

Improving Chinese University EFL Students' Speaking Skills through Digital Storytelling

การพัฒนารูปแบบการเรียนรู้ด้วยตนเองอย่างอิสระในการเรียนการสอนภาษาอังกฤษในฐานะภาษาต่างประเทศโดยใช้การเล่าเรื่องด้วยสื่อดิจิทัลเพื่อเพิ่มทักษะการพูดสำหรับนักศึกษาระดับมหาวิทยาลัยชาวจีน

Qiwei Wei*, Peerasak Siriyothin and Andrew-Peter Lian
นីเหវី វេយោ* ពិរសាងគី សិរិយុទិន និងអ៊ណែល លោន

*School of Foreign Languages, Institute of Social Technology,
Suranaree University of Technology, Nakhon Ratchasima, Thailand
สาขาวิชาภาษาต่างประเทศ สำนักวิชาเทคโนโลยีสังคม มหาวิทยาลัยเทคโนโลยีสุรนารี*

ABSTRACT

The present study aims to investigate whether a 12-week digital storytelling (DST) intervention could improve Chinese university EFL students' speaking skills. The entire population for this study consisted of 100 English major undergraduates from 2 intact classes of EFL students that were taught by the same teacher. Each class contained 50 participants. The experimental group students participated in the DST intervention and were exposed to the DST activities both inside and outside classroom while the control group students only received conventional whole-class instruction. Statistical analysis within groups showed that there was a significant difference between the pretest and posttest means in the experimental group with a large effect size ($p=0.000, d=1.58$), but that there was no significant difference between the pretest and the posttest in the control group ($p=0.056$). Statistical analysis between groups indicated that the pretest mean of the experimental group was not significantly different from that of the control group ($p=0.084$). However, there was a significant difference between the posttest means of the experimental group and the control group, and the effect size was large ($p=0.001, d=0.658$). DST participants obviously outperformed the control group in terms of speaking skills after the treatment. In addition, the quantitative data elicited through the questionnaire on the value of the DST intervention revealed that 82% of the respondents indicated that digital storytelling allowed them to improve their technical skills, 62% claimed that digital storytelling improved their ability to apply knowledge to practice. 95% of students considered in their diaries that the DST intervention was interesting, challenging, helpful, and enjoyable and contributed to the development of students' autonomous learning. Most of the interviewees claimed that DST intervention could not only improve their language skills but also their learner autonomy. The findings call attention to the value of DST used in this study for language instruction.

ARTICLE INFO

Article history:
Received 3 November 2017
Received in revised form
2 April 2018
Accepted 8 May 2018
Available online
24 December 2018

Keywords:
Computer-Assisted Language Learning, Speaking proficiency, Chinese university EFL students, Digital storytelling, Project-based learning, Autonomy

* Corresponding author
E-mail: jokerwei@163.com

บทคัดย่อ

งานวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาว่าการใช้การเล่าเรื่องด้วยสื่อดิจิทัลเป็นระยะเวลา 12 สัปดาห์ สามารถช่วยพัฒนาทักษะการพูดของนักศึกษาจีนที่เรียนภาษาอังกฤษในฐานะภาษาต่างประเทศได้หรือไม่ ผู้เข้าร่วมการวิจัยประกอบด้วยนักศึกษาระดับปริญญาตรีอุปกรณ์อังกฤษจำนวน 100 คน โดยวิธีการคัดเลือกจากห้องเรียนปกติ แล้วแบ่งออกเป็น 2 กลุ่ม คือ กลุ่มทดลองจำนวน 50 คน และกลุ่มควบคุมจำนวน 50 คน โดยกลุ่มทดลองจะเรียนรู้ผ่านการเล่าเรื่องด้วยสื่อดิจิทัลและกิจกรรมการเล่าเรื่องด้วยสื่อดิจิทัลทั้งในและนอกห้องเรียน ในขณะที่กลุ่มควบคุมจะเรียนรู้ผ่านการสอนในห้องเรียนแบบดั้งเดิมเท่านั้น

การวิเคราะห์ทางสถิติภายในกลุ่มแสดงให้เห็นว่ามีความแตกต่างอย่างมีนัยยะสำคัญระหว่างคะแนนเฉลี่ยของ pretest และ posttest ในกลุ่มทดลอง แต่ไม่มีความแตกต่างอย่างมีนัยยะสำคัญระหว่างคะแนนเฉลี่ยของ pretest และ posttest ในกลุ่มควบคุม การวิเคราะห์ทางสถิติระหว่างกลุ่มนั้นชี้ว่าคะแนนเฉลี่ยของ pretest ของกลุ่มทดลองและกลุ่มควบคุมไม่ได้มีความแตกต่างอย่างมีนัยยะสำคัญ ในขณะที่คะแนนเฉลี่ย posttest ระหว่างกลุ่มทดลองและกลุ่มควบคุมมีความแตกต่างอย่างมีนัยยะสำคัญ ซึ่งเห็นได้อย่างชัดเจนว่ากลุ่มทดลองทำได้ดีกว่ากลุ่มควบคุมทางด้านทักษะการพูด

นอกจากนี้ ข้อมูลจากแบบสอบถามแสดงผลว่า 82 เปอร์เซ็นต์ของผู้ตอบแบบสอบถามระบุว่าการเล่าเรื่องด้วยสื่อดิจิทัลช่วยพัฒนาทักษะทางด้านเทคนิค ในขณะที่ 62 เปอร์เซ็นต์ระบุว่าการเล่าเรื่องด้วยสื่อดิจิทัลช่วยพัฒนาความสามารถในการนำความรู้ไปประยุกต์ใช้ในการปฏิบัติ และ 95 เปอร์เซ็นต์ได้เขียนไว้ในสมุดบันทึกประจำวัน (diaries) ว่าการเล่าเรื่องด้วยสื่อดิจิทัล มีความน่าสนใจ ท้าทาย ช่วยในการเรียนรู้ เกิดความสนุกในการเรียน และมีส่วนช่วยพัฒนาการเรียนรู้ด้วยตนเองของนักศึกษา ผู้รับการสอนภายนอกส่วนใหญ่กล่าวว่า การเล่าเรื่องด้วยสื่อดิจิทัลไม่ได้ช่วยพัฒนาแค่ทักษะทางภาษาเท่านั้น แต่ยังช่วยพัฒนาการเรียนรู้ด้วยตนเองอีกด้วย ผลของการวิจัยแสดงให้เห็นถึงคุณค่าของการใช้การเล่าเรื่องด้วยสื่อดิจิทัลในการสอนภาษา

Introduction

English language learning is one of the main language skills taught at all education levels in China from elementary to higher education. All levels of education in China emphasize improving students' speaking skills. Of the four macro skills in language learning, i.e., listening, speaking, reading, and writing, speaking has been considered the most challenging since it involves a complex process of representing meaning (Celce-Murcia & Olshtain, 2000). Yet, although it is complicated, speaking is a skill that language teachers are required to teach their students (Kamil, 2017). This is because the ability to speak enables the expression of one's ideas and thoughts in a variety of person-to-person interactions. Furthermore, a person's speaking ability is one of the important indicators of language mastery (Fauzan, 2014). The ability to speak English specifically (as opposed to other languages), is ranked as one of the essential job skills for vocational college graduates in China (Wu, 2011). However, after spending years learning English, Chinese EFL learners are still found to be fairly weak in their English proficiency, particularly in their speaking ability. According to the Education First (EF) (2017) survey, China ranks 36th out of 80 countries in the world and 8th out of 20 countries in Asia in English proficiency and Guizhou province in which this study was conducted ranks second last in English proficiency in China. Zhang (2002) concludes that two short phrases summarize the outcomes of English teaching in Chinese universities: "much input, little output," and "high grades, low ability."

Hence the urgent need for developing ways of improving Chinese university EFL students' speaking ability, especially those enrolled as English majors in pre-service teacher training programs, since they will directly influence future EFL learners in China.

Statement of the problem

The traditional teacher-centered teaching approach in Chinese EFL learning has caused the "deaf and dumb" English learning phenomenon. In other words, learners are unable to speak English, neither can they understand what other people say in English. Although the Chinese Ministry of Education (MOE) has invested heavily in integrating computers and technology with all areas of learning, the researchers have noticed that teachers, in general, struggle to incorporate computer applications into regular classroom instructional practices to enhance learning because of ineffective and inappropriate training as well as lack of vision as to how technology can improve learning. It thus often happens in authentic situations that technology-based approaches would give some sort of challenge to the teachers because they have never been introduced to these activities (Pritchard, 2004). In addition, no previous study has examined the potential of computer-based multimedia applications, in general, or digital storytelling, in particular, in encouraging Chinese EFL teachers to integrate technology into the curriculum and engage students in technology-rich, active and cooperative learning situations that help students to construct their own learning.

The impact of new technologies in educational contexts has been mostly positive as new technologies have given educators the opportunity to enhance their knowledge, skills, and therefore enhance the standard of education. However, great things come from people – not machines (Lian, 2004). Therefore, it is crucial to design a project or implement an intervention in which there are approaches of how to use the technology. As a result, the present study was conducted in Qiannan Normal University for Nationalities to investigate whether digital storytelling can improve Chinese university EFL learners' English speaking skills.

Objectives of the study

The foremost purpose of this study was to investigate whether the implementation of a DST intervention could improve Chinese university EFL students' speaking skills. It also intended to explore whether the participants enjoyed the newly applied intervention in speaking instruction. The specific objectives of the present study were as follows:

- 1) To investigate whether the implementation of a DST intervention could improve EFL learners' speaking skills;

- 2) To investigate students' perceptions of DST.

Research questions

In order to fulfill the abovementioned purposes, the following research questions were proposed:

- 1) Can DST improve Chinese university EFL students' speaking skills?
- 2) What are the students' perceptions of the DST intervention?

Literature review

Universities in the less developed areas like Guizhou province in Southwest China, mostly lack technology-enhanced learning opportunities, and teachers often encounter some technical problems with regard to the software due to a lack of technological skills. Roessingh (2014) claimed that creatively exploiting the combined potential of information communication technology (ICT) and project-based learning (PBL) makes significant demands on teachers if their students are to realize the benefits of both. Technology-enriched classrooms have been claimed to produce enhanced learning opportunities for foreign language students (Naqvi & Al Mahrooqi, 2016). Furthermore, many scholars consider project-based learning as an excellent form of instruction to encourage the self-learning of students (Gerber *et al.*, 2001; Moursund, 2003; Chang & Lee, 2010). David (2008) claimed that project-based learning could provide students with more learning chances and interpersonal interactions, as it conforms to the requirements of technological instruction. For instance, digital cameras, personal computers, scanners, and easy-to-use software have become available to educators to harness the digital world and thus ensure in projects more effectively. One form of technology-enhanced learning with potential to assist learning is digital storytelling as a form of project-based learning. A digital story is a 2-to-5 minute digital video clip, told in first person narrative, recorded with the teller's own voice, illustrated with still images, text, recorded audio narration, video clips, and with an optional music track to add emotional tone (Rance-Roney, 2008).

Digital storytelling as a modern way of storytelling and a popular component of project-based learning, is one of the innovative pedagogical approaches that can engage students in deep and meaningful learning (Smeda, *et al.*, 2014), because it can expand learning beyond the traditional face-to-face methods to create high levels of student engagement in their studies as they need to do it by themselves and therefore necessarily engage in learning activities. It is a complex project which enables students to identify and confront their difficulties and learning needs, thus personalizing their learning, i.e. by its nature, it breaks away from a one-size-fits-all model of learning. Johnston (2016) claims that storytelling mirrors the way that we make sense of our lives and the lives of others; it is

part of every discipline, every thought, and every image. Digital storytelling, as a specific form of storytelling, can thus motivate and create new opportunities for learners to succeed in speaking. To create a digital storytelling episode, learners have to depend on themselves and the community they live in. There are more and more autodidacts as a result of technological development in today's Do-It-Yourself (DIY) society where people clearly prefer solving many of their problems by themselves (Lian, 2017). From a modern pedagogic perspective where, at least according to some, learner knowledge is constructed individually according to each person's logical and representational systems (e.g. Lian, 2004), the spirit of this approach is reflected in the strengthening of the notion of "just in time, just enough and just for me" pedagogy in today's DIY world (Lian, 2014). Technology-enhanced learning thus has the potential to develop students' interest and engagement in EFL learning, and at the same time develop students' autonomous learning. Meanwhile, they need to get help from the community through interactions. As a practical approach of technology-enhanced learning, the collaborative learning opportunities in DST are learner centered, emphasize interaction and doing, and promote group work for developing solutions to real-world problems. Signes (2010) claims that DST helps develop autonomous learning, since students will, after a brief period of instruction, have become comfortable with writing the story by themselves and using the software to create a digital version of it. Since students have the chance to create stories in groups, a great deal of discussion and different points of view will appear. Further, students will have to come to mutual understandings before they deliver the final version of the story. In addition, these basic but powerful desktop tools have been demonstrated to be user-friendly, accessible, and easy for learners to master (Istencic Starčić, Cotic, Solomonides, & Volk, 2016). A study by Razmi *et al.* (2014) showed that by the use of digital storytelling techniques students develop better oral skills and this technique can be considered as an essential tool in foreign language learning and teaching. Wulandari *et al.* (2016) also demonstrate that the use of DST is strongly effective to develop student's ability in speaking. It is thus anticipated that Chinese university EFL learners would improve their English speaking skills through the use of digital storytelling.

Research methodology

Participants and materials

The entire population for this study consisted of 100 English major undergraduates from two intact classes of EFL students that were taught by the same teacher (none of the researchers). Both classes were in their second year of study in the School of Foreign Languages in Qiannan Normal

University for Nationalities. As the number of students was manageable, the entire population participated in this study and selecting a representative sample was not necessary. All participants had studied English for a minimum of 11 years. They were homogeneous in terms of their levels of speaking skills. One group was assigned as an experimental group and the other as control group. Each group consisted of 50 students. Students in both groups were not very active in speaking English as reflected by their teachers. The teacher of the Speaking Course thus has been trying to apply a teaching and learning method that could stimulate the students to become more engaged in using the language. A digital storytelling intervention was then introduced by the researchers at a propitious time. The reason that the researcher chose the second-year undergraduate students to be participants in this study was that they had been in university for one year and had become used to the teacher's teaching method, had learned to be independent in study somehow and might have looked for some autonomous learning methods to improve their English speaking skills. In a word, since the research took place in a natural setting, it may have wide applicability to other similar settings (Thyer, 2012).

This project was undertaken within the organizational structures of the Chinese Ministry of Education (CMOE). Consequently, the learning materials used needed to comply with the requirements set by the CMOE and consist of two parts. The first part consisted of textbooks prescribed in the approved syllabus. Both the control and experimental groups used the approved textbook *Challenge to Speak* which was edited by Professor Yao Baohui (Yao, 2009). The second part consisted of any materials chosen by students themselves to achieve their purpose. All students in both groups could use any resources available for themselves. They were free to practice their speaking using an approach where they were normally guided by the teacher. Student activities included student-to-student interactions as well as teacher-to-student interactions. Students worked independently, in pairs, and in groups. Students asked and answered questions and they created conversations with the target language. The control group took the class in a traditional way as usual. They used the approved textbook for speaking. Basically, students repeated and practiced what the teacher presented. They also participated in classroom activities like drill work or role-play. However, no DST was applied in the control group. The experimental group made their digital stories based on either the materials in their textbook or anything else they were interested in. They may make their stories based on what they read, experienced, or even what they imagined. The teacher's role was no longer central, and the students were encouraged and helped to learn in their preferred ways. Participants in both groups could spend as long as they liked practicing either in groups or on their own (as could the control group). Materials and activities involved in both groups are compared in Table 1.

Table 1. Materials and activities involved in experimental group and control group

	Control group	Experimental group
Instructor	Native speaker 1 (not the researchers)	The same instructor (not the researchers)
Textbook	<i>Challenge to Speak</i> (Yao, 2009).	The same textbook
Teaching hours	2 hours a week	The same teaching hours
Activities	Teacher-centered activities - teacher explaining - teacher telling stories - students role-playing - teacher assessing - students using blackboard and chalk	Student-centered activities - students discussion - students telling stories - students roleplaying - self-, peer- and teaching assessing - students using DST

Instruments

To answer research question 1 as to whether digital storytelling can improve Chinese university EFL students' speaking skills, pre- and post-tests were utilized. Both pretest and posttest papers were chosen randomly from the Test for English Majors-Band 4 Oral Test (shortened as TEM4-Oral). TEM4-Oral is one of the four tests of the TEM test battery which correspondingly consists of TEM4 and TEM4-Oral, assessing students' English proficiency at the end of the foundation stage, and TEM8 and TEM8-Oral, assessing students' English proficiency at the end of the advanced stage. The purpose of the TEM is to measure the English proficiency of Chinese university undergraduates majoring in English Language and Literature and to examine whether these students meet the required levels of English language abilities as specified in the National College English Teaching Syllabus for English Majors (NACFLT, 2000). Based on notions of communicative competence and communicative language use (Bachman & Palmer, 1996), three tasks are designed in TEM4-Oral in order to best elicit the examinee's true oral English proficiency. These tasks include story retelling, monologue and role-play. Unlike other speaking tests such as the International English Language Testing System (IELTS), First Certificate in English (FCE), Business English Certificate (BEC) etc., tape-recordings rather than oral interviews are employed in TEM4-Oral. Correspondingly, the examinee's performance is not rated by on-the-spot interviewers. Instead, raters gather after the exam and score tape-recordings without a real involvement in the communicative context.

TEM4-Oral has a high validity and reliability as determined by researchers (e.g. Liu, 2004). TEM4-Oral takes approximately 25 minutes to complete. Test scores are reported to the Academic Affairs Office of the participating universities. Test takers scoring 60 or above receive a certificate from the NACFLT on which their level of performance is reported, including 'excellent' (score 80 or above),

'good' (score between 70 and 79) and 'pass' (score between 60 and 69). Neither composite scores nor section scores are reported to test takers. They can, however, check their composite scores through the Academic Affairs Office of their university. Test takers who pass the tests are awarded a certificate from the NACFLT on which the three levels are reported: 'excellent', 'good' and 'pass'.

In this study, four experienced teachers of English, two Chinese and two native speakers were invited to be raters to listen and score each performance. The final score for each participant consisted of the mean of the scores given by the four raters. Ratings were blind.

To answer the research question for students' perceptions of the digital storytelling intervention, a questionnaire was utilized to check whether they liked or disliked the intervention. The researcher prepared the questionnaire based on the ideas of researchers like Kuforiji *et al.* (2011) and Price *et al.* (2015). The students were asked to circle a response on a 5-point scale from 'Strongly Agree' (5) to 'Strongly Disagree' (1) as an exploratory investigation designed to obtain descriptive information about the effectiveness of the DST intervention. The researcher was also interested in the level of critical reflection the participants demonstrated after the DST intervention experiences. Opportunities for open-ended responses were provided at the end of the questionnaire.

A follow-up oral interview was conducted to acquire in-depth information of students' perceptions towards using DST in learning to speak English. It took place after the students were given the post-test. 10 students were interviewed. The researcher purposively selected 10 students from the experimental group to be the interviewees. The criteria for selecting the interviewees were based on the students' speaking levels. The 10 students were thus selected on the basis of their English speaking levels (3-high, 4-medium and 3-low). Each interview lasted between 10 to 15 minutes and was audio-recorded. The data was then classified into positive and negative reactions.

In order to get in-depth data about students' learning time and other aspects about their learning to speak English out of class, participants in both control group and experimental group were asked to keep a diary. The diaries recorded all of their activities including time of day, length of time taken, place, materials (content), effectiveness, feelings, resources etc.

To avoid misunderstandings and confusion, the questionnaire was written in both English and Chinese. The index of item-objective congruence (IOC) developed by Rovinelli and Hambleton (1977) is a procedure used in test development for evaluating content validity at the item development stage. The validity and reliability of all instruments employed in the study including the tests, questionnaire and semi-structured interview were thus checked. The holistic rubric and analytic rubric of the tests were checked also. Five experts in English teaching were invited to validate the language and content

in all instruments in order to check the validity of all items. First, 5 experts were invited to rate each item of both the pretest and posttest paper. The experts rated the relevance of each item for the purpose of the test and the appropriateness of the content areas, and checked the evaluation form by using IOC as a validation method for the relevance of the content and the objective of the questionnaire. The evaluation form used a 3-point scale (1 = relevant, 0 = uncertain, -1 = irrelevant). The items of tests, questionnaire and semi-structured interviews were refined and improved until the results of the IOC analysis showed that they were valid to be adopted. Furthermore, in order to determine the reliability of each questionnaire, Cronbach's Alpha Coeffient (α) was used to check the internal consistency of the questionnaire items by analyzing the data from the trial version in the pilot study which were conducted with 20 participants from a similar class that were not supposed to participate in the main study. The Cronbach's alphas of the questionnaire was 0.882.

Procedures

DST is not just a simple slideshow of photos set to music as it is often mistakenly thought to be. On the contrary, it adds a new dimension to storytelling by interweaving digital stories using very interactive media (which may include digital audio, video, and images). In addition, the process of creating a digital story involves mastery of a wide range of technical and non-technical skills. This includes researching topics, writing scripts, storyboarding, and assembling the final product using video-editing software and other supporting tools to create the desired effects and sound (Ohler, 2006). For the present project, the students were asked to create three digital stories using Microsoft PhotoStory3 a piece software that can be accessed offline and requires only a low threshold level of ICT skills. PhotoStory 3 can be downloaded from: <http://www.microsoft.com/windowsxp/using/digitalphotography/photostory/default.mspx> .

PhotoStory3 needs Windows Media Player 10 or Windows Media Player 11 to be able to see the story created. Windows Media Player is also a free download from the internet. It can be found on: <http://www.microsoft.com/windows/windowsmedia/players.aspx>

Participants of the experimental group followed the procedures outlined below (Figure 1) to create digital stories during the 12-week experiment. **Stage 1** was undertaken over two weeks (week one to week two). In the first week of the first stage, a pretest was given to both experimental group and control groups. In the second week, the researchers introduced the experiment demonstrating their digital stories to the participants, training both the teacher and the students. **Stage 2** took four weeks (week 3 to 6) in which each participant had to finish writing three stories. While in the classroom, they

presented their stories orally gaining peer and teacher assessments to improve both the contents and speaking skills of the stories. **Stage 3** which took four weeks (weeks 7, 8, 9 and 10), involved participants recording and presenting their digital stories using Microsoft PhotoStory3, gaining reflections from peer and teacher assessments both in class and out of class. **Stage 4** was undertaken in week 11 and 12, which was the final stage. In week 11, the participants chose one of the three digital stories to present, one by one, for grading according to three forms of assessments, i.e., self-, peer, and teacher assessments. In the last week, a post test was given to both experimental group and control group.

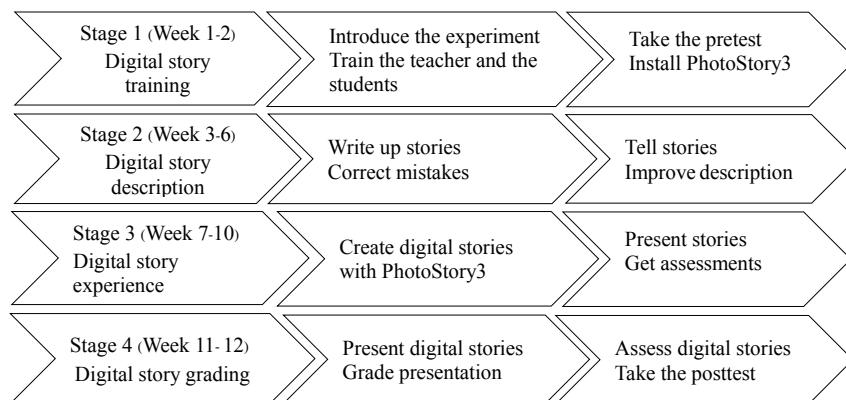


Figure 1 Description of the tasks and assessments involved in the project

Data analysis

Data obtained from the 12-week experiment on DST intervention, pretest and posttest, together with data from the written questionnaires were analyzed quantitatively, while data obtained from semi-structured interviews and students' diaries were analyzed qualitatively. In order to analyze the data taken from the scores of pre- and post- speaking tests of both experimental group and control group, independent sample t-tests were utilized. Paired samples t-tests were also utilized to compare the participants' mean scores on the pretest and posttest. The purpose was to see whether there were statistically significant differences in the mean scores between students' pretest and posttest scores, as a reflection of the DST procedure's impact on speaking skills. To examine the participants' reflections of DST intervention, the data collected from the questionnaire was analyzed using frequency statistics through SPSS. For such data, calculating the median of each item was suggested. The median (the number found exactly in the middle of the distribution) is a measure of central tendency which shows what the 'average' respondent might think, or the 'likeliest' response. Experts have demonstrated

that frequencies (percentages of responses in each category) should be used for analysis of Likert scale data rather than mean score, because descriptive statistics, such as means and standard deviations, have unclear meanings when applied to Likert scale responses and are usually not helpful or enlightening to readers (Sullivan & Artino, 2013). Content analysis was used to analyze the data from the semi-structured interview and students' diaries. The content analysis consisted of five steps as proposed by McCracken (1988). Each step in the process of analysis represents a higher level of generality. The first step was to read and review each participant transcript. In the second stage of analysis, observations were developed into preliminary descriptive and interpretive categories based on evidence present in the transcripts. The third stage of the analytic framework consisted of thorough examination of these preliminary codes in order to identify connections and develop pattern codes. The fourth stage of analysis involved a determination of basic themes by examining clusters of comments made by respondents and notes made by the researchers. The final stage examined themes from all participants across such groupings, to delineate predominant themes contained in the data.

Results

Four experienced assessors reviewed the recording and assessed the students' speaking skills using TEM4-Oral rating criteria (Liu, 2004). The assessors were not told about the subjects of experimental or control conditions so as to avoid their bias in assessing the students' performance. All recordings were numbered and randomly ordered. Assessors guided by the rubrics, assessed each piece of the recordings. They were not able to identify whom the recording belonged to, as the whole assessing procedure was blind. Each student was scored respectively on the categories of the assessment scale in order to get a clearer analysis of their performance. The average of the scores given by the four assessors was the final mark. To ensure reliable results, estimates of inter-rater reliability was calculated in the speaking tests by using Pearson's correlation coefficient (Table 2 and Table 3). Data in Table 2 and Table 3 indicate that there was a significant correlation between the score given by each rater for the participants in the pretest and posttest. In the pretest, the correlation between the scores of Rater 1 and Rater 2 was reported as .858, between Rater 1 and Rater 3 as .957, between Rater 1 and Rater 4 as .970, between Rater 2 and Rater 3 as .976, between Rater 2 and Rater 4 as .976, and between Rater 3 and Rater 4 as ..993. In the posttest, the correlation between the scores of Rater 1 and Rater 2 was reported as .988, between Rater 1 and Rater 3 as .979, between Rater 1 and Rater 4 as .983, between Rater 2 and Rater 3 as .977, between Rater 2 and Rater 4 as .983, and between Rater 3 and Rater 4 as .984.

Table 2. Correlations between inter-rater's scores of pretest

	Correlations					
	R1&R2	R1 & R3	R1 & R4	R2 & R3	R2 & R4	R3 & R 4
Pearson Correlation	.905**	.957**	.970**	.976**	.976**	.993**
Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
N	100	100	100	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed). R = Rater

Table 3. Correlations between inter-rater's scores of posttest

	Correlations					
	R1&R2	R1 & R3	R1 & R4	R2 & R3	R2 & R4	R3 & R 4
Pearson Correlation	.988**	.979**	.983**	.977**	.983**	.984**
Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
N	100	100	100	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed). R = Rater

Pretest results

The pretest was administered at the beginning of the experiment to estimate the students' speaking ability in both experimental and control groups. All the tests were recorded and renumbered for rating purposes and especially, to maintain anonymity. The findings of the pretest were used to set a baseline for comparison and to help interpret the findings, particularly if any improvements or differences were discerned at the end of the experiment.

A descriptive analysis based on total scores was employed to provide an overview of the participants' speaking performances. The significance level of all tests was set at 0.05. Table 4 below shows the mean of the total scores on the pretest together with the standard deviation.

Table 4. Descriptive statistics of total scores in the pretest

	CG and EG	N	Mean	Std. D	p-value
Pretest total score	Control Group	50	86.30	3.991	.084
	Experimental Group	50	84.96	3.675	

To compare the means of the two groups, a two-tailed *t-test* was employed. The mean score of the experimental group was not significantly different from that of the control group ($p = .084$). Specifically, the control group and the experimental group were at a similar level statistically.

Posttest results

The posttest was administered when the DST intervention had been completed. The assessment procedures were the same as those employed for the pretest. Descriptive analysis based on total scores was employed to provide an overview of the participants' speaking performances as groups in the pretest and the posttest (see Table 5). It was obvious that the experimental group improved much more than the control group. In the experimental group, the mean changed from 84.96 to 89.60, an increase of 4.6 (5.5%). In the control group, the mean changed from 86.30 to 86.70, an increase of 0.4 (0.5%). All students in the experimental group improved in the posttest while some students in the control group even went backward.

Table 5. Descriptive statistics of total scores in the pre- and posttest

Group	Tests	Mean	N	Std. D	P-value	Cohen's D
Experimental Group	Pretest	84.96	50	3.675	.000	1.58
	Posttest	89.60	50	4.160		
Control Group	Pretest	86.30	50	3.991	.056	
	Posttest	86.70	50	4.205		

There was a significant difference between the posttest means of the experimental group and the control group, and the effect size is large ($p = 0.001$, $d = .658$) as seen in Table 6. Specifically, the experimental group performed significantly better than the control group after the DST intervention. This result indicated that the two groups were at different level after the intervention in terms of English speaking performance.

Table 6. Effect size values between control and experimental groups in the posttest

	CG and EG	N	Mean	Std. D	p-value	Cohen's D
Posttest total score	Control Group	50	86.70	4.205	.001	.658
	Experimental Group	50	89.60	4.160		

With regard to the improvement of each group, paired-sample t-tests were used to perform the comparison of the pretest and posttest, in order to verify the potential effects of the DST intervention on the EFL learners. This statistical analysis compared the means of two variables – the pretest and the posttest – for each group. Statistical analysis showed that there was a significant difference between the

pretest and posttest means in the experimental group ($p = 0.000$) with a large effect size ($d = 1.58$) as seen in Table 5, but that there was no significant difference between the pretest and the posttest in the control group ($p = 0.056$). It is worth noting that all students in the experimental group improved their performances in the posttest while students in the control group were not stable in their performance. Some students in the control group went backward in the posttest or, to put it another way, following the traditional regime, students did not always result in improved performance.

Students' reflections on the DST intervention

The quantitative data elicited through the questionnaire on the value of the DST intervention revealed the following results. Among the 50 students in the experimental group, eighty-two percent (82%, N=41) of the respondents indicated that digital storytelling allowed them to improve their technical skills, while sixty-two percent (62%, N=31) indicated that digital storytelling improved their ability to apply knowledge to practice. Fifty-eight (58%, N=29) believed that digital storytelling improved their writing skills, and fifty-six percent (56%, N=28) agreed that digital storytelling provided them with new insights. Fifty percent (50%, N=25) pointed out that digital storytelling allowed them to improve their presentation skills. Only twenty-four percent (24%, N=22) stated that digital storytelling allowed them to develop their critical thinking and twenty-two percent (22%, N=11) agreed that digital storytelling could help to improve their deep learning (see Table 7 and Table 8).

Among the open-ended responses, one respondent indicated that using DST was much fun. Another respondent implied that using DST to improve speaking skills was a wonderful idea because it exposed both teachers and students to new methods of making learning enjoyable. Some respondents claimed that they were so excited to use the PhotoStory program. They loved working on the computer. While working, they collaborated with one another and learned how to compromise with others' opinions.

However, one respondent complained and felt overwhelmed that DST was a time-consuming process.

Table 7. Median of students' reflections of DST intervention

Perceptions	N	Median (/5)
Technical skills	50	4
Ability to apply knowledge to practice	50	4
Writing skills	50	4
New insights	50	4
Presentation skills	50	4
Critical thinking	50	2
Deep learning	50	2
Valid N (listwise)	50	

Table 8. Percentage of students' reflections on DST intervention

Perceptions	Disagreement		Agreement	
	N	%	N	%
Technical skills	7	14	41	82
Ability to apply knowledge to practice	16	32	31	62
Writing skills	18	36	29	58
New insights	18	36	28	56
Presentation skills	19	38	25	50
Critical thinking	35	70	22	24
Deep learning	36	72	11	22

Legend: N=Number of responses, %=Responses in percentage

Data from the semi-structured interview

Findings from the interviews supported the abovementioned quantitative findings. One student explicitly stated that DST contributed towards his improvement in writing skills whereas others described how digital storytelling helped in their new insights and presentation skills. Some students found the experience of creating their DST fun and enjoyable. In addition, some students described the project as encouraging them to apply English into real-life practices. It is worth noting that one student claimed that digital storytelling was not just a tool for them to tell other people things about ourselves, but also to tell us who actually we are. Most of the interviewees claimed that DST intervention could improve their learner autonomy and thus improve their language skills. A further question of why this would be so was asked. They said that they could apply this approach when they practiced alone. However, two interviewees who demonstrated lower abilities in EFL complained that DST was a time-consuming process.

Student diaries

All 50 students in the experimental group submitted the notebooks in which they had written their diaries after the experiment. Information from the diaries were grouped, coded, and categorized and reported as results. According to the students' diaries, the time they spent practicing English speaking both in and outside class was around 8.5 hours a week. Their study time varied from early morning to late at night. Most of them tended to practice speaking in the early morning which was popularly called "morning reading on the campus". More detailed information in terms of study time revealed that English speaking learning activities were carried out much more often than before. Many students had developed the habit of going to bed late and rising early, something that they had never done before. Because the DST project was always lingering around in their minds, they could not stop thinking about new ideas for digital story making. One student mentioned her experience of talking to herself while waiting in line for a ride or when in the canteen. More interestingly, not a few of them said that they had dreamed of reciting their digital stories. Regarding their feelings for the DST intervention, 95% of students used the words "new", "challenging", "amazing", "different", and "happy" to describe their feelings while preparing, creating and presenting their DST for practicing English speaking.

50 notebooks were also collected in the control group. The length of time spent practicing English speaking reported both in class and outside class in the control group, was about 8.8 hours per week. That is, both the experimental group and the control group spent almost the same number of hours learning to speak English. As in the case of the students in the control group, their study time varied from early morning to late at night. However, their study places seemed to be limited to the classroom, the dormitory and the English corners on the campus while the students in the experimental group could choose to practice their speaking anywhere, anytime, anyhow and they depended more on the computers. Moreover, the content of the speaking exercises in the control group were limited to what they found in their speaking textbook and the training exercises prepared by their teacher. The feelings of the students in the control group could, in general, be summarized, in their own words as "boring", "cliché-ridden", "stereotyped", and "drowsy". Thus, while time on task was not an issue as both groups gave the same amount of time to their English learning, students in the DST group accessed and produced more variety in their texts.

Discussion

The results of the data analysis indicated that the two groups were at a similar level before the DST intervention in terms of English speaking performance. This finding was not surprising as

the control and the experimental groups came from two intact classes according to their scores on the university entrance examination. This finding was also consistent with their speaking test in the previous semester. However, the experimental group improved significantly in the posttest while the control group did not. A possible explanation may be that the DST approach motivated students to speak English and thus guaranteed the improvement and benefited everyone. But, not everybody could benefit from the traditional approach. The data gained from the semi-structured interview and the students' diaries revealed that students were interested in the DST intervention and motivated to practice speaking English. The key information is that they agreed to have improve in English speaking ability. These findings indicated that the DST intervention was effective in English speaking. This outcome was consistent with that of Robin (2007) which indicated that one of the most powerful tools in multimedia is DST. The findings in this study also supported Alismail (2015) who argued that DST is one of the multimedia tools that can support teaching and learning as well as students' motivation.

The results of data analyzed from the questionnaire on students' reflections on the DST intervention indicated that the DST intervention enabled them to improve their technical skills, provided new insights, developed the ability to apply knowledge to practice, as well as their presentation and writing skills. The results also indicated that using DST was fun and students enjoyed collaborating with one another and learning how to compromise with others' opinions. Some students emphasized that DST exposed both teachers and students to new methods of making learning enjoyable.

Findings from the interviews resonated with the findings from the questionnaire which indicated that the project encouraged them to apply English into real-life practice. It is worth noting that the students became more confident in speaking through the DST intervention. This finding is in accordance with Fauzan (2016) who found in his study that the students would not talk if they did not have any self-confidence because confidence was a pivotal aspect in learning speaking. In addition, it was reported that students became more co-operative in accomplishing their DST projects. The finding also is consistent with that of Kleanthous and Cardoso (2016) which reveals that cooperative learning and peer support can encourage students not only to clarify themselves but also to contribute more to the discussion. These findings supported earlier studies which showed that DST can guide students towards meaningful learning (Gillies, 2004; Barrett, 2006; Robin, 2007). The findings also revealed that even quiet students seemed to be more active and confident to speak English. This supported the findings of Bull and Kadjer (2005) and Sylvester and Greenidge (2009) which showed that DST can create a fun and enjoyable learning environment that is both motivating and non-threatening. It was possible to conclude that the DST intervention contributed to students' development of language

skills especially in speaking and gave them opportunities to practice English in authentic situations. However, it is worth noting that it was also reported that some students disliked DST, because it was a time-consuming process. This supported the findings of Christiansen & Koelzer (2016) which claimed that DST had many benefits for the students' language learning progress, but it also had its limitations.

Conclusions

The present study was conducted to investigate the effects of a DST intervention on Chinese intermediate level university EFL students' ability to speak English and to identify their perceptions of this approach. The study employed a mixed methods design. A quantitative framework was used to assess the students' speaking performances at the beginning and at the end of the pedagogical intervention. A qualitative framework was used to explore the students' perceptions of DST intervention through the use of a semi-structured interview and the analysis of information from student diaries. There was a significant difference in speaking improvement between the experimental and control groups. Students in the experimental group learned to speak more effectively than those in the control group. Data from the semi-structured interview and student diaries supported the findings gained from the quantitative data. Students found the experience of creating their DST fun and enjoyable. The students also claimed that the DST intervention could improve learner autonomy. They were motivated to speak in autonomous activities. Speaking was a direct consequence of autonomy. Mastery of digital skills is thus crucial for both teachers and students of EFL in the 21st century which views these skills as a necessity. The present study thus has some significant points as follows:

First, the study may provide an example of technology-enhanced student-centered learning as a way of improving EFL learners' speaking skills.

Second, this research may present a clear picture of issues involved in integrating DST into the university environment and its significant benefits in terms of learner autonomy improvement and even lifelong learning.

Third, the planning concept can be applied to designing other language courses or curricula in other EFL instructional contexts.

Fourth, the design of the study may stimulate both instructors and learners to reflect on how learning actually occurs.

Finally, the findings can provide key guidelines for further research and studies in the implementation of a project-based learning approach in EFL instruction, courses or curriculum design that use digital technology. In this case, the findings of the study may have pedagogical implications

for speaking and for other skills in language learning, even in education more generally, both in China and other parts of the world.

Although this study yielded many promising and, in some cases, surprising insights and perspectives into the improvement of English speaking and other language-learning phenomena, some limitations should be addressed. First, the findings were from an experiment on a tertiary school English speaking course; therefore, it could be difficult to generalize the findings to other courses or subjects. Second, the participants in this study were 100 second-year undergraduate English majors in Qiannan Normal University for Nationalities, China, who were intermediate EFL learners. Students from other majors and other levels were not included in this study. Thus the findings of this study should be treated with caution in relation to generalizations.

Hopefully the findings of this study will help to create the necessary awareness in the educational sector in China and help to initiate change in educational reform, resulting in the creation of a new type of classroom, a classroom where the students will not only acquire language skills but also other skills desirable for life in the 21st century.

Acknowledgements

The authors were very much appreciated for the valuable suggestions and comments provided by two anonymous reviewers.

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