenging for FL educators/researchers to collect and evaluate students' learning process, achievement, or behavior. Consequently, it has become a must to develop a technique to provide both educators/researchers and learners with timely information and clear explanation about FL learners' learning log for improving the outcome of FL teaching and learning.

As described at the beginning, there are various options of the modalities which fit the FL learners' learning needs the best. At the same time, the complete learning process of the FL learners recorded in the digital era, whichever the modalities are adopted, mostly becomes the BIG DATA. Consequently, the huge volume of data produced by the learners are so BIG that they cannot be easily handled and interpreted via the traditional

approach to yield meaningful and critical information related to the above-mentioned three essential components in FL learning for learners, educators, and researchers. Unfortunately, an overwhelming amount of information does not satisfy the needs of FL learners, educators, and researchers. In a word, developing more advanced techniques to better address FL learning is an important and urgent research issue in FL learning and teaching. Using learning analytics is considered as a common way to deal with the situations mentioned above and that is why this journal calls for this special issue.

Learning analytics refers to the technique to analyze the existing, learner-produced data for assessing academic progress, predicting future performance, giving suggestions, and spotting potential issues (Ali, Hatala, Gašević, & Jovanović, 2012; Duval, 2011; Johnson, Adams, & Cummins, 2012; Xing, Guo, Petakovic, & Goggins, 2015). With learning analytics techniques, educators are able to better satisfy L2 learners' needs, predict L2 learning behaviors and outcomes, and provide L2 learners with personalized and adaptive learning (Godwin-Jones, 2014). Additionally, through data visualization, L2 learners, educators, and researchers can be better informed with timely decision-making information for improving their learning and teaching practices (Kickmeier-Rust, Bull, & Meissl-Egghart, 2014).

The aim of this special issue is to provide a platform for researchers to present their study efforts that may offer insights into the potential of using learning analytics to analyze language learning in different modalities and scenarios. These are open questions worth further exploration. Through the publication of this special issue, we can help develop a further understanding of the potential of learning analytics in TELL. After a rigorous review process, nine high-quality research papers have been accepted for publication in this special issue, and these papers clearly explain how learning analytics can be adopted in TELL to provide the learners, educators, and the researchers with insights into the real story of language learning from different perspectives. We hope that these studies will inspire future research in this direction.

In the first paper entitled "Visualization analytics for second language vocabulary learning in virtual worlds," Hsiao, Lan, Kao, and Li developed a visualization analytic method based on the analysis on social network to examine the recorded learner paths within a virtual world during the learning process. They collected and analyzed the learning data of 14 college students from the virtual worlds while learning Mandarin Chinese vocabulary. Through the visualization analysis, the current study revealed a link among the learning paths, strategies and learners' outcomes. The second paper with the title of "To activate English learning: Listen and speak in real life context with an AR featured u-learning system," written by Ho, Hsieh, Sun, and Chen, presented a ubiquitous learning instruction system with augmented reality features (UL-IAR). The aim was to improve the performance of EFL learning with authentic situations. Through a field experiment, the authors found that the learning outcomes were affected by students' learning strategies and cognitive styles while students were using UL-IAR. That is, the enforcing learning strategy is more suitable for individuals with a field-dependent cognitive style than for other users who are field-independent and with mixed-field cognitive styles. Further, Pan investigated whether the proposed Kinect motion-sensing interactive system (KMIS) enhanced students' English vocabulary learning. The paper "The effects of using the Kinect motion-sensing interactive system to Enhance English learning for elementary students" confirmed the effects of interactive games with a questioning strategy on students' long-term retention of English vocabulary.

Next, in the fourth paper, Berger, Crossley, and Kyle introduced a model of lexical proficiency based on novel computational indices related to word context. By analyzing the correlations between lexical proficiency scores received from trained human raters and contextual indices, four indices related to associative, lexical, and semantic operationalizations of word context were confirmed. They found that computational measures of word context can predict human ratings of lexical proficiency and suggested that lexical, semantic, and associative context each plays an important role in the development of lexical proficiency. The fifth paper by Mørch, Engeness, Cheng, Cheung, and Wong evaluated the effects of the feedback provided by a writing aid system, EssayCritic, on essays written by students of English as a foreign language. By comparing two feedback conditions, one given by EssayCritic, and the other by peers, the authors found that the students in the EssayCritic group put more emphasis on the organization of their ideas while those in the contrary group included more ideas (contents) in their essays. Next in the sixth paper, "Assessing the language of chat for teamwork dialogue," Shibani, Koh, Lai, and Shim focused on analyzing teamwork dialogue from a dataset of online chat data. By evaluating pre-processing and classification methods, their study provides a direction for assessing the language of chats for teamwork dialogue and helps extend the work of technology enhanced language learning to academic competency as well as to communication aspect.

Dahlberg, in the seventh paper entitled "A multivocal approach in the analysis of online dialogue in the language-focused classroom in higher education," proposed and evaluated a multivocal approach to analyzing

online dialogue. She used practical data of screen recording from a 40-hour online Italian course to investigate the importance of an environment to the organization of the interaction among individuals, specifically the participants' focus during the encounters. In the next paper, Chen and Yeh investigated the effects of cognitive styles on the use of hints in the context of academic English. Two types of hints were compared in their study, direct and indirect hints. By collecting and analyzing both quantitative and qualitative data, they confirmed that cognitive styles have considerable influence on students' learning patterns in the context of academic English. Last but not least, the ninth paper by Wu and Huang developed a mobile game-based English vocabulary practice system aiming at enhancing students' learning of English vocabulary. The proposed system entails selecting words according to textbook passages, a difficulty ratio, and learning portfolios. The practical evidence approved the effects of the proposed system on students' English learning by different constructs.

Various learning analytics approaches were adopted in the abovementioned papers to analyze the data obtained from different TELL applications and therefore these papers provide insights into research outcomes from multi-perspectives. Thus, the papers included in this special issue will likely provide readers with a deep and extensive understanding of the potential of using learning analytics in TELL research. More issues for future research are undoubtedly to be inspired by reading the articles of the special issue.

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