Chapter 9
Open Educational Resources (OER)-Based Flipped Classroom Practice in an Undergraduate Course

Yan Li, Muhua Zhang, Curtis J. Bonk, Wenjun Zhang and Yuqing Guo

Abstract The purpose of this study was to explore the process and effectiveness of Open Educational Resources (OER)-based flipped classroom practice in an undergraduate course named "Internet and Distance Education." The course was taught in Winter Semester, 2013 at the Zhejiang University, China to 15 undergraduate students majoring in education. The course was designed as a Web-based and blended course, which mainly included two parts. In the first 5 weeks of the course, students were invited to take a Coursera course named "Emerging Trends & Technologies in the Virtual K-12 Classroom." In the last 6 weeks of the course, students were invited to learn Sakai-based course chapter contents and complete an OER-related assignment. Flipped classroom practices were utilized during the whole course. Data analysis found that participating students generally progressed through four stages in the OER-based flipped classroom: (1) being unfamiliar, (2) understanding, (3) adapting, and (4) becoming skilled. At the same time, students emotionally shifted from excitement and nervousness to relaxation, happiness, and confidence. Diary analysis and a general e-learner satisfaction survey found that students were generally satisfied with the OER-based flipped classroom practice. In their diaries, some students also put forward several suggestions for this form of instruction. Based on the findings, several suggestions to improve OER-based flipped classroom practices are offered.

Y. Li (✉) · M. Zhang · W. Zhang · Y. Guo
Zhejiang University, Hangzhou, China
e-mail: yanli@zju.edu.cn

M. Zhang
e-mail: zhangmuhua1678@163.com

W. Zhang
e-mail: zhangwj91@gmail.com

Y. Guo
e-mail: nikiguo@zju.edu.cn

C.J. Bonk
Indiana University, Bloomington, USA
e-mail: cjbonk@indiana.edu

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9.1 Introduction

Open Educational Resources (OER) is one of the most excited and promising educational innovations emerging in the higher education arena in the twenty-first century. According to a popular definition put forward by Organization for Economic Cooperation and Development (OECD), OER are "digitized materials offered freely and openly for educators, students, and self-learners to use and reuse for teaching, learning, and research" (OECD 2007, p. 10). The worldwide OER movement started when MIT launched its Open Courseware (OCW) project in 2001. This movement toward placing course contents freely on the Web became more influential after the introduction of massive open online courses (MOOCs) and the later offering of online programs based on MOOCs by several world first-class universities in 2011 and 2012 such as Stanford, MIT, and the University of Michigan.

MOOCs are online courses aimed at unlimited participation and open access via the Web (Wikipedia 2014). Different from OCW that is characterized by free online course syllabus, reading materials, and lecture videos, MOOCs provide interactive user forums that help build a community for students, instructors, and teaching assistants. Since 2011 MOOC projects and platforms have increasingly been put forward, and Coursera, edX, and Udacity are three pioneers. Among them, Coursera is currently the most well-known with 116 higher education institutions (HEIs) as partners, offering more than 975 courses to over 11,780,000 registered users (as of March, 4, 2015).

OER and MOOCs are expected to transform ways and patterns of knowledge production and consumption not only in traditional school systems but also in continuing education settings. In effect, OER and MOOCs could possibly challenge the higher education knowledge transmission model by offering cheaper and better-qualified solutions for learners with Internet access around the world (Dillahunt et al. 2014). The boundaries of the higher education market are now rapidly expanding. As this occurs, for-profit companies and alternative educational ventures are attempting to grab market share from what used to be a closed market but with a goal of excessive profits.

China's higher education institutions (HEIs) are also inevitably affected by this emerging trend. Since 2001, the Chinese government has put forward three nationally sponsored OER projects: (1) the Chinese Quality Course (CQC) Project led by Chinese Ministry of Education; (2) National Cultural Information Resources Sharing Project led by Chinese Ministry of Culture; and (3) the Science Data Sharing Project led by Chinese Ministry of Science and Technology. Among these three projects, the CQC Project is the most influential, and it has significantly impacted higher education reform and development in China.

Since MOOCs emerged, China's top HEIs have experienced an urgent need to build capacity to construct, administer, and publicize MOOCs with unique Chinese features and potentially massive reach. Under the technical and financial supports from the Ministry of Education (MOE), Chinese universities have started to set up experimental MOOCs to join the world trend. As one of the leading universities in China, since October 2013, Tsinghua University has launched courses on edX and its own MOOCs platform (www.xuetangx.com), using edX's open-source code. At the same time, another prominent university in China, Peking University, is actively launching new MOOCs on its platform (mooc.pku.edu.cn).

Although competition between traditional higher education service providers and MOOCs enterprises seem harsh, a paradigm or vision for both sides to cooperate has begun to emerge. According to American Council on Education's (ACE) 2013 report, integrating MOOCs into higher education may open the MOOC 3.0 era. Martin (2012) advocated using flipped classrooms as a strategy for hybrid learning concerning MOOCs. Flipped classroom is a pedagogical approach characterized by allowing students to watch online video lectures before class and to participate in interactive activities such as problem solving, discussions, and debates during the in-class sessions (Davies et al. 2013). Researchers found that, compared with traditional lecture-dominated classrooms, the flipped classroom approach provides better opportunities for instructors to create student-centered learning environments (Kong 2014).

As growing numbers of colleges and universities have experimented with MOOC integration, they have come up with diverse approaches regarding MOOC adjustment, integration, and research (Sandeen 2013). Researchers and teachers have attempted to investigate MOOC users' behaviors and satisfaction in multiple ways (Bonk and Khoo 2014; DeBoer et al. 2014; Rizzardini et al. 2014). Some studies have applied quantitative methods with big data that learners left behind as digital traces (e.g., Breslow et al. 2013). Although meaningful and significant insights were obtained on users' online learning behaviors, this set of analytic methodologies focuses basically on the macro level of the entire learning community of a course, which is less suitable for understanding smaller clusters of users. In addition, Rizzardini et al. (2014) and other researchers borrowed various scales and assessment schemes to better understand the impact and outcomes of MOOCs. These measures included the Computer Emotion Scale (CES) (Kay and Loverrock 2008), Intrinsic Motivations Measure (IMM) (Tseng and Tsai 2010), and system usability scale (SUS) (Brooke 1996; Bangor et al. 2008).

Such measures provide a paradigm for looking into participation in MOOCs as part of a community at the institutional level. Nevertheless, research using more open-ended measures was noticeably lacking. As a result, the authors failed to provide a panoramic view of how all MOOC users responded when it came to their learner satisfaction, motivation, and so on. Zutshi, O'Hare, and Rodafinos' (2013) study on a MOOC in Latin America searched learners' blogs for content analysis to identify feelings that they expressed after participating in a course on a MOOC platform. However, in their study, the blog posts were collected from random MOOC users, instead of a learning community with a clear boundary.

There have been some studies in western countries that focused on the integration of MOOCs and other OER resources in higher education. In comparison, limited research has been done in China. This study aimed to do an experimental instructional activity on OER-based flipped classroom practice in a Chinese undergraduate course. Quantitative and qualitative methodologies mentioned above were used in the study.

9.2 Purpose and Objectives of the Study

The purpose of this study was to explore the process and effectiveness of OER-based flipped classroom practice in an undergraduate course named "Internet and Distance Education." Specifically, the study had three primary objectives:

(1) Describe participating students' perceptions about OER and MOOCs before the course;
(2) Describe participating students' learning processes in an OER-based flipped course through three aspects: self-reported degree of familiarity over weeks, self-reported changes in general feelings over weeks, and students' online diaries; and
(3) Examine students' general e-learning satisfaction after the course.

9.3 Description of Instructional Approaches

The course "Internet and Distance Education" was a 2-credit course taught in Winter Semester, 2013, at the Zhejiang University (ZJU) in Hangzhou, China. It was taught twice per week with three lessons each time. The course aimed to introduce distance education theory and practice under an international perspective. Since OER is an important trend in the distance education arena, the course instructor spent significant time introducing OER-related contents.

9.3.1 Course Format and Organization

In previous semesters, the course was taught chapter by the instructor in a traditional classroom with set time. In the OER-based flipped classroom practice, the course was designed as a Web-based and blended course, which mainly included two parts. In the first 5 weeks of the course, students were invited to take a MOOC. Considering content relevance, time arrangement, and students' language proficiency, a Coursera course named *Emerging Trends and Technologies in the Virtual K-12 Classroom* (http://www.coursera.org/course/k12virtualtrends) was selected by

the instructor for students to go through. The MOOC was carried out from November 11 to December 13, 2013 and was taught by Melissa Joell Loble from the University of California, Irvine. For the latter part of the course, the instructor set up a Sakai-based online learning platform (http://ocw.zju.edu.cn/portal). Each chapter's content was videotaped in advance and put on the platform. Students were invited to learn chapter contents through a Sakai learning platform and to complete an OER-related assignment through group activities. Another key step involved the collection of OER-related resources and academic publications in the learning platform.

During the course, flipped classroom practices were utilized. In the first lesson of each class, the students carried out Web-based self-study (WBSS), and the instructor organized discussion and guided students' assignment accomplishment during the second and third lessons in each class. For some weeks, the discussion was topic-specific, such as "sharing and discussing MOOC's peer assessment assignment." For a few other weeks, the instructor and two teaching assistants simply answered every student's specific questions. Figure 9.1 recaps the course timeline and major activities.

9.3.2   Course Evaluation Design

The instructor employed a continuous evaluation method to assess students' overall performance in the course. As displayed in Fig. 9.2, to successfully complete the course, the students needed to complete the following assignments: (1) finish one Coursera course and obtain a course certificate of completion; (2) draft a proposal based on a comparison study and then make a presentation in the class; (3) finish the assigned course quizzes; and (4) actively participate in course discussions, group activities, and writing an online diary. In terms of the second requirement, based on a comparative study about one selected national and international OER project, students were asked to generate a proposal for the Chinese Ministry of Education (MOE) or for ZJU about Chinese OER development and application. At the beginning of the course, students were informed about these course assignments and criteria of evaluation.

Time / Activities	November, 2013			December, 2014				January, 2014	
	Week 1	Week 2	Week 3	Week4	Week 5	Week 6	Week 7	Week 8	Week 9
1st lesson	Taking online Coursera course					Reviewing online OER resources			
2nd lesson	Discussion during class					Discussion during class			
3rd lesson	Finishing Coursera course assignment					Finishing course assignment			
MOOC experience									
Chapter content									
Comparative study & Proposal									

Fig. 9.1 Course timeline and major activities

Assignments	Descriptions	Criteria	Form	Due time	Score
Task 1: MOOC experience	Taking Coursera course "Emerging Trends & Technologies in the Virtual K-12 Classroom"	Finishing Coursera course, getting course certificate	Individual or group activity	5th week	40
		Online diary	Individual activity	5th week	10
Task 2: Comparative study & Proposal	Based on comparative study about one selected national and international OER project, making a proposal for MOE or ZJU about Chinese OER development and application	2-3 pages, having key points, having references, well written	Group activity	9th week	20
	Making a presentation about your proposal	Clear presentation, well organized, good time control, well done in Q&A			10
Quiz	Five True/False questions per chapter	Finishing Quiz	Individual activity	9th week	10
Participation	Performance in discussion and group activities	Writing course diary, active participation	Individual activity		10
Total					100

Fig. 9.2 Description of course assignments and criteria

9.4 Methods

This research employed both quantitative and qualitative methodologies to collect data. A survey and students' diary analysis were employed to measure the effectiveness of the course. Descriptive statistics were used to describe the results.

9.4.1 Participants

Participants in this study include one instructor, two teaching assistants, and 15 undergraduate students enrolled in the "Internet and Distance Education" at Zhejiang University, Hangzhou, China, during the winter semester of 2013. During the first week, 21 students participated in the class, and all of them took the pretest. In the second week, when students needed to decide whether or not to actually choose the course, 16 students continued with the course. During the course time, one student experienced a long-term illness, and, therefore, was unable to attend most of course activities. In the first class, the instructor introduced the nature and purpose of the experimental instructional activity.

9.4.2 Data Collection Instrument

Data were collected through a survey and students' online diaries. The survey instrument consisted of three parts: (1) general e-learning satisfaction, (2) self-reported degree of familiarity with course contents over the weeks, and (3) self-reported changes in general feelings over weeks.

(1)   General e-learning satisfaction

Arbaugh's (2000) general e-learner satisfaction was adopted as a major instrument to measure students' satisfaction after class. The instrument consisted of six statements. A sample statement was "I am satisfied with my decision to take this course via the Internet." A 7-point Likert scale was utilized to indicate student attitudes toward these statements. The Cronbach's Alpha for the general e-learning satisfaction was 0.910.

(2)   Self-reported degree of familiarity with course contents over weeks

Based on their personal experiences about possible stages of familiarity with a new material, the instructor and two teaching assistants developed a table to measure students' self-reported degree of familiarity about the course contents over 9 weeks. Two faculty members and two graduate students majoring in Educational Technology were invited to review the contents of the table to ensure its validity. The horizontal column of the table listed the 9 weeks one by one, and the vertical column described four different stages of familiarity, namely (1) unfamiliar, (2) understand, (3) adapted, and (4) skilled. Students were allowed to choose only one word to describe their degree of familiarity in each week.

(3)   Self-reported changes in general feelings over weeks

Based on their personal experiences about possible feelings during a course, the instructor and two teaching assistants developed another table to measure students' self-reported changes in general feelings over 9 weeks. Two faculty members and two graduate students majoring in Educational Technology were invited to review the contents of the table to ensure its validity. The horizontal column of the table listed the 9 weeks of the course one by one (from the 1st week to the 9th week), and the vertical column listed six adjectives that might describe students' feelings. The listed words include excited, nervous, relaxed, happy, confident, and satisfied. A blank column was left to allow students to list other feelings that they might have in some weeks. Students were allowed to choose more than one word to describe their main emotional status in each week.

   Students' online diaries were designed as part of students' performance evaluation. On the Sakai platform, blogs were created for every student. At the end of each course section (i.e., three lessons), students were required to write an online diary in their individual blog space. Importantly, they could type their diary in Chinese or in English. The instructor did not give a word limit for each student's diary post. Once logged into the platform, the instructor, teaching assistants, and peers could review and make comments on every student's diary contents. Content analyses were utilized to analyze participating students' diaries.

9.4.3 Data Collection and Analysis

Data collection was conducted at the end of the course. A survey was carried out with 15 students in January 2014. Data were compiled and analyzed using the Statistical Package for Social Sciences (SPSS20.0). Descriptive statistics were used to describe each variable.

9.5 Findings

9.5.1 Objective 1: Describe Participating Students' Perceptions About OER and MOOCs Before the Course

For Objective 2, in the pre-class survey, the teacher asked students to indicate their general familiarity with OER and MOOCs. Table 9.1 shows that, among the 21 participating students, 5 indicated that they were not familiar with the concept of OER at all, 15 were a little familiar with the concept, and one did not answer the question. In addition, in regards to MOOCs, 12 students were not familiar with MOOCs at all, 8 were a little familiar with MOOCs, and one did not answer the question.

9.5.2 Objective 2: Describe Participating Students' Learning Process in OER-Based Flipped Course Through Three Aspects: Self-reported Degree of Familiarity with Course Contents Over Weeks, Self-reported Changes in General Feelings Over Weeks and Their Course Journals

As Table 9.2 shows, most of participating students experienced substantive changes in the degree of familiarity with course contents over the 9 weeks of the course, from being unfamiliar to understanding, adapting, and being skilled. Not surprisingly, there were individual differences in regard to the timing of such changes. Simply put, some students required more weeks to experience such a change than

Table 9.1 Participating students' familiarity with OER and MOOC before the course

	Not at all	A little familiar	Very familiar
Are you familiar with the concept of OER?	5	15	0
Are you familiar with MOOCs?	12	8	0

Table 9.2 Participating students' self-reported degree of familiarity with course contents over weeks (n = 15)

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
S1	1	2	2	3	3	4	4	4	4
S2	1	2	3	4	4	–	–	–	–
S3	1	1	2	3	3	3	3	4	4
S4	1	2	2	3	3	3	2	4	4
S5	1	2	2	3	3	4	4	4	4
S6	1	2	3	3	3	2	4	4	4
S7	–	–	3	–	–	4	4	4	–
S8	1	2	3	4	4	4	4	4	4
S9	1	2	3	4	4	4	4	4	4
S10	1	2	3	3	4	4	4	–	4
S11	–	–	3	3	3	3	–	3	3
S12	1	1	2	–	4	4	3	3	3
S13	2		3	4	–	–	–	–	–
S14	1	1	2	3	3	3	3	3	–
S15	–	–	2	3	3	4	4	4	4

Note 1 = unfamiliar; 2 = understand; 3 = adapt; 4 = skilled

other students. In the last 2 or 3 weeks, most students indicated that they were skilled at OER-based flipped course. By the last week, all participating students indicated that they were skilled. Such changes signal that a flipped classroom can provide the needed skills established by the curriculum and instructor.

Table 9.3 shows the results of participating students' self-reported changes in general feelings over weeks in the OER-based flipped classroom. The table indicates that, in the first week of the course, most of students felt excited about the innovative format and content of the course. In the first 5 weeks–when students mainly focused on MOOC course experience–there were six or seven students constantly experiencing nervousness. Such feelings might be due to their initial

Table 9.3 Participating students' self-reported changes in general feelings over weeks (n = 15)

	Excited	Nervous	Relaxed	Happy	Confident	Satisfied
1st week	13	6	1	3	–	–
2nd week	9	7	2	2	1	–
3rd week	–	7	8	3	3	–
4th week	–	6	8	2	2	2
5th week	–	6	7	3	5	1
6th week	2	3	9	5	1	3
7th week	–	2	9	5	4	2
8th week	–	3	5	3	6	7
9th week	–	4	8	4	2	6

experiences with a totally online English course taught by an American instructor. While as the weeks went on, some of these initially nervous students became more relaxed, happy, confident, or satisfied. During the last 4 weeks, most of participating students indicated that they were relaxed, happy, confident, and satisfied.

At the end of course, the online blog space accumulated 231 students' diaries. In the following analysis, each diary is recorded by student's information (named S1, S2…S15) and the date when it was written. Diary analyses revealed that students felt certain pressure from MOOC at the beginning of the course, and they experienced dramatic changes in their self-perceived competence during the OER-based flipped classroom. Students' diaries also indicated that they had a general positive attitude toward this kind of nontraditional instruction, including course format, instructor guidance, interaction with peers, and course evaluation. In addition, some students also put forward some suggestions for improving the quality of the course.

As to experience about the OER, especially the MOOC experience, at the beginning of the course, students felt excited about the open and free international educational resources available online, while many of them felt that they met a major challenge by taking the bilingual Web-based course, especially enrolling in a typical MOOC from a worldwide well-known university, which was a totally online course and taught in English by an American instructor.

> This is my first time to try an English online course. Frankly speaking, I feel big pressure. Firstly, I am not so confident about my English and reviewing those course materials would be a challenge for me. Secondly, there are deadlines for assignments in every module and there are many assignments waiting for me. What's more, I need to explore how to utilize online communication tools (S9, Nov. 19th, 2013).
>
> The instructor in the Coursera course spoke English too fast and it was a little hard for me to catch up with her speed. I need time to practice my English, especially in reading, listening, and comprehension. I feel such online course in English is challengeable and happy task for me (S8, Nov. 19th, 2013).
>
> It is so cool to have classmates from all over the world. We have different background according to age, career, culture, and etc. Having chance to assess international peers' assignments broaden my field of view and I learned a lot from it (S2, Dec. 12th, 2013).

Several students mentioned that they could understand the contents of lectures on the MOOC if they reviewed them carefully. Still, it was somewhat difficult for them to recall the key points of those lectures after watching the videos. Some reflected and summarized that such a phenomenon might result from the primarily asynchronous nature of the MOOC as well as limited interaction between instructor and students.

> I found that, although I finished watching lecture videos and quiz for every module, it is hard for me to get the key points of each lecture and to summarize what I've got in these lessons. I feel the major reason behind such outcomes lies in the fact that I followed the pace of the video and had not time to think about learning contents in a further and deep step and, after class, I did not reviewed the key points of those lectures for another time. At the same time, lack of interaction with others may be another possible reason behind having no impression about the learning contents (S5, Dec. 24th, 2013).
>
> Why did what I've learned from lecture videos only leave an obscured image in my mind? Maybe too much information in the course websites distracts our attention. Perhaps we

need to adjust our learning methods when studying online. Learning knowledge through watching videos is so different from learning knowledge from traditional face-to-face classroom. Multimedia information in online course, like water, flows away freely but quickly and it takes time for us to catch it up and to comprehend it (S6, Jan. 2nd, 2014). During discussion session, I noticed that I had few questions and also I have not paid attention to some questions my classmates proposed about the lesson contents. It seems that I missed some important points during the lesson. I suspected my traditional learning strategies in this Web-based course. Maybe I need to adjust them. I need to pay more attention to some minor things (S12, Dec. 10th, 2013).

To deal with the issues related to recalling content and other challenges mentioned above, some students figured out and mentioned in their diaries that making notes would be a valuable learning strategy that would help them master knowledge more effectively.

I feel taking notes is very important for me to better understand the lectures. At the same time, notes would let me record some questions I proposed and some thoughts I made, which would remind me what I have learned and what I still wondered (S3, Jan. 2nd, 2014).

As to the experience about the flipped classroom format, most of students expressed that they appreciated this form of instructional delivery since it emphasized self-directedness and self-control of learning process by the learners. It was the first time for all students to engage in a flipped classroom situation. Therefore, students took some time to be familiar with such a novel learning format.

Flipped classroom is very interesting! (S15, Nov. 19th, 2013).
I feel flipped classroom is better than traditional classroom because I can control the learning pace. I like such self-paced learning format (S2, Dec. 12th, 2013).
I like flipped classroom because I am a person liking freedom. Such kind of self-directed learning is suitable for me (S2, Jan. 7th, 2014).
The course gave me several 'first try': I took MOOC for the first time, I took flipped classroom practice for the first time, I did my first instructional design in English, I assess peer's assignment for the first time……during the course, I have decided to take another Coursera course which is about playing Guitar (S7, Dec. 17th, 2013).

One student indicated that she was not used to attending discussion sessions in the flipped classroom course even though she was thinking about improving her communication skills in the course. More students indicated that the instructor's timely feedback and proper guidance/help are important for their successful experience and positive attitude toward the flipped classroom practice.

In today's discussion session, I still kept quiet because I didn't know what to say. Late I reflected about my previous learning style for a while. I felt that I am used to listening in traditional course, instead of putting forward questions and thinking issues in a deeper way. I need to change my learning methods and learn to communicate more with others (S7, Dec. 31st, 2013).
Today my group members and I discussed with the instructor about the final proposal (because we had little idea about what it was about and from which perspectives we should make proposal). It was very helpful and thank instructor! (S1, Dec. 31st, 2013).
After reading my draft about my instructional design, the instructors gave me many suggestions. Comparatively, I felt that my initial thoughts about instructional design were too simple and too traditional. I need to improve both the contents and the format of the

instruction. Based on the instructor's advisor, I revised my draft dramatically (S2, Dec. 3rd, 2013).

During the presentations on the peer assessment assignment, the instructor gave everyone a careful and encouraging feedback, which made us understand the strengths and weakness of our assignments (S13, Dec. 17th, 2013).

At the same time, most of the students expressed in their diaries that online and offline peer-to-peer interactions were vital for students to get help, including timely feedback as well as the courage to participate, especially when attempting to complete an assignment.

Discussing with my group mates is very helpful, just like an old saying: you have an apple and I have an apple, each of us still has one apply when we exchange ours apples. However, when you have a thought and I have a thought, both of us have more than one thought after exchanging them. My group mates gave me some good suggestions, which keep me improve my assignment (S1, Nov. 28th, 2013).

During class discussion, classmates gave me many good corrections and suggestions, which would improve my instructional design (S3, Dec. 3rd, 2013).

Today, instructor guided us to share our peer assessment assignment during discussion session. I felt lucky to have such opportunities because I got good advice from my peers and from the instructors (S6, Dec. 12th, 2013).

In their diaries, students also reported that there are some aspects that this OER-based flipped classroom may improve. One is about technical issues. Another related to setting up and engaging in discussion sessions. Still another concerned presentation styles of the instructors doing the lectures.

We cannot try such social media as Facebook and Twitter, which limited our communication with the international instructor and classmates in the MOOC (S6, Nov. 19th, 2013).

Sometimes the speed of Internet is not so satisfactory (S4, Dec. 19th, 2013).

These days, because of poor Internet and browser, I cannot reach the course content, which resulted that I lagged behind the schedules (S9, Dec. 26th, 2013).

I strongly suggest that instructor could put discussion session behind assignment doing session because we would have more questions to discussion after we do our assignment for a while (S2, Jan. 2nd, 2014).

Wiki was not used well for group assignment because groups members were always together during the course and we still preferred to face-to-face communication instead of online communication (S3, Jan. 2nd, 2014).

I felt that PPTs in Coursera course were full of words and reading them slide by slide was quite boring and also it was hard for me to acknowledge the key points from so many words. So I suggest that instructors to make PPT in a more concise way. (S11, Nov. 19th, 2013).

9.5.3 Objective 3: Examine Students' General e-Learning Satisfaction After the Course

As shown in Table 9.4, participating students' general e-learning satisfaction was at a moderate level (M = 5.33, SD = 0.88). All students agreed or strongly agreed

Table 9.4 Participating students' general e-learning satisfaction about the course

	N	Mean	SD	Min	Max
General perceived e-learner satisfaction	15	5.33	0.88	3.83	6.83
(1) I am satisfied with my decision to take this course via the Internet	15	5.47	0.92	4	7
(2) If I had an opportunity to take another course via the Internet, I would gladly do so	15	5.40	1.06	4	7
(3) My choice to take this course via the Internet was a wise one	15	5.40	1.50	1	7
(4) I was very satisfied with the course	15	5.47	1.06	3	7
(5) I feel that this course served my needs well	15	5.47	0.99	4	7
(6) I will take as many courses via the Internet as I can	15	4.80	1.21	3	7

Note 1 = Strongly Disagree; 4 = Neutral; 7 = Strongly Agree

with these three statements: "I am satisfied with my decision to take this course via the Internet," "If I had an opportunity to take another course via the Internet, I would gladly do so," and "I feel that this course served my needs well." Most of students agreed or strongly agreed with these three statements: "My choice to take this course via the Internet was a wise one," "I was very satisfied with the course," and "I will take as many courses via the Internet as I can." At the same time, there was one student who chose to disagree or strongly disagree with these thee statements.

9.6 Conclusions and Suggestions

This study investigated an experimental OER-based flipped classroom practice in a Chinese undergraduate course. Before taking the course, none of participating students indicated that they were very familiar with OER and MOOCs. Some were slightly familiar with these two concepts, and others did not know them at all.

During the OER-based flipped classroom course, students experienced substantive changes in the degree of familiarity with the course contents, from being unfamiliar to understanding, adapting, and eventually being skilled. As to self-reported changes in general feelings over weeks, six or seven students reported being nervous in the first 5 weeks when students mainly focused on MOOC. Such tension might have been due to their first time experiencing a MOOC taught by an American instructor. As the weeks went on, the students as a whole became more relaxed, happy, confident, or satisfied.

There were a plethora of student blog reflections during the course. In total, students made 231 diary postings, which recorded their experiences from being anxious and excited to being happy and satisfied. At the same time, analysis of students' diaries found that they had a positive attitude toward OER utilized in the

course as well as the self-directed, self-controlled, and flipped course format, including Web-based course design, instructor's guidance, and interaction with peers. In their diaries, some students also put forward some suggestions for improving the quality of the course, including various technical issues, the handling of the discussion sessions, and the instructor presentation styles in the recorded videos. At the end of the course, the student surveys indicated that students' general e-learning satisfaction was at moderate level.

Due to time and other contextual limitations, the study only explored a small group of Chinese college students majoring in the field of education at a comprehensive university. Further research should be carried out to explore college students' perceptions and usages of OER with a larger and more diverse population or among some specific educational groups or types of institutions, such as students from research-oriented universities, normal universities, community colleges, and vocational colleges. Also, self-reported instruments utilized in the study seem a somewhat subjective and lacking in extensive theoretical support. Of course, other factors such as personality traits, cognitive styles, and motivation might provide additional insights into the benefits of the flipped classroom and participant changes over time.

Based on the above findings and reflection about the limitations of the study, the authors of the study made three suggestions. First, the instructor may pay more attention to interaction design in such Web-based and flipped classroom courses, including the types and forms of face-to-face and online interaction. Second, the instructors may prepare optional plans when unexpected situations emerge during flipped classroom practice. For example, if students who are used to traditional courses indicate that they lack the necessary skills for self-directed and independent learning (especially at the beginning of the course), or they are not active in discussions or Q&A section, the instructors may need to provide some suitable scaffolding for those needing help. They might also adjust their predesigned activities with alternative strategies that may engage more passive students. Third, a more accurate and objective instrument specifically considering flipped classroom practice might be needed to assess students' actual perceptions about their experiences.

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Learning and Knowledge Analytics in Open Education

Feng-Qi Lai · James D. Lehman
Editors

Learning and Knowledge Analytics in Open Education

Selected Readings from the AECT-LKAOE 2015 Summer International Research Symposium

Springer

Editors
Feng-Qi Lai
Indiana State University
Terre Haute, IN
USA

James D. Lehman
Purdue University
West Lafayette, IN
USA

Foreword

These proceedings represent the intellectual enrichment, academic rigor, and thoughtful reflection among various top scholars in the field of educational communications. Dr. Feng-Qi Lai at Indiana State University and Dr. James Lehman at Purdue University have edited a text that is consistent with the AECT mission, which is to "provide international leadership by promoting scholarship and best practices in the creation, use, and management of technologies for effective teaching and learning in a wide range of settings." The content from the AECT-LKAOE 2015 Summer International Research Symposium introduces and explains innovative educational technologies that have a proven record of success across a variety of teaching and learning environments.

Indeed, the AECT-LKAOE 2015 Summer International Research Symposium is well represented in this collection of proceedings, which includes 16 papers. The first of these, "Learning Is a Journey, Not a Destination," by Phillip Harris and Donovan R. Walling, offers a philosophical perspective grounded by the fundamental processes common across teaching and learning in many forms and settings. The authors assert that educators' self-examination and self-understanding are keys to guiding learners, whoever they may be, on their learning journeys.

J. Michael Spector's "The Impact of Instructional Design: Questions of Conscience" articulates the tension that often exists "between the need to rely on instructional designers to cope with the complexities and challenges of planning and implementing learning environments in the digital age and a general distrust of instructional designers to deliver on promises to transform education using new technologies." Tristan E. Johnson, in "Using Data Analytics to Drive Performance and Instructional Decision Making," goes to the heart of the symposium's theme to examine "a need at many levels to conceptualize the types of data that would deliberately inform decision making."

In Yanyan Li, Haogang Bao, and Chang Xu's "Learning Analytics: Serving the Learning Process Design and Optimization," the authors propose a "process model of learning analytics," accompanied by a review of the research and challenges of "multi-source educational data collection and storage." Li et al. include an

elaboration about how to align learning analytics with pedagogical and organizational goals. In "Design of Online Student Orientation with Conceptual and Procedural Scaffolding," Juhong Christie Liu and Andrea Adams report on a study concerning the design and development of an orientation course to prepare students for online learning. In particular, Liu and Adams focus on the design and development process and methods used for assessment.

"Improving Learning in MOOCs through Peer Feedback: How Is Learning Improved by Providing and Receiving Feedback?" by Jianli Jiao, Juqin Yang, Hongrui Zhong, and Gaimei Ren aims to answer the title question using a study that is based on a case involving a MOOC titled, "The Red Chamber Dream." J. Ana Donaldson's "Emerging Technology: Instructional Strategies for Nailing Jello-O to a Tree," despite the tongue-in-cheek title, takes up the serious matter of trying to keep up with ever-increasing numbers of emerging technologies. Donaldson also discusses "using Merrill's First Principles of Instruction and Keller's ARCS Model as a framework for instructional approaches that align with an experiential immersion methodology for learning about the new technology."

Marcus D. Childress, in "Utopian and Dystopian Futures for Learning Technologies," addresses a related theme with regard to how learning technologies and media continue to change and augment teaching and learning. This paper offers a brief history of "technological utopianism, ultimately leading to learning technologies and utopian/dystopian views for the future." Yan Li, Muhua Zhang, Curtis J. Bonk, Wenjun Zhang, and Yuqing Guo, in "Open Educational Resources (OER)-based Flipped Classroom Practice in an Undergraduate Course," take a practical tack, based on a study "to explore the process and effectiveness" of OER in a specific course at Zhejiang University in China.

In "Tracking Students' Activities in Serious Games," Jina Kang, Sa Liu, and Min Liu examine the Serious Game (SG), "a virtual process designed for the purpose of real-world problem solving." Kang, Liu and Liu focus on a study of "learning analytics of students' activities in a 3D immersive SG environment called Alien Rescue," a program designed for middle school science education. Robert A. Reiser, in "Eight Trends Affecting the Field of Instructional Design and Technology: Opportunities and Challenges," casts a wide net, providing a useful perspective. The purposes of this paper are "to identify some of the major trends that have affected the field over the past decade" and "to discuss some of the opportunities and/or challenges each of these trends presents for instructional design and technology professionals."

"Social Media: An Integration Guideline for Teaching and Learning in Higher Education," by Wei Zakharov, Akesha Horton, Pat Reid, James Willis, and Donalee Attardo, offers a thought-provoking examination of social media in educational contexts, noting in particular some underlying issues. According to the authors, "Trust, privacy, and safety are critical to learning in an open education." Rob Branch's "An Instructional Design Model for Information Science" provides an important perspective on conceptual models and introduces a "basic instructional

design model for information science." M. David Merrill, in "If Content is King then e3 Instruction is Queen," avers, "When content information is accompanied by appropriate learning activities then more *effective, efficient,* and *engaging* learning is promoted"; thus, this paper focuses on achieving e3 learning.

This proceedings volume concludes with two papers that closely connect to factors that are central to the research symposium but also have broader applicability. Tristan E. Johnson, J. Michael Spector, and Hinhong (Maggie) Wang, in "Academic Writing, Publishing, and Presentations in Educational Technology," address misconceptions about academic writing and publishing "that sometimes inhibit or intimidate educational researchers" and offer practical advice. Finally, Feng-Qi Lai, one of the principle organizers of this symposium, draws on a study of faculty in educational technology at more than 30 universities in China for this concluding paper, "Chinese Scholars' Perspectives Regarding Educational Technology."

This collection of proceedings is a far-ranging, diverse compendium of ideas and information, from the philosophical to the practical. There is much to ponder here. For those who were in attendance at the symposium, the various papers provide a valuable mnemonic for an extraordinary experience. All readers should find insights and information to inform their own knowledge and practice within the realm of educational communications and technology.

Phillip Harris, Ed.D.
Executive Director for the Association for
Educational Communications and Technology
Bloomington, USA

and

Robert Maribe Branch, Ed.D.
President of the Association for
Educational Communications and Technology
Athens, USA

Preface

This book is a collection of selected proceedings papers from the AECT-LKAOE 2015 Summer International Research Symposium. AECT is the Association for Educational Communications and Technology. LKAOE is the theme of the symposium: Learning and Knowledge Analytics in Open Education. This symposium was organized by AECT in partnership with Indiana State University (ISU) and hosted by East China Normal University (ECNU). The symposium was held on June 17–19, 2015, at the campus of East China Normal University in Shanghai, China.

The purpose of this book was to disseminate the essence of the symposium. Serving as an open-discussion forum, the symposium was designed to draw the best minds together for an intensive intellectual exchange of ideas and information about research, development, and applications on topics related to learning and knowledge analytics in open education in all disciplines. The contributors of this book include many well-known professors in the field, Drs. M. David Merrill and Robert A. Reiser; AECT presidents, Drs. J. Mike Spector, J. Ana Donaldson, Marcus D. Childress, and Robert Maribe Branch; and AECT Executive Director Dr. Phillip Harris. The target audience for this book is higher education faculty members, graduate students, scholars, and practitioners in educational technology and related fields. This book can be used as supplementary reading for courses in educational technology programs, including introductory courses, courses in distance education and instructional design, and beyond. Readers will learn about trends and issues in education today—and tomorrow—and the principles to follow in order to address challenges as the Internet and multimedia technologies continue to develop at tremendous speed.

The title of this book is the theme of the symposium. We decided to adopt this theme for the symposium because, according to ECNU, Chinese scholars in educational technology were most interested in this topic. There were six tracks, including learning-and-knowledge-analytics-related standards, policy, and pedagogy; learning design in open-ended learning environments (OELE); MOOCs (Massive Open Online Courses) and open education; new technology and new

media; instructional designers as change agents in the age of open education; and other learning analytics studies and applications. This book includes chapters related to these six tracks of the theme of LKAOE.

This collection is composed of 16 chapters, arranged based on the order of the tracks for the symposium. The first chapter and the last two are not theme-related. They are included in the book because they were papers that the authors were invited to present at special sessions of the symposium serving special purposes. The first chapter asserts that learning is a journey, not a destination. By declaring so, the authors tell us: "Teachers must recognize the human differences inherent in the many ways their students acquire knowledge and construct understandings. Instruction must proceed in ways that accommodate these differences if the learners' individual journeys are to be successful." This chapter is important and placed as the first chapter because it lays a strong foundation to guide readers' thinking as they read the other chapters in this book. Chapter 15 provides guidance for readers who are interested in academic writing and publishing. The chapter includes "some tips on writing clearly for an academic audience along with an editor's perspective on publishing research." The last chapter reports the findings of a qualitative study about perspectives that the Chinese scholars hold regarding educational technology. The purpose of this chapter was to provide those who are interested in engaging in collaborative programs or projects in educational technology with China with information they will need, such as a general picture of the scholars with whom they are going to work and what projects or programs they may want to consider undertaking with Chinese scholars in Chinese higher education.

Editing this book has been a learning process for me. First, I learned from the chapter authors. Most of them are prominent scholars in educational technology in the USA or China. Their views and the points they made were valuable to all of us who want to be better scholars in educational technology. Second, I learned from my co-editor. His thoroughness and strong sense of responsibility bring back memories of the years when I was a student at Purdue University. The knowledge and work ethics I learned from him as well as from my other Purdue professors made me a successful scholar today. Third, I learned how to work on an edited book. I have had the experience of writing a book as a sole author or co-author, but working on an edited collection was a new experience. I learned from AECT Executive Director Phil Harris his style of working with different people. I find that I truly have learned something from everyone with whom I have worked. I understand that publishing a good book requires more than just knowledge.

I was inspired and motivated to take on this editorial project because I would like to dedicate myself to global education. I chose education as my career because I always have remembered my late parents saying to me: "There are two best professions you may want to choose from—being a medical doctor or being an educator. Medical doctors save peoples' lives and educators inspire learners and help improve the world." I am grateful for the opportunity of compiling and editing this book, one of the best tasks I have been given in my life, awarded by AECT.

I feel equally grateful for the support I received from my co-editor, my professor at Purdue University, Dr. James Lehman. He did the hard part of the task. Without his help, this book would not be of this quality. I hope our readers will enjoy reading this book and learning from the scholars who are represented in its pages.

Acknowledgement

I would like to thank my graduate assistant Haisong Ye for his assistance with the formatting of the chapters.

Terre Haute, USA   Feng-Qi Lai

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Editors and Contributors

About the Editors

Feng-Qi Lai Ph.D. is a professor of educational technology and the educational technology graduate program coordinator at Indiana State University. She received her doctorate in educational technology from Purdue University in 1997. After her graduation, she worked for corporations in the Chicago area until 2002 as the Director of Training and later as the Senior Instructional Designer/Project Manager. Prior to 1992, she taught K-12 and at the university for a total of more than 14 years while in China. Dr. Lai started her publications and translations in 1983. Her first translation entitled *Writing Scientific Papers in English* by O'Connor, M., & Woodford, F. P. was printed in 1983 (62,000 copies) and reprinted in 1985 (62,001–72,100). One of the papers she translated received the Award for Scientific English Translation at the Second Scientific Translation National Competition, China, in 1983. Her publications include books, book chapters, and journal papers in both English and Chinese. She also worked on more than three thousand phrases in *A Complete dictionary of English-Chinese idiomatic phrases* edited by Xing, Z., the work of which was started in 1991 and published in 1995. Since 2005, Dr. Lai has been actively involved in academic exchange with universities in China and invited to present by more than ten universities in China. She has received honorary titles and certificates from Shanghai Normal University (2006), Association of Shandong Higher Education (2007), Henan University (2013), Henan Normal University (2014), and East China Normal University (2015), respectively. She was one of the founders of Society of International Chinese in Educational Technology and the planner and general chair of AECT-LKAOE 2015 Summer International Research Symposium.

James D. Lehman Ph.D. is a professor of learning design and technology and the Director of the Discovery Learning Research Center at Purdue University. He has also served in leadership roles as an associate dean for discovery and faculty development in the College of Education and head of the Department of Curriculum and Instruction at Purdue. Professor Lehman's scholarship and teaching focuses on

technology integration in education particularly in the sciences, e-learning, and interactive multimedia. He has published more than 50 refereed journal articles and book chapters and is a co-author of *Educational Technology for Teaching and Learning*, an educational technology textbook now in its 4th edition. He has secured grant funding totaling approximately $20 million and is currently involved in two NSF-funded projects, PD4CS: Professional Development for Computer Science which focuses on online professional development of teachers of computer science and SLED: Science Learning through Engineering Design which focuses on integrating engineering design as a vehicle for teaching science in the elementary grades. Professor Lehman is a member of Purdue's Teaching Academy and was inducted into its Book of Great Teachers.

Contributors

Andrea Adams M.Ed. is the Director of Faculty Development and e-Learning Programs in the Center for Instructional Technology at James Madison University. She has a master's degree in educational technology and has taught in both K-12 and higher education. She has conducted mixed-method studies, published in peer-reviewed journals and books, and presented at international, national, and regional conferences. Andrea was a fellow in the OLC Institute for Emerging Leadership in Online Learning and the Breakthrough Models Academy by EDUCAUSE and NGLC with the sponsorship from the Bill and Melinda Gates Foundation.

J. Ana Donaldson Ed.D. is a past-president of AECT (Association for Educational Communications and Technology) and is a contributing faculty member for Walden University in the Ph.D. Educational Technology program. She retired in 2009 as an associate professor of Instructional Technology from the University of Northern Iowa. Beside her years of classroom and online experience, she is a published author, keynote speaker, and international presenter. She co-authored with Rita-Marie Conrad: *Engaging the Online Learner: Activities for Creative Instruction* (2004 & 2011) and *Continuing to Engage the Online Learner: More Activities and Resources for Creative Instruction* (2012).

Donalee Attardo Ph.D. is Manager of Academic Technologies in the Office of Information Technology, University of Minnesota. Donalee holds a Ph.D. in linguistics from Purdue University and has been a specialist in educational technology in higher education for over 20 years, most at Purdue University, where she was a director of the Instructional Development Center in Teaching & Learning Technologies, and before that a senior educational technologist.

Haogang Bao is a postgraduate student in the School of Educational Technology of Beijing Normal University. His research interests include learning analytics and social recommender system.

Curtis J. Bonk Ph.D. is a former corporate controller and CPA who, after becoming sufficiently bored with such work, received his master's and Ph.D. degrees in educational psychology from the University of Wisconsin. Curt Bonk is now professor of Instructional Systems Technology at Indiana University and president of CourseShare. Drawing on his background as a corporate controller, CPA, educational psychologist, and instructional technologist, Bonk offers unique insights into the intersection of business, education, psychology, and technology. He has received the CyberStar Award from the Indiana Information Technology Association, the Most Outstanding Achievement Award from the US Distance Learning Association, and the Most Innovative Teaching in a Distance Education Program Award from the State of Indiana. In 2003, Curt founded SurveyShare, which he sold in 2010. From 2012 to 2015, Bonk has been annually named by *Education Next* and listed in *Education Week* among the top contributors to the public debate about education from more than 20,000 university-based academics. In 2014, he also was named the recipient of the Mildred B. and Charles A. Wedemeyer Award for Outstanding Practitioner in Distance Education. A well-known authority on emerging technologies for learning, Bonk reflects on his speaking experiences around the world in his popular blog, *TravelinEdMan*. He has authored over 300 publications, including several widely used technology books, including *The World Is Open: How Web Technology Is Revolutionizing Education* (2009), *Empowering Online Learning: 100 + Activities for Reading, Reflecting, Displaying, and Doing* (2008), *The Handbook of Blended Learning* (2006), and *Electronic Collaborators* (1998). His 2014 book, *Adding Some TEC-VARIETY: 100 + Activities for Motivating and Retaining Learners Online*, is freely available to download as an eBook in both English and Chinese at http://tec-variety.com/. Bonk's most recent book, *MOOCs and Open Education Around the World*, was published by Routledge in July 2015.

Robert Maribe Branch Ed.D. is a Professor of Learning, Design, and Technology at the University of Georgia. He is also the Head of the Department of Career and Information Studies. Rob earned an associate of science degree from New York City Technical College in Brooklyn, New York, a bachelor of science degree from Elizabeth City State University in North Carolina, and a master of arts degree from Ball State University in Muncie, Indiana. Rob taught secondary school in Botswana as a Peace Corps Volunteer and later joined the University of Botswana as a lecturer in the Engineering Design and Technology Department. Rob completed his Doctor of Education degree from Virginia Tech in 1989. Dr. Branch joined the faculty at Syracuse University and taught graduate courses and conducted research in the Department of Instructional Design, Development, and Evaluation rising to a tenured associate professor. Dr. Branch worked as a Fulbright lecturer/researcher at the University of KwaZulu-Natal in South Africa, where he co-founded the master's degree in Educational Technology, while conducting research on the complexities of intentional learning spaces. Dr. Branch is an editor of the *Educational Media and Technology Yearbook* and the *Survey of Instructional Development Models*. He recently published *Instructional Design: The ADDIE*

Approach. Dr. Branch emphasizes student-centered learning and teaches courses related to project management. Dr. Branch's research focuses on diagraming complex conceptual relationships and other complicated flow processes. He is the President-elect of the Association for Educational Communications and Technology.

Marcus D. Childress Ph.D. is an associate dean of the school of education, professor, and director of the Instructional Design and Performance Technology doctoral program at Baker University (Kansas). Dr. Childress earned his Ph.D. from Virginia Tech. His research interests include online learning, heutagogy and using virtual worlds for training and education. His research has been documented in publications such as *Distance Education*, *Journal of Research on Computers in Education*, *International Journal of Educational Telecommunications*, *Globalized e-Learning Cultural Challenges*, *EDUCAUSE Quarterly*, *Academic Leadership Journal*, and the *Encyclopedia of Distance Learning, Teaching, Technologies, and Applications*. In addition to his higher education experience, Dr. Childress' training involvement includes consulting with the Intel Corporation, the People's Bank of China Training Center, SchwindTEC, Virginia Modeling, Analysis and Simulation Center, and the United States Joint Training Analysis and Simulation Center; the world's leading research centers for computer modeling, simulation, and visualization. As a past-president of the Association for Educational Communications and Technology (AECT), he served on the executive committee and board of directors and was the convention chair for the 2012 AECT International Convention in Louisville, KY.

M. David Merrill Ph.D. has been engaged in the study of effective, efficient, and engaging instruction for more than 50 years since he started his PhD program at the University of Illinois in 1961. He was honored to receive the AECT Distinguished Service Award 2001 for advancing the field of instructional technology through scholarship, teaching, and leadership. He received a lifetime achievement award from the Utah State University College of Education 2010, and he was recognized as an Honored Alumni for the College of Education at BYU 2011. He recently received the ETR&D Distinguished Development Award from AECT. Since receiving his Ph.D. from the University of Illinois in 1964, he has served on the faculty of George Peabody College, Brigham Young University-Provo, Stanford University, the University of Southern California, Utah State University, Florida State University, and BYU Hawaii (as a missionary volunteer). He served a service mission at BYU Hawaii where he helped faculty put courses online. Since retiring, he has taught online courses at Florida State University, BYU Hawaii, University of Hawaii, and Utah State University. He is internationally recognized as a major contributor to the field of instructional technology, has published many books and articles in the field, and has lectured internationally. Among his principle contributions: TICCIT Authoring System 1970s, Component Display Theory and Elaboration Theory 1980s, Instructional Transaction Theory, automated instructional design and ID based on Knowledge Objects 1990's, and recently First Principles of Instruction.

Yuqing Guo Ph.D. is an assistant professor of educational technology in the College of Education at Zhejiang University, China. She has presided over several provincial-level research projects and has published several academic papers or books in the area of educational technology. Her research interests include distance education, open education resources, and diffusion of educational resources. She is currently conducting research in the field of e-learning, educational data mining, learning analytics, and educational computing.

Phillip Harris Ed.D. is an executive director of the Association for Educational Communications & Technology. He is the former director of the Center for Professional Development at Phi Delta Kappa International, the association for professional educators, and was a member of the faculty of Indiana University for 22 years, serving in both the Department of Psychology and the School of Education.

Akesha Horton Ph.D. is an associate professor in the Teaching and Diversity Department of Concordia University, Chicago. She earned her doctorate degree in Curriculum, Teaching, and Educational Policy from Michigan State University. Dr. Horton has been an active agent in a plethora of experiences in the educational arena, including in-school and out-of-school urban settings, higher education, instructional design, educational technology, e-learning, and curriculum development. Further, she has served on the board of national educational organizations in the USA. These experiences led to her research interests, which explores the intersections between learning, technology, and culture for youth and young adults.

Jianli Jiao Ph.D. is a professor of educational technology and a well-known active blogger in the field of information and communication technologies in education in China. He is the Interim Dean of the School of Information Technology in Education at South China Normal University (SCNU), where he teaches courses on Foundation of Educational Technology, Social Networking in Education, Learning Sciences and Technologies, and Technology-Enhanced Teachers' Professional Development. He received his Ph.D. from SCNU in 2005 in educational technology with a concentration on theory perspectives of educational technology. His research interests include e-learning, online courses, technology-enhanced teachers' professional development, social media and networking in education, instructional design in traditional, blended, and online learning environments, as well as one-to-one teaching and learning with mobile devices. He has published a couple of books and more than 80 journal and conference proceeding papers. Dr. Jiao is currently leading his team working on the projects related to the Massive Open Online Courses, teachers' professional development in online communities, and teaching and learning supported with mobile devices in one-to-one settings.

Tristan E. Johnson Ph.D. is the Executive Director of Engineering Education Initiatives in the Graduate School of Engineering at Northeastern University. He is also the Research Editor-in-Chief for the Educational Technology Research and Development Journal. He has served as the president for the Training and

Performance Division of the Association of Educational Communications and Technologies. He earned his Ph.D. in educational technology from Purdue University looking at Computer Simulations as Cognitive Tools. Dr. Johnson's primary technical expert is in training, curriculum, and instruction. He has 20 years of experience in designing, developing, and evaluating curriculum and training systems for business, military, industry, and academia. He has worked on the creation of university courses, educational simulations, electronic performance support systems, workshops, certificates, programs, as well as numerous technology-based instructional materials. He has expertise in the application of instructional strategies including case studies, team-based learning, gaming, problem solving, task-centered instruction, and many other strategies that have strong levels of learning effectiveness and engagement. His research focuses on team cognition and its links to team performance. Specifically, he studies how mental models are created and shared and their effect on performance. Dr. Johnson has published papers related to team cognition as well as visual representations effect on learning, and technology as a tool to represent internal mental models and schemas. He has served as: Associate Editor for the *Encyclopedia of Educational Technology*, on the Editorial Board for *Educational Technology Research and Development*-Development Section, and on the Editorial Advisory Boards for the *Encyclopedia of the Sciences of Learning* and *Performance Improvement Quarterly*.

Jina Kang M.A. is a doctoral student in the learning technologies program at the University of Texas at Austin. She holds master's degrees in learning technologies and astronomy. She has been working as a teaching assistant for the classes related to instructional systems design and interactive multimedia production. Her main research interest is in serious games analytics: using students' logged actions in serious games to understand how the students solve a problem by interacting with various cognitive tools of the environment; visualizing their learning behavior; and providing just-in-time feedback via dashboards to help teachers facilitate the students' learning.

Yan Li Ph.D. is a professor of educational technology in the College of Education at Zhejiang University, China. She has presided over several international-, national-, and provincial-level research projects and has published series of academic papers or books. You may find her papers in journals such as *Computers & Education*, *British Journal of Educational Technology*, *Educational Technology Research & Development*, *Asia Pacific Journal of Education*, *Social Behavior and Personality*, *International Journal on Emerging Technologies in Learning*, and *Journal of International Agricultural and Extension Education*. Her research interests include distance education, open education resources, and diffusion of educational resources.

Yanyan Li Ph.D. is a professor in the School of Educational Technology at Beijing Normal University, where she teaches courses on data structures, intelligent information processing, and introduction to artificial intelligence. She received her

Ph.D. degree in computer software and theory from the Institute of Computing Technology at Chinese Academy of Sciences. Her research interests include computer-supported collaborative learning, learning analytics, and Semantic Webs with a concentration on semantic organization of learning resources for active collaborative learning, opinion mining, and sentiment analysis in an online learning community. Dr. Li is the leader of two projects funded by the National Natural Science Foundation of China and the Principal Investigator of more than ten academic projects. She has published more than 50 academic papers in journals and international conferences, including *Journal of Educational Technology & Society*, *Knowledge-based Systems*, and *Future Generation Computer Systems*. Three of her papers have been judged as the best paper at the Institute of Electrical and Electronics Engineers (IEEE) International Conference on Advanced Learning Technologies (ICALT, 2007 & 2008) and International Conference on Computers in Education (ICCE, 2006). She is the Managing Editor of *Journal of Computers in Education* and an editorial board member of *Journal of Technology for Education and Learning* as well as *Journal of Smart Learning Environments*.

Juhong Christie Liu Ph.D. is a senior instructional designer/assistant professor in the Center for Instructional Technology at James Madison University. Her teaching includes face-to-face, online asynchronous, and synchronous formats. Her research areas focus on engaging student learning in technology-mediated environments and collaborative teaching and learning with interoperability and connectivity. Juhong received her Ph.D. in Instructional Design and Technology from Virginia Tech. She published in peer-reviewed journals, book chapters, and encyclopedia and presented at international, national, and regional conferences. She was an AECT PacifiCorp Design Competition finalist and a best-in-track presenter at the OLC conference.

Min Liu Ed.D. is a professor of learning technologies at the University of Texas at Austin. She serves as the program coordinator and graduate advisor since 2002. Her teaching and research interests center on educational uses of new media and other emerging technologies and their impact on teaching and learning for learners at all age levels. She has published over 64 research articles in leading peer-reviewed educational technology journals (e.g., *Educational Technology Research and Development, Computers in Human Behavior, Journal of Research on Technology in Education, Journal of Educational Computing Research, Interdisciplinary Journal of Problem-Based Learning, The American Journal of Distance Education, Journal of Educational Technology & Society, Journal* of *Interactive Learning Research, The International Journal of Gaming and Computer-Mediated Simulations)*, nine peer-reviewed book chapters, and 48 peer-reviewed conference proceeding papers and presents regularly at national and international conferences. She has also served on numerous editorial boards for peer-reviewed research journals, including: *Educational Technology Research and Development, Interdisciplinary Journal of Problem-based Learning, Computers in Human Behavior, Journal of Research on Technology in Education, Journal of Educational*

Computing Research, Journal of Computing in Childhood Education, and has also reviewed for such research journals as *Language Learning & Technology*, *Instructional Science*, *Computers & Education*, *Interactive Learning Environments*, and *Learning, Media and Technology*. Her current R&D projects include studying the design and effectiveness of immersive, rich media environments on learning and motivation; learning analytics and data visualizations; understanding MOOCs as an emerging online learning tool; examining the affordances and constraints of using mobile technologies in teaching and learning; and use of Web 2.0 tools to facilitate instruction.

Sa Liu M.A. is a doctoral student in curriculum and instruction specializing in learning technologies. She has a master's degree in educational technology and a B. S. in computer science. Her research interests include game-based learning, technology-promoted teacher development, and computer-supported language learning.

Pat Reid Ed.D. has worked in faculty professional development and instructional design for over 20 years in higher education at Cleveland State University, Wintec and NorthTec, Purdue, and now at the University of Cincinnati. Pat works as part of both CET&L (where she is the Associate Director of Integrated Instruction) and eLearning (as Director of Instructional Innovation). In these roles, she works with instructional designers and faculty across the university, supporting instructional technology. Her focus is on helping instructors identify how to get technologies working to support their students' learning. Pat has an Ed.D. in Adult Education from Nova Southeastern University.

Robert A. Reiser Ph.D. is the Associate Dean for Research, a Distinguished Teaching Professor, and the Robert M. Morgan Professor of Instructional Systems in the College of Education at Florida State University. He has written five books and more than 75 articles and book chapters in the field of instructional design and technology. His most recent book, *Trends and Issues in Instructional Design and Technology* (2012), has received several outstanding book awards from major professional organizations, including the Association for Educational Communications and Technology and the International Society for Performance Improvement. Dr. Reiser's service activities have included founding, and chairing for 25 years, the AECT Division for Design and Development Awards Program. He also served for 20 years as an editorial board member of *Educational Technology Research and Development*, a premier research journal in the field of instructional design and technology. In recognition of his service efforts, the AECT Division of Design and Development has presented Dr. Reiser with its annual Presidential Award for Outstanding Service on four separate occasions. During the 39 years he has been at Florida State, Dr. Reiser has received several university awards, including a Professorial Excellence Award, a Developing Scholar Award, and a University Teaching Award. In April 2000, he received the University Distinguished Teacher Award, the highest teaching award at Florida State. Each year this award is given to one faculty member at Florida State who has, over his or

her career, demonstrated a record of sustained teaching excellence. Dr. Reiser is the first member of the College of Education to have received this award.

Gaimei Ren M.A. received her master's degree in educational technology from South China Normal University. Her interests include blended learning and flipped classroom.

J. Michael Spector Ph.D. is a professor of learning technologies at the University of North Texas. He was previously Professor of Educational Psychology and Instructional Technology, Doctoral Program Coordinator for the Learning, Design, and Technology Program, and a Research Scientist at the Learning and Performance Support Laboratory at the University of Georgia. Prior to that, he was an Associate Director of the Learning Systems Institute, Professor of Instructional Systems, and Principal Investigator for the International Center for Learning, Education, and Performance Systems at Florida State University. He served as Chair of Instructional Design, Development and Evaluation at Syracuse University and Director of the Educational Information Science and Technology Research Program at the University of Bergen, Norway. He earned a Ph.D. in Philosophy from The University of Texas at Austin. His research focuses on intelligent support for instructional design, assessing learning in complex domains, and technology integration in education. Dr. Spector served on the International Board of Standards for Training, Performance and Instruction (*ibstpi*) as Executive Vice President; he is a past-president of the Association for Educational and Communications Technology as well as a Past Chair of the Technology, Instruction, Cognition, and Learning Special Interest Group of AERA; he is also an active member of several AERA Special Interest Groups. He is editor of *Educational Technology Research & Development* and serves on numerous other editorial boards. He co-edited the third and fourth editions of the *Handbook of Research on Educational Communications and Technology*, is editing the *Encyclopedia of Educational Technology*, and has more than 100 other publications to his credit.

Donovan R. Walling is an independent scholar, writer, editor, and consultant. He is a senior consultant for the Center for Civic Education. Previously he was Director of Publications for Phi Delta Kappa International, following more than twenty years as a public school teacher and administrator. His numerous publications feature works on arts education, civic education, and the teaching of writing in journals, encyclopedias, and professional books, including *Writing for Understanding*, *Why Civic Education Matters*, and *Public Education, Democracy, and the Common Good*. His most recent book is *Designing Learning for Tablet Classrooms: Innovations in Instruction*, published by Springer in 2014.

Minhong (Maggie) Wang Ph.D. is an associate professor at the University of Hong Kong and Director of the KM&EL Lab. She has visited Harvard University, MIT, and University of Cambridge as a visiting scholar in recent years. Her research interests include technology-enhanced learning, knowledge visualization, workplace learning, higher education, and artificial intelligence. She has published

in *Educational Research Review*, *Computers & Education*, *Medical Education Online*, *Internet and Higher Education*, *Educational Technology & Society*, *Information & Management*, *IEEE Transactions on Education*, and *Knowledge-based Systems*. She is the editor of *Knowledge Management & E-Learning* and the associate editor of *Information Management*.

James Willis Ph.D. is a research associate in the Center for Research on Learning and Technology in the School of Education at Indiana University. He was previously an educational assessment specialist at Purdue University. His research and publications include work on the ethics of learning analytics and digital badges, the intersection of automated technology and its potential ethical and educational implications, and the future of educational technology. Educated in theology, philosophy, and comparative religion, he holds a Ph.D. from King's College London, an M.Litt. from the University of St. Andrews in Scotland, and a B.A. from Roanoke College in Virginia.

Chang Xu is a postgraduate student in the School of Educational Technology of Beijing Normal University. Her research interests include knowledge map and collaborative knowledge construction in CSCL.

Yuqin Yang is a doctoral candidate in the Faculty of Education at the University of Hong Kong. Her current interests are in various aspects of knowledge building and creation including pedagogy, assessment, and teacher education, technology-enhanced instruction, and MOOCs.

Wei Zakharov Ph.D. is a Senior Educational Technologist from Instructional Development Center at Purdue University. She received her Ph.D. in Learning Design & Technology from Purdue University and has over 12 years of experience in educational uses of instructional media and emerging technologies, innovations in technology and learning, flipped/hybrid/online courses design and development, and faculty professional development.

Muhua Zhang is a doctoral student studying in College of Education at Zhejiang University, China. She is currently conducting research in the field of OER development and application, MOOCs and its application in higher education, blended learning, and e-learning.

Wenjun Zhang was an undergraduate student studying in College of Education at Zhejiang University, China, and got his bachelor degree in June 2014. During his undergraduate study, his research interests included OER development and application, MOOC and its application, and blended learning.

Hongrui Zhong M.A. received his master's degree in educational technology from South China Normal University. His interests are in MOOCs, teacher learning, and TPACK.