

A Practical Research on the Flipped Classroom and Teaching Process Reengineering via Smart Learning

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Abstract—This paper studied how to apply the flipped classroom and reengineer the teaching process to improve the teaching effectiveness through smart learning model in higher vocational schools. An information-centered teaching process was designed for the course content “In-flight Safety Announcements” for flight attendant students. The template provided enables faculty to design before, during, and after class activities and assessments based on objectives using all levels of Bloom’s extended digital taxonomy. The research shows that reengineered teaching process, which focuses on learner-centered instruction, could effectively enhance student engagement both in and out of class as well as help language teachers develop strategies and skills for the second language learning and teaching with the aid of information technology.

Keywords—*flipped classroom; teaching process reengineering; smart learning; higher education*

I. INTRODUCTION

In this information era, Internet-based technologies are becoming widely used in education and the contexts for and forms of teaching and learning English for ESL learners have been greatly changed. According to China’s Education Informatization 2.0 Action Plan, proposed by the Ministry of Education in 2018, smart education should be upgraded and a smart learning supporting environment should be constructed to enable pervasive, flexible and intelligent teaching and learning for educators and students. And enhancing the efficiency and effectiveness of knowledge transfer, competency development and quality improvement has been set as the focus [1].

China’s civil aviation strategy demands a higher level of professionalism as well as comprehensively stronger skill sets for those engaged in the Chinese civil aviation industry, giving it a new lease of life. The highly visible role performed by flight attendants means that they represent their airline, the entire civil aviation industry and also the nation. This paper attempts to investigate an oral English class for flight attendant majors and see how they utilize information-centered learning to improve their own language skills and professional department with the teaching mode of flipped classroom, and how the teaching process reengineering is achieved through four different perspectives: teaching analysis, course design,

the learning process and then a conclusion.

II. TEACHING ANALYSIS

A. Teaching Content

The teaching content for this ninety minute long class is taken from the safety announcement segment of Chapter 13, Onboard Service, of the vocational oral English textbook “*Essential Oral English for Civil Aviation*”. Supplementary, related content from the *New Course of Civil Aviation English* is also used.

B. Learning Analysis

The students on this course are second year flight attendant majors. Although these students have already acquired a certain degree of professional knowledge, the high level of language proficiency required for in-flight announcements, an important component of the role can prove to be rather challenging. Airline recruitment standards demand a certain level of language proficiency, yet information-centered learning is an effective educational tool that can raise student engagement and improve learning outcomes for the new generation of young people who have grown up immersed in a world of mobile phones and the Internet.

C. Teaching Goals

The teaching content, based on industry standards and professional talent training programmer, meets three teaching goals: knowledge and skills acquisition, and character development.

D. Teaching Focus and Obstacles

The goal of this class is for students to reach proficiency in a large component of the in-flight announcement text: vocabulary and sentence structures pertaining to in-flight safety announcements. The challenge is to improve student real-world communication skills and also resolve problems that arise in the work environment from their language ability.

III. COURSE DESIGN

Commonplace online, teaching and support platforms, along with mobile devices are utilized to establish a smart learning environment. Diversified, smart teaching materials provide the teacher and students with a teaching and learning system grounded in modern technology.

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Based on the smart classroom teaching model, the teaching process for this class is divided into three segments: before class, during class, and after class [2]. Each segment helps strengthen the skills of both the teacher and students. Pre-class consists of a questionnaire, the results of which are then analyzed to set students and assign them tasks for completion during independent study. The teacher monitors their progress online and responds to queries, the students assess each other online, and the platform displays the students' study progress in real time and provides feedback data. The teacher utilizes this pre-class preparation to adjust and determine the focus and difficulties of a class. The multiple screens in the classroom allow industry professionals to view live broadcasts and join in class activity appraisals. Communication between both the teacher and students and between students themselves is constant, and the wide range of activities is highly targeted on

learning outcomes and problem resolution. The post-class segment consists of the sharing of professional critiques, opinions, and completed projects, as well as the completion of assignments, homework, group work, and online foreign teacher assistance. The flipped classroom strategy is fully applied in the whole process of learning, stretching students' learning time and space to a great extent, and the interlinked pre-class, in-class, and post-class learning activities, as shown in TABLE I, are student-centered, task-orientated, and based on industry standards to ensure the teaching goals to be achieved by equipping the students with a vital combination of the theoretical with the practical [3][4]. The features of the nature of the learning design can be described as being transmissive, dialogic and constructive, considering how each element contributes to the adaptation of theory into practice in a thoughtful way. [5]

TABLE I. THE WHOLE PROCESS OF LEARNING ACTIVITIES

Task No.	Pre-class Learning	In-class Learning		After-class Learning	
		Period I	Period II	Period I	Period II
1	Questionnaire	Assessing and summarizing	Vocabulary review	Recording	Reviewing role-play performance
2	Video learning	Reading aloud and imitating	Sentence pattern review	Learning the micro-class video	Modifying and filming dialogues for upload to the platform
3	Film learning	Words race	Dubbing competition		Commenting on other classmates' films
4	Film making		Role play		
5	Listening and repeating				

IV. LEARNING PROCESS

The implementation process, based on the concept of teaching process reengineering derived from Business Process Reengineering [6], demonstrates the application of smart classroom teaching model featuring with being task-driven, student-oriented and IT-centered.

A. Study Before the Class

1) *Questionnaires & study progress*: The teacher distributed a pre-class questionnaire to students' mobile devices to ascertain their grasp of cabin safety announcement vocabulary, as well as difficulties that students might encounter during self-study.

2) *Assignments & independent study*: The teacher assigned teaching resources and tasks one week in advance, also uploaded key vocabulary and cabin safety announcement videos featuring bilingual subtitles in both English and Chinese to the platform so that students can prepare for class. The key vocabulary videos included a mini micro-class video, 2-minute long, explaining the use of two key words in safety announcement: buckle and fasten (see TABLE II), a key vocabulary short film and a short film featuring a word bank with common pronunciation errors made by the students (TABLE III).

The video control bar of the pre-class video learning materials prohibited skipping, assisting supervision. In addition, the teacher compiled a body of test questions pertaining to the

assigned learning materials, which were then randomly selected for students to answer once the video had finished. The platform recorded student online study progress in details, allowing the teacher to assess each individual student's progress. Then, based on the questionnaire results and language ability, the entire class was then divided into four groups. Each group gathered different kinds of cabin announcement vocabulary, which they used to make a PowerPoint presentation and also recorded a short film. This recording was subsequently uploaded to the learning platform. Everyone in the class shared their work, and all were free to comment anonymously online. In addition, the teacher invited two native English speakers, language teachers, one from the UK and the other from the USA, and one American aviation expert to record a standard version of the announcements based on the content of the students' short films for upload to the platform, which the students then utilized to compare and contrast with their own efforts.

TABLE II. EXERCISE IN BUCKLE & FASTEN MINI MICRO-CLASS

Key Word	Sample Sentence		Alert (in Emergency)
buckle	Plane passengers are constantly being asked to <u>buckle</u> up their seatbelts.	To <u>fasten</u> the seatbelt, insert the metal tip into the <u>buckle</u> and adjust the strap.	Buckle up!
fasten	The plane is taking off. Please <u>fasten</u> your seatbelt. Please remain seated with your seatbelt securely <u>fastened</u> anytime the seatbelt sign is on.		Fasten your seatbelt!

TABLE III. WORD BANK WITH COMMON PRONUNCIATION ERRORS

Item	Word Bank
Cabin equipment	seatbelt, armrest, aisle, window shade, rear, exit, lavatory
Other	fasten, buckle, suspend, switch off, demonstrate (demonstration), emergency (emergent), evacuation (evacuate), turbulence

B. Activities During the Class

The following illustrates how several of the class segments help realize the teaching goals.

1) *Commenting on projects & key point focus:* During the class (Period I), the teacher assessed the pre-class student created short films, and summarized the four types of common

safety announcement vocabulary and sentences, such as ‘The use of mobile phones and other portable electronic devices is strictly prohibited. Please keep your seatbelts securely fastened when seated.’ Different kinds of classroom activities were conducted through mobile teaching model to consolidate the key point focus, as shown in TABLE IV, which greatly generated students’ interest and involvement in class [7].

TABLE IV. CLASSROOM ACTIVITIES BASED ON THE MOBILE TEACHING MODEL

Item	Exercise
Questionnaire	Dos and Don'ts in an emergency landing: 1. Dos in an emergency landing: _____ A) Fasten your seatbelt. B) Return your seat back to the upright position. C) Stow your tray table. D) Open the window shades. (Key: ABCD) 2. Don'ts in an emergency landing: _____ A) Walk around in the cabin. B) Inflate your life vest in the cabin. C) Take your baggage with you during evacuation. D) Follow the instructions of the cabin crew. (Key: ABC)
Vote	1. Passengers can never move emergency equipment by themselves. (✓) 2. Smoking is prohibited during the whole flight. (✓) □ 3. You can send messages to your friends via WeChat during take-offs. (×) 4. You can inflate your life vest in the cabin. (×) 5. You should take your baggage with you during evacuation. (×)
Theme discussion	Translate the following sentence from English to Chinese: We will be showing the safety video and would like the next few minutes of your complete attention.
Quiz	Answer these questions after watching Emirates' safety video. 1. Passengers should buckle their seatbelts during takeoff and landing. (✓) 2. Laptops should be placed in carry-ons or under the seat. (✓) 3. Electronic devices can be used during takeoff, taxiing and landing. (×) 4. Smoking is allowed on the aircraft. (×) 5. You can inflate your lifejacket when you are sitting on your seat. (×) 6. When there is an emergency, lights at floor level would direct you to the doors. (✓)
Online game	QR code cabin word game: 

2) *Individualized guidance & consolidating progress:* An accurate grasp of pronunciation and intonation is vital in ensuring that students can accurately and fluently narrate the cabin announcements. The teacher first pointed out

commonplace pronunciation errors, before directing students to correct their own pronunciation errors with the help of the platform study software. Later, a pronunciation contest created

a fun, competitive online and offline environment, and helped to consolidate student progress.

The teacher then invited students to use English dubbing software to imitate the announcement video viewed during pre-class self-study. This task helped raise pronunciation and intonation accuracy, before organizing them to hold an in-class dubbing competition. A live commenting function allowed students to participate online whilst watching the competition.

When the first class ended, each group then practiced the safety announcements recorded by two foreign teachers and one American aviation expert. The team members who performed best then recorded an audio file for upload to the online forum, which was then commented upon by the entire class. The teacher selected the best work from the four groups, which was later used for subsequent class activities, helping to create an environment conducive to language acquisition.

3) *Situational practice & language acquisition:* Such language skill training provides students with a practical tool: effective communication skills. The teacher created a good study environment for the students by seamlessly combining oral classes with practical classes. Period II was devoted to cabin environment simulations. Students paired up for a role play, the theme of which was how, as a flight attendant, to provide the best passenger service based on the announcement content, how to guide passenger behavior, or answer their queries. This activity not only exercised student language ability in a practical environment but also served as excellent practice for their professional demeanor and service attitude. The teacher invited several groups of students to perform live

broadcasts, whilst students watching used their mobile devices either to send normal or live comments to display in the broadcast. In addition, industry tutors supervised student performances online, before giving an online assessment, providing students with comprehensive performance appraisals.

C. Development After the Class

After Period I, the teacher assigned the students to read after the safety announcements recorded by the foreign teachers or experts, work in groups to make in-flight announcement records, and upload them to the platform. Besides, students were required to study a micro-class video online, presenting a five-step strategy for students for solid study: pronounce words correctly, remember words and sentence patterns smartly, know British and American English better, add your emotions to announcements (see TABLE V, TABLE VI) , practice in a cabin environment.

To provide students with a strong and comprehensive grasp of a variety of different safety announcements and practical language usage situations, the teacher set a post-class group work topic after Period II. Students were asked to utilize a wide range of the platform’s learning resources. They reviewed each group’s role play performance as well as professional critiques, and complete the topic safety announcement situation role play. This was then filmed and uploaded. Once each small group’s work had been uploaded, they then commented on each other’s performance. The teacher and an invited foreign teacher also provided input. Each group then utilized this feedback to modify their work, before uploading to the database, so that it served as a learning resource for their fellow students.

TABLE V. EMBEDDING EMOTIONS IN SAFETY ANNOUNCEMENTS

Type of Announcement	Tone and Intonation	Sample Sentence
Safety Demonstration	clear, slow, quiet	In the unlikely event of an evacuation, please follow the emergency indication lights to the nearest exit, and do not carry any hand luggage with you.
Emergency Landing	calm, assertive, confident	The crew has been well-trained to handle this type of situation and will ensure your safety.

TABLE VI. SAFE IN MAKING SAFETY ANNOUNCEMENTS

Element	Synthesis
<u>S</u> tandard	SAFE!
<u>A</u> ccuracy	
<u>F</u> luency	
<u>E</u> mpathy	

V. CONCLUSION

In this information-centered course, teachers are not just mere repositories of knowledge, but serve as the designers, facilitators and guides of student learning activities. This creates a mutually reciprocal exchange of the practical and theoretical between both the teacher and students. The integration of rich multimedia resources, information-centered learning platform and mobile devices, along with the comprehensive assessment system, frees the teacher and students from the constraints imposed by the traditional classroom, and provides more study methods, stimulating

student knowledge acquisition. As such, this reengineered teaching has the following advantages [2]:

A. Smart, Targeted Resources

Information-centered classes improve learning outcomes via personalized, targeted promotion of learning materials. This both consolidates student strengths and boosts weaknesses.

B. Objective, Data Orientated Teaching Strategy

The teacher can utilize the data at their fingertips to accurately assess learning progress; meaning that the teaching focus shifts from reliance on teacher proficiency to one that is data centered. This is actuated via the IT platform, and based on the collection and analysis of dynamic study data, allowing the collation of student learning efficiency data throughout the entire learning process.

C. Interaction & Communication

Smart classroom teaching methods lead to more stimulating teaching, communication and interaction, and result in highly informative communication between the teacher and students, and between classmates.

D. Individualized & Diversified Study

Student usage of the Internet, the smart learning platform and mobile devices to complete assigned tasks, means they can learn where they want, how they want, and when they want. Each student can choose the learning method which best suits him or her. After the class, the teacher is free to provide each student with individual guidance, catering to his or her current attainment level. Such dynamic assessments and feedback bring just in time production methods to the education sphere.

E. Dynamic & Instant Assessments

Assessments are based on objectives using all levels of Bloom’s extended digital taxonomy, as presented in Fig. 1. The assessment system utilizes mobile devices and the IT platform, to achieve the real time monitoring and objective, dynamic recording of student study progress. This includes the length of study, study records, engagement levels, assignment and test status. It handles and provides feedback on all obstacles encountered, as well as their ideas and suggestions that come up during learning. It is a comprehensive learning appraisal system.

Such new tools provide teachers with countless opportunities to stretch students both in and out of the classroom. It makes the complicated simple, helping both teacher and students to develop their skills.



Fig. 1. Bloom’s digital taxonomy in in-flight safety announcements

However, it is obvious that more action plans should be made to further optimize the teaching process to ensure better construction of “golden courses”, which refer to those courses with basic characteristics of active interactions and communication between teachers and students, process-focused and student-oriented sustainable improvement, including designing in-and-out-of-class activities for students to cater to their existing attainment and language levels and a strict but flexible assessment system to secure the students’ combination of the theoretical with the practical [8]. And a real smart learning supporting environment is a must for facilitating the cultivation of highly skilled talents under the context of Internet+ education.

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