

Impact of Using a Smart Online Teaching Tool “Rain Classroom” on Sophomores’ Class

Engagement in an Intercultural Communication Course

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Abstract: This study investigates the impact of Rain Classroom, a smart online teaching tool, on sophomores' engagement in an Intercultural Communication Course (ICC) in China. Using a quantitative embedded quasi-experimental design, the research involved 131 students learning with Rain Classroom and 112 in traditional settings in four weeks. The experimental group utilized the Presentation-Assimilation-Discussion (PAD) teaching model. Pre- and post-tests, analyzed through ANCOVA, revealed that the experimental group exhibited significantly higher cognitive engagement ($F = 6.34, p < 0.05; \eta^2 = 0.03$) compared to the control group. The result suggests that the platform may enhance self-regulated learning and deep learning strategies. However, no significant differences were found in emotional or behavioral engagement between the groups, indicating a need for further research in these areas.

Keywords: Rain Classroom, Presentation-Assimilation-Discussion (PAD) Model, Intercultural Communication Course (ICC), Class engagement

1. Introduction

The 21st century has put forward new requirements for the teaching and learning of teachers and students, and the importance of educational technology is also clearly indicated in PISA (Petko et al., 2017). UNESCO stresses that the twenty-first-century revolution focuses on the use of educational technology to facilitate the uptake of knowledge by students and their collaborative knowledge-building (Chai et al., 2015). The deep integration of science, technology, and education is one of the future development directions of education. In light of the proliferation of mobile internet and big data, Tsinghua University has introduced a new smart teaching tool called Rain Classroom (Da-Hong et al., 2020). Though this platform is important and widely used, related research is still limited, especially those about students' engagement, reflecting the need for this research. The PAD classroom teaching model is a new teaching model proposed by Prof. Zhang of Fudan University in 2014 (Lv et al., 2024), and it promotes student engagement as an essential aspect that contributes to accomplishing educational goals. Therefore, the following research question is posed in this study: Does Rain Classroom with PAD mode impact sophomores' class engagement in the Intercultural Communication Course?

2. Literature Review

2.1. Class Engagement

Engaging students in the classroom is essential for effective teaching and learning. Educators can employ various strategies to create a dynamic and interactive learning environment. One key approach is the use of active learning techniques. Fostering collaboration and interaction is another important aspect of class engagement. Offering opportunities for students to make decisions, such as selecting project topics or presentation formats, can foster a sense of ownership and investment in the learning process. Constructive feedback, ongoing support, and a positive learning environment that encourages risk-taking and celebrates student achievements which can further contribute to a more

engaging and enriching classroom experience. Most of the previous studies on classroom engagement were based on classroom organization forms, teachers' teaching methods, or students' learning strategies, and were rarely considered from the perspective of a teaching platform (Kong, 2021; Elmaadaway, 2018). This study is conducted through the Rain Classroom, which echoes the research significance of the relationship between classroom engagement and teaching platforms.

2.2. Intercultural Communication Course

Central to ICC is the understanding of how culture shapes communication styles, perceptions, and behaviors. Students will study cultural dimensions, such as Hofstede's framework and Hall's concept of high-context and low-context cultures, to analyze their impact on verbal and nonverbal communication (Yu et al., 2019). The course addresses the effects of cultural biases and stereotypes on interactions and explores conflict resolution and negotiation techniques in cross-cultural settings.

Additionally, contemporary issues such as globalization, technology, diversity, and ethical considerations in intercultural interactions are discussed. Through lectures, case studies, and experiential activities, students can cultivate a comprehensive understanding of intercultural communication, fostering an appreciation for cultural diversity and enhancing their ability to communicate effectively across cultural boundaries. The nature of ICC requires students' active participation in class, which is also the reason for choosing this course for research.

3. Theoretical Framework: Presentation-Assimilation-Discussion (PAD) Mode

The Presentation-Assimilation-Discussion (PAD) instructional strategy is a structured approach to facilitating effective learning in educational settings (Yu et al., 2019). This three-phase method aims to engage students actively throughout the learning process. By following this three-step process shown, educators can effectively introduce new content, provide opportunities for students to process and apply the information, and engage them in meaningful discussions to solidify their understanding. PAD mode is combined with pre-class preparation and after-class review to form five phases shown in Figure 1. The combination of PAD mode and Rain Class undoubtedly makes the course design in Rain Classroom more orderly, so that teachers can be more confident when using the platform to teach. In this study, Rain Classroom in PAD mode was used as an intervention, as shown in Figure 1.

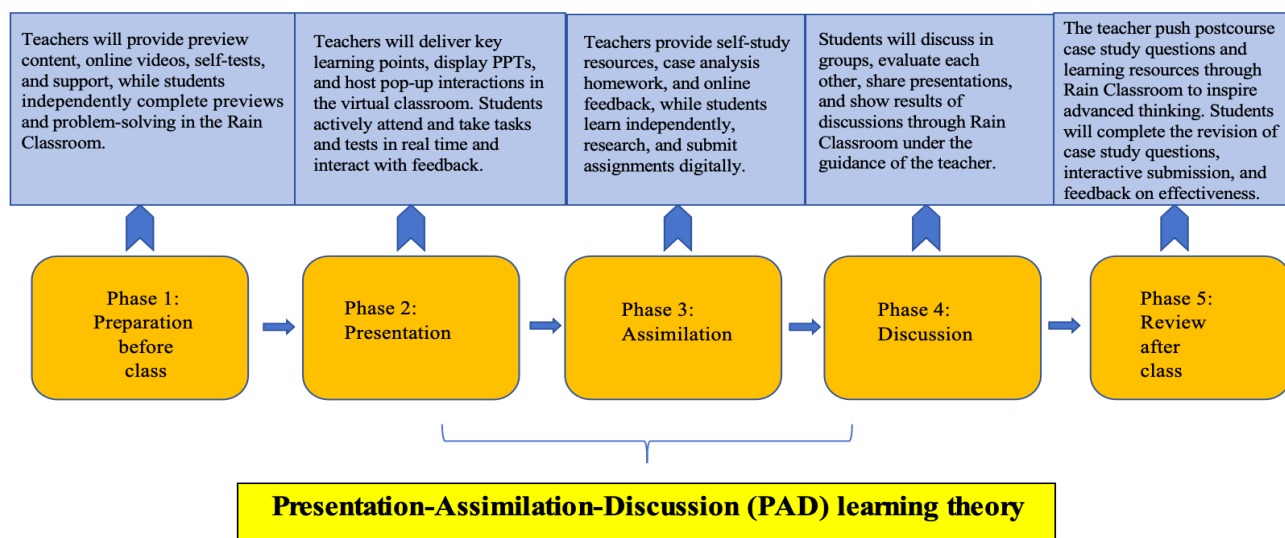


Fig.1 Processes of intervention

4. Research Design, Data Collection and Analysis

This research employed a quasi-experimental design with pretest and posttest measures, involving 243 second-year undergraduate students from a university in Guangdong, China. Students with similar English academic performance were divided into an experimental group (n=131) and a control group (n=112). Over four weeks, both groups attended

90-minute English classes given by the same teacher. While the control group followed a traditional format using paper-based assignments, the experimental group utilized the PAD model through an online platform for in-class and out-of-class learning.

Pretests and posttests used the class engagement measure (Muir et al., 2022), which has three dimensions: cognitive engagement, emotional engagement, and behavioral engagement. Quantitative data were analyzed using IBM SPSS 29.0. Cronbach's alpha assessed the internal consistency of the Class Engagement Scale based on pretest data. Descriptive analysis and ANCOVA were conducted on pretest and posttest data to evaluate overall student engagement in both the experimental and control groups. Pretest scores were considered as potential confounding factors impacting posttest outcomes. ANCOVA adjusted for these variables, maintaining a 0.95 confidence interval. The dependent variables included total class involvement and its facets, while the independent variable was group assignment. Levene's test verified variance homogeneity between the groups before analysis.

5.Results and Findings

The Cronbach's alphas for all dimensions exceeded 0.7 ($\alpha_{CE} = 0.963$, $\alpha_{EE} = 0.973$, $\alpha_{BE} = 0.955$), indicating strong reliability and internal consistency of the scale. An independent samples T-test ($p=0.09$) showed no significant difference in pretest scores between the experimental and control groups before the intervention. Descriptive analysis in Table 1 illustrates a slight improvement in class engagement scores, with the experimental group performing better on average. Levene's test confirmed variance homogeneity across all dimensions (overall engagement: $F=2.107$, $p > 0.05$; cognitive: $F=0.870$, $p > 0.05$; emotional: $F=1.205$, $p > 0.05$; behavioral: $F=1.059$, $p > 0.05$). ANCOVA was conducted to assess differences in posttest scores, revealing significant differences in cognitive engagement ($F = 6.344$, $p < .005$; $\eta^2 = .026$). This suggests that Rain Classroom with PAD mode enhanced cognitive engagement, motivating students in ICC. However, the intervention did not significantly impact emotional or behavioral engagement dimensions.

Table 1. Descriptive Statistics and ANCOVA Results of Class Engagement

Dimension	Pretests		Posttest		ANCOVA		
	Mean	SD	Mean	SD	F	P	η^2
Experimental: Control							
Overall Engagement	4.123: 3.969	0.689: 0.720	4.253: 4.087	0.663: 0.631	3.636	0.058	0.015
Cognitive Engagement	4.003: 3.859	0.764: 0.799	4.163: 3.915	0.725: 0.734	6.344	< 0.05	0.026
Emotional Engagement	4.139: 3.984	0.720: 0.746	4.274: 4.132	0.669: 0.639	2.516	0.114	0.010
Behavioral Engagement	4.212: 4.041	0.684: 0.746	4.303: 4.172	0.666: 0.666	1.817	0.179	0.008

6.Discussion and Conclusion

This study was a pretest-posttest quasi-experimental design to investigate the impact of Rain Classroom, a smart online teaching tool, on class engagement in ICC. To answer the research question, the results show that the use of Rain Classroom with PAD has a certain effect on the participation of English majors in ICC, especially at the level of cognitive engagement, but there is no significant difference in other aspects. Teaching practice helps teachers realize the benefits of using smart educational tools with PAD to make students' learning more motivated because cognitive engagement represents students' willingness to make an effort even when the activities are challenging. As for the result of the significant improvement of students' cognitive participation in the Rain Classroom, teachers can use the platform to arrange pre-reading tasks in advance and formulate students' curriculum learning goals. Meanwhile, a number of online blended learning platforms are available, including www.icourse163.org, classroom.google.com, kahoot.com, and www.ketangpai.com. These platforms, which include online work correction, performance record and analysis, courseware sharing, and online discussion, are made to make it easier for teachers to engage with their students in the classroom (Gao et al., 2020). This is similar to the effect of Rain Classroom on promoting students' engagement in class. This study has several limitations. First of all, students' class engagement varies in different educational contexts. Future studies are expected to employ different disciplines. Individual factors of teaching and students are taken into

account to draw a broader range of conclusions. In addition, since the intervention lasted only 4 weeks, the impact of the intervention on students' course engagement is likely to be quite limited. With longitudinal experiments, further research can be done. Additionally, the participants in this study were mainly sophomore students, and did not attempt to cover all the grades of university students, lacking multiple data to provide a source of triangulation. Data collection relies largely on self-reporting, which can make the results relatively subjective and imprecise. It is possible to conduct more extensive research using a variety of tools, such as leveraging machine learning algorithms or Rain Classroom background data to help consider student classroom engagement. Lastly, combined with qualitative research or comparing rain classroom with other platforms, its advantages and limitations can be more fully assessed.

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