The Effectiveness of Formative E-assessment with DingTalk on Academic Achievement, Engagement and Satisfaction of Advertising Copywriting Course Students

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Abstract

Integrating technology into formative assessment is currently a focal point in educational research. This research aimed to analyze the role of utilizing formative e-assessment with DingTalk in advertising copywriting class for students' academic achievement, engagement, and satisfaction. Students from the Advertising Copywriting course at a university in China have participated as a sample for the study. Through quasi-experimental research, the effectiveness of formative e-assessment with DingTalk was tested by comparing the differences of improving score of four groups obtained through the pretest and post-test. At the end of the quasi-experiment period, an engagement survey was used to compare students' engagement levels between the experimental and control groups, and a satisfaction survey was administered to determine students' perspectives of the class by introducing formative e-assessment with DingTalk. The results revealed that there was a statistically significant difference among groups on improving scores: $F(3, 150) = 26.539$, $p = .000$. It indicated that formative e-assessment with DingTalk as the treatment had a significant effect on improving academic achievement. The creativity, writing ability, and conceptual knowledge of academic achievement were all significantly improved ($p < 0.05$). Among them, creativity increased the most. Based on the analysis of surveys, the data suggests that students' engagement scores between the experimental and control groups were statistically significant different, $t(152) = 2.693$, $p = .008$. In addition, students in the experimental group expressed their high level of satisfaction with the

intervention—formative e-assessment with DingTalk (M=4.48). The experiment revealed that this intervention could improve students' academic achievement and engagement in the course, as well as students' satisfaction. This finding contributes to the understanding of effective strategies of technology integration, enriching the field of formative e-assessment and guiding future research and practices.

Keywords: effectiveness of formative e-assessment; DingTalk; achievement; participation and satisfaction; copy-writing course students

Introduction

Assessment is the core element of higher education. Technology has become an essential tool to make assessments meaningful and efficient. Its rapid development such as mobile phones and social networks has sparked researchers' interest in integrating technologies in formative assessment (Beevers et al., 2010).

Cohen and Sasson (2016) found that online formative assessment significantly improved student performance, and McCallum (2021) stated its effectiveness on monitoring students' study progress and promoting their learning. In the study of Chen, Jiao and Hu (2021), students had positive attitudes towards formative e-assessment as it helped them practice until mastery and focus.

The spread of Covid-19 has further driven the development of technology integration represented by DingTalk, as well as the research on them. However, there are few articles related to formative assessment in the field of advertising.

This research seeks to integrate DingTalk into formative assessment as the teaching intervention of Advertising Copywriting course which aimed at improving students' academic achievement and engagement, gaining their satisfaction.

Research Objectives

1. To identify formative e-assessment with DingTalk effect on students' academic achievement.

2. To determine the differences on students' engagement in Advertising Copywriting course between the formative e-assessment with DingTalk and traditional assessment method.

3. To examine students' satisfaction level towards the formative e-assessment with DingTalk.

Literature Review

Constructivism

Constructivism advocates that teachers should incorporate assessment into students' learning process. The developing constructivism learning theory pays attention to the building of learning environment (Xu & Shi, 2018). Students can use a variety of tools and information resources to achieve their learning goals. Furthermore, constructivism learning also emphasizes context, providing evidence for the task design of the formative e-assessment in this study.

Collaborative Learning

Collaborative learning is an educational method, which requires the joint intellectual efforts of students and teachers. Golub (1988) proposed the main characteristic of collaborative learning is allowing students to talk, and learning occurs during conversation. Higher education often calls for students actively engage in learning, and collaborative learning can involve students actively in the learning process (Laal & Ghodsi, 2011).

Multiple Intelligence

The theory of multiple intelligence classifies human intelligence into many intelligence (Gardner, 1983) and emphasizes the diversity of assessment methods and contents. This is support for the introduction of formative assessment. Moreover, this theory provides a framework for teachers to determine the use of technology in teaching (McKenzie, 2005).

Formative assessment

Assessment is a bridge between teaching and learning. Formative assessment considers assessment should measure outcomes, as well as improve knowledge (Clements & Cord, 2013). Formative assessment emphasizes moments of contingency. William (2007) proposed five key strategies for formative assessment which crosses three process dimensions (determining where the learners are in their learning, where are they going, what they need to do) with three agent dimensions (teacher, learner and peer).

A crucial aspect of formative assessment is feedback. Formative assessment requires to create an effective feedback loop which should include a clear interpretation of goals (Earley et al., 1990), testing in learning (Palmer & Devitt, 2008) and specific guidance for next development (Shute, 2008). Moreover, both cognitive feedback and affective feedback can improve students' learning performance and self-regulation skills (Zhang et al., 2022).

E-assessment

The rapid development of technology has promoted the development of e-assessment. E-assessment can be developed not only in online teaching model, but also in physical environments (Lajane et al., 2021). It is valuable to give feedback in the draft process (Pekrun et al., 2014) and ask for a resubmit in e-assessment (Winston et al., 2017).

Formative E-assessment

Formative e-assessment is a combination of formative assessment and e-assessment. It was defined by Daly et al. (2010) as the use of ICT to support the iterative process of gathering and analyzing information about student learning and of evaluating it in relation to previous achievement and expected attainment, as well as unexpected outcomes.

Jiao (2015) stated formative e-assessment can improve students' performance. Moharreri and Nehm (2014) noted its role in promoting student engagement. Cohen and Sasson (2016) reported that students had a positive attitude towards it. However, these studies are concentrated in some fields, such as English, Biology and Medicine, and there is a lack of research in advertising.

DingTalk

DingTalk serves as a multi-terminal platform facilitating free communication and collaboration among Chinese enterprises. Following the outbreak of covid-19, DingTalk, in its commitment to advancing the concept of the smart campus, availed itself of the opportunity to introduce the "no pause learning" initiative. Under this program, online classes are provided without charge to schools nationwide, with targeted functionalitie such as online teaching, homework correction submissions, and online examinations. These features are meticulously crafted to accommodate concurrent online learning for millions of students (Chen & Cleesuntorn, 2023). At present, it has evolved into a pivotal platform within the realm of online education.

Integration of DingTalk

Davis (1989) stated that whether a new technology can be accepted mainly refers to its ease of use and usefulness. DingTalk is widely used in China during the Covid-19 period with lots of active users (Bick et al., 2020). Most students can operate it expertly. Zhang et al. (2020) found that students' knowledge and their behaviors of discussion were significantly improved by online course with DingTalk. Song et al. (2021) claimed that DingTalk improved students' performance and satisfaction with the class. Live broadcast (Cai, 2022), brush tools to correct

assignments (Zhou, 2023), mind map and discussing group (Li, 2021) are all valid tools mentioned in previous studies. In summary, DingTalk is considered an efficacious educational tool.

Notably, due to covid-19, previous research on DingTalk mostly utilized online class featuring live broadcasts. With the majority of schools transitioning back to traditional class, there is a shift in the utilization of DingTalk as an online component in blended class. Consequently, an in-depth examination of its strategy and efficacy in this modified context becomes imperative.

Collectively, the combination of constructive learning theory and cooperative learning theory, as well as multiple intelligence provides the theoretical basis for researching formative e-assessment. Previous research on formative assessment and e-assessment has emphasized certain design strategies for formative e-assessment, including the implementation of five key strategies, the incorporation of affective feedback, and the provision for resubmission.

Conceptual Framework

This research utilized a quantitative research method which contains two parts, one was quasi-experiment, and the other was survey. Four classes participating in research were randomly assigned to two experimental groups and two control groups. Following the pretest conducted across four groups, the experimental groups received intervention for 6 weeks. Subsequently, all groups completed the post-test. The questionnaires were applied to compare the students' levels of engagement between the experimental and the control groups as well as to evaluate the satisfaction levels of the experimental group students. Figure 1 shows the conceptual framework of the research.

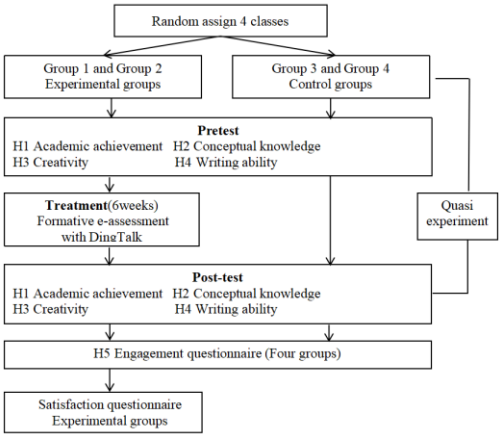

Fig 1 Conceptual Framework

Hypotheses

Based on the literature review and the conceptual framework, the hypotheses have been developed as follows.

$H_0$1: The formative e-assessment does not statistically significant affect students' academic achievement via traditional method.

H_a1: The formative e-assessment statistically significant affect students' academic achievement via traditional method.

$H_0$2: The formative e-assessment does not statistically significant affect students' conceptual knowledge via traditional method.

H_a2: The formative e-assessment statistically significant affect students' conceptual knowledge via traditional method.

$H_0$3: The formative e-assessment does not statistically significant affect students' creativity via traditional method.

H_a3: The formative e-assessment statistically significant affect students' creativity via traditional method.

$H_0$4: The formative e-assessment does not statistically significant affect students' writing ability via traditional method.

H_a4: The formative e-assessment statistically significant affect students' writing ability via traditional method.

$H_0$5: There is no difference on students' engagement between the class with formative e-assessment and traditional class.

H_a5: There is a difference on students' engagement between the class with formative e-assessment and traditional class.

Research Methodology

Population and Sample

The population of the research was all the undergraduate students studying Advertising Copywriting course during the academic year 2021 at the university located in the Northwest of China, which contributed to 597 students. Only 154 students were purposively selected to participate in the research. Then, the random assignment was applied to assign the classes to the control and the experimental groups. The detail is as shown in Table 1.

Table 1 Number of Population and Sample Size

Population	Sample (n = 154)			
	Experimental	Experimental	Control	Control
597	Group 1	Group 2	Group 3	Group 4
	36	37	40	41

Research Design

The quantitative research design was applied. There were two parts of the quantitative data, which were the quasi-experimental research, and the survey research.

In the quasi-experiment, a pretest and post-test design with control group was utilized. The random assignment was applied to select the classes to be in the control and the experimental groups.

Group1 and Group 2 were experimental groups, while Group 3 and Group 4 were the control groups. Before the experiment, all four groups were participated in the pretest to check the participants' prior knowledge.

Then, the formative e-assessment with DingTalk was applied to the two experimental groups. Students have been exposed to the formative e-assessment with DingTalk for six weeks. After that, all four groups have worked on the post-test. The score from the post-test were compared with the pretest to see if they are different or not.

Both pretest and post-test examined the academic achievement of three aspects, which are conceptual knowledge, creativity, and writing ability.

Two self-report questionnaires were utilized in the survey. All groups of students were asked to report their engagement after the experiment. Two experimental group students were required to report their satisfactions on the class using DingTalk.

Research Treatment

In this research, the treatment was the utilization of formative e-assessment with DingTalk to an Advertising Copywriting course.

The course contained five weeks for theoretical teaching and eleven weeks for practice which need to complete four tasks. From Week 6th to 10th, four classes used traditional class to complete two tasks. From Week 11th to 16th, control groups continued to adopt traditional assessment while experimental groups adopted formative e-assessment with DingTalk.

The researchers used the design mode (Alexander, 1977) to design the treatment. The core of the design mode is to determine the background, problems and solutions in the practical field, which can help to sort out the design ideas. Each practice task was divided into three sub-tasks: creative proposal, draft, and final work. Students were required to complete each sub-task in one week. The sub-task basically included the steps as: sharing goals and standards, discussing, assigning sub-task, working, presentation, peer assessment and teacher assessment, modification, sending back and resubmit. The main role of DingTalk was to enhance the communication between the students, teachers, and peers, as well as to realize the construction and representation of students' ideas. The core formative activity was the assessment of teacher and peers on students' thinking. Through the generation and circulation of feedback, thinking was adjusted in real time.

Research Instrument

In the research, there were two main research instruments as follows.

Performance test

The performance test was utilized to measure students' performances. Students were tested on the aforementioned skills for the pretest on the 10th week of the study. Then, at week 17th, students were tested in the post-test for the same skills and test.

The performances were measured based on conceptual knowledge for 20%, creativity for 40%, and writing ability for 40%. The total score was 100% representing academic achievement.

The concept knowledge was divided into two parts, which were knowledge and understand with a proportion of 50% each. The creativity was divided into three parts, which were originality, appropriateness and design or production, each accounting for 33.3%. The writing ability was divided into three parts, which were theme, rhetoric and language, each accounting for 33.3%.

The teacher scored 1–10 points for each score point, where 1 to 5 indicates unqualified, 6 indicates passing, 7 indicates medium, 8 indicates good, and 9 to 10 indicates excellent.

Questionnaire

There were two main variables—engagement and satisfaction to measure students' attitudes towards the formative e-assessment.

Students' engagement construct was measured by three dimensions, which are behavioral engagement, emotional engagement, and cognitive engagement. The questionnaire items were adopted from the previous research of Skinner and Belmont (1993); Fredricks et al. (2004).

Students' satisfaction construct was measured by six dimensions, which are supportive issues, learner perspective, instructor attitude, service quality, information quality, and system quality. The questionnaire items were adopted from the previous research of (Ozkan & Koseler, 2009).

Five-point Likert-scale item was used, where 1 indicates strongly disagreement and 5 indicates strongly agreement.

Validity of Research instruments

The performance test used in the research was the standardized test used within the university. The test was developed by instructors within the university who teach the Advertising Copywriting course. It has been applied to test students' performance in Advertising Copywriting course for several years. Therefore, it can be ensuring the validity of the test.

As for the questionnaire, it has been validated by three experts using the Item Objective Congruence (IOC) to analyze the construct validity. The three experts were instructors with teaching experience in the field of advertising for more than 20 years. Two of them were Ph.D. holders, while the other holds master's degree. The IOC results indicated that all items rated with the score of 1, which confirmed the construct validity, according to Turner and Carlson (2003).

Reliability of Questionnaire

Two pilot tests were conducted for questionnaires. The researcher collected 36 valid questionnaires for engagement and 31 valid questionnaires for satisfaction through Wenjuanxing. The samples for the pilot test all had the experience to use DingTalk in the subject from previous semesters.

Cronbach's Alpha was used to measure the estimated internal consistency. It ranges from −1 to +1 and can be considered as poor to excellent according to Hair et al. (2003).

The results of the Cronbach's alpha calculation for each variable were from 0.750 to 0.914, which represents from good to excellent as listed in Table 2.

Table 2 Results of Cronbach's Alpha of the research instruments

Variables	Number of Items	Cronbach's Alpha
Behavioral engagement	4	0.853
Emotional engagement	3	0.787
Cognitive engagement	3	0.750
Satisfaction on supportive issues	4	0.855
Satisfaction on students' perspectives	5	0.856
Satisfaction on instructor attitude	4	0.861
Satisfaction on system quality	5	0.840
Satisfaction on information quality	3	0.850
Satisfaction on service quality	3	0.914

Data Collection

Quasi-experimental Procedures

In Week 10th, all students participated in the pretest by the offline test. Then, the intervention was the formative e-assessment with DingTalk was given to Group 1 and Group 2 for six weeks. In Week 17th, all groups were participated in the post-test.

Questionnaire Procedures:

Wenjuanxing (an online questionnaire platform) was used to distribute the questionnaires. The online questionnaires compiled in advanced can generate QR code and URL links and be sent through WeChat to students. Students can fill in the answers through their mobile phone or computer.

Prior to the experiment, informed consent from the participants was obtained which includes the purpose, content and procedures of the study, and the promise to keep the participant confidential. The participants had the right to participate or not and withdraw at any time.

Data Analysis

The statistical analysis was carried out with SPSS (v.26).

The One-way analysis of variance (ANOVA) was applied to compare students' improvement scores (pertest and post-test) within groups on academic achievement, conceptual knowledge, creativity, writing ability in the quasi-experiment.

The Independent Samples T-test was utilized to compare students' levels of engagement between the control groups and the treatment groups.

The Descriptive statistics (mean and standard deviations) were used to analyze students' engagement and students' satisfaction levels with the course.

Research Results

The research collected data from 154 students with the number of 81 for the control group and 73 for the experimental group.

1. Result of Data Analysis for Research Objective 1: *To identify formative e-assessment with DingTalk effect on students' academic achievement.*

The result of the data analysis for research objective 1 is based on the hypotheses testing test of the one way ANOVA.

The research proposed four hypotheses ($H_0$1 to $H_0$4) to identify the effectiveness of formative e-assessment with DingTalk on students' academic achievement.

To test the hypotheses, the one-way ANOVA was applied to compare differences of students' improvement scores on Academic achievement, Conceptual knowledge, Creativity and Writing ability among groups (two control groups and two experimental groups). The results of the one-way ANOVA were shown in Table 3.

Table 3 One Way ANOVA

		Mean differences (Post – Pre)	SD	N	F	P
Conceptual knowledge	Experimental Group 1	2.39	1.02	36	7.64	0.000
	Experimental Group 2	2.16	0.83	37		
	Control Group 3	1.50	1.09	40		
	Control Group 4	1.54	1.03	41		
	Average	1.88	1.07	154		
Writing ability	Experimental Group 1	5.42	1.23	36	11.91	0.000
	Experimental Group 2	5.35	1.14	37		
	Control Group 3	3.98	1.69	40		
	Control Group 4	4.02	1.57	41		
	Average	4.66	1.58	154		
Creativity	Experimental Group 1	6.00	1.64	36	30.87	0.000
	Experimental Group 2	6.22	1.11	37		
	Control Group 3	3.63	1.21	40		
	Control Group 4	4.39	1.57	41		
	Average	5.01	1.76	154		
Academic achievement	Experimental Group 1	17.61	3.04	36	26.54	0.000
	Experimental Group 2	17.59	3.02	37		
	Control Group 3	11.64	4.30	40		
	Control Group 4	12.75	4.41	41		
	Average	14.76	4.64	154		

According to the results presented in Table 3, groups showed statistically significant difference in the academic achievement, which was the combination of the conceptual knowledge, creativity ability, and writing ability ($p<0.05$). Therefore, the null hypothesis was rejected.

Further review on the descriptive statistics on the improvement scores for groups showed that mean values of the experimental groups were consistently higher than the control groups. These indicated that students in the experimental groups had higher improvement scores on these four variables than the control groups. Among them, creativity increased the most (with the min mean difference of 1.61 between control and experimental groups).

As a result, formative e-assessment with DingTalk has an improving effect on students' academic achievement, conceptual knowledge, creativity and writing ability.

2. Result of Data Analysis for Research Objective 2: ***To determine the differences on students' engagement in Advertising Copywriting course between the formative e-assessment with DingTalk and traditional assessment method.***

The result of the data analysis for research objective 2 is based on the hypotheses testing test of the independent sample t-test.

The research proposed hypothesis $H_0$5 to differentiate students' engagement between the control and experimental groups.

To test the hypothesis, the independent sample t-test was applied to compare the engagement. The result of the independent sample t-test was shown in Table 4.

Table 4 Independent Sample T-test

	Mean Difference	Sig.
Experimental Group and Control Group	0.24	.008

According to the result in Table 4, the t-test was significant, t (152)=2.693, p = .008. Thus, the null hypothesis was rejected. The result indicated that students' engagement score between experimental group and control group are different.

Combined with descriptive statistics for the specific analysis, the mean value of experimental group was 0.24 higher than the control group. It is shown in Table 5.

Table 5 Means Summary for Engagement score

	Mean	SD	N
Experimental Group	4.34	0.54	73
Control Group	4.10	0.58	81

As a result, there was a difference of students' engagement between control group and experimental group.

3. Result of Data Analysis for Research Objective 3: ***To examine students' satisfaction level towards the formative e-assessment with DingTalk.***

The result of the data analysis for research objective 3 is based on the analysis of the questionnaire on students' satisfaction on the class utilizing formative e-assessment with DingTalk.

In the study, Five-point Likert-scale questionnaire was employed to collect samples' attitudes toward each variables measured. The data obtained was interpreted according to the arbitrary level of Norman (2010).

Table 6 Arbitrary Level for Interpretation of Questionnaire Data

Likert scale score	Range	Interpretation
5	4.51 – 5.00	Strongly Agree
4	3.51 – 4.50	Agree
3	2.51 – 3.50	Neutral
2	1.51 – 2.50	Disagree
1	1.00 – 1.50	Strongly Disagree

Source: Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in Health Sciences Education, 15*(5), 625-632.

Table 7 shows students' satisfaction level on the formative e-assessment with DingTalk. The mean of satisfaction was 4.48, which represents the agree level when compared to the arbitrary level. The low standard deviation indicated that the values are closer to the means and have a low level of variance.

In six dimensions, satisfaction on instructor attitudes and service quality had the highest score (with same mean score of 4.67), which represents students strongly agreed that they were satisfied on instructor attitudes and service quality. The lowest one was system quality (with mean score of 4.28), in which the mean score of system errors was only 4.07. As a result, students were satisfied on the class utilizing formative e-assessment with DingTalk.

Table 7 Descriptive Statistics of Satisfaction

	Item Statement	Mean	SD	Interpretation
Satisfaction on Supportive issues	The practice task in DingTalk is prepared by obeying the ethical and legal issues.	4.55	.62	Strongly Agree
	If the use of assignment function was optional, I would still prefer to use it as a supportive tool as it helps my performance in the class.	4.44	.71	Agree
	If it was trendier and more popular, I would prefer to take this module totally online without face-to-face assignment.	4.30	.81	Agree
	The practice task in DingTalk helps me to cut-down my expenditure such as paper cost, communication cost (i.e., phone), transportation cost, etc.	4.36	.79	Agree
	Average	**4.41**	**.73**	**Agree**
Satisfaction on Instructor attitudes	The instructor follows up student problems and tries to find out solution via DingTalk.	4.75	.46	Strongly Agree
	The instructor is good at communication with students via DingTalk.	4.69	.55	Strongly Agree
	I think communicating with the instructor via DingTalk is important and valuable.	4.66	.58	Strongly Agree
	I find it easy to communicate with the instructor via DingTalk.	4.55	.73	Strongly Agree
	The instructor encourages us to read other students' superior practice task.	4.70	.52	Strongly Agree
	Average	**4.67**	**.57**	**Strongly Agree**
Satisfaction on Students' perspective	I can manage my study time effectively and easily complete practice task on time by using DingTalk.	4.43	.67	Agree
	In my studies, I am self-disciplined and find it easy to set working time.	4.32	.78	Agree
	I believe that DingTalk is a very efficient educational tool.	4.38	.76	Agree
	I have previous experience with DingTalk.	4.58	.60	Strongly Agree
	Average	**4.42**	**.70**	**Agree**
Satisfaction on System quality	DingTalk supports interactivity between learners and system by chat, customer service, etc.	4.37	.75	Agree
	I have not faced any system errors on DingTalk.	4.07	.98	Agree
	I can find required information easily on DingTalk.	4.15	.94	Agree
	DingTalk is easily accessible via Internet.	4.40	.76	Agree
	Fonts (style, color, and saturation) are easy to read in both on-screen and in printed versions.	4.40	.72	Agree
	Average	**4.28**	**.83**	**Agree**
Satisfaction on Information content quality	I find it easy to understand the practice task in DingTalk.	4.41	.68	Agree
	Practice tasks are supported by multimedia tools (flash animations, simulations, videos, audios, etc.).	4.40	.66	Agree
	Vocabulary and terminology used are appropriate for the learners.	4.55	.55	Strongly Agree
	Average	**4.45**	**.63**	**Agree**
Satisfaction on Service quality	Instructor's attitudes are friendly to learners.	4.70	.52	Strongly Agree
	Instructor is knowledgeable enough about practice task.	4.69	.52	Strongly Agree
	I can contact the instructor via phone, email, WeChat, DingTalk, etc.	4.63	.54	Strongly Agree
	Average	**4.67**	**.53**	**Strongly Agree**
Satisfaction		4.48	.53	Agree

Discussions

The study aimed to evaluate the effectiveness of formative e-assessment on students' academic achievement, engagement and satisfaction.

Academic achievement

According to the results, the formative e-assessment with DingTalk can significantly improve students' conceptual knowledge, creativity, and writing ability, which can be measured as academic achievement. The results obtained conform with the previous findings in the previous related research of Jiao (2015) and Mohamadi (2018). The finding of conceptual knowledge is consistent with Morris et al. (2021) research, which highlights the influence of formative e-assessment to the understanding of conceptual knowledge. The result of creativity aligns with Hasanah et al. (2023) study which showed that the formative assessment had a significant impact on students' creative thinking ability. In addition, the literature review also supports the finding of writing ability, as studies by Mohamadi (2018) have reported the improvement of writing ability caused by formative e-assessment. Note that, the results showed that formative e-assessment with DingTalk had the greatest improving effect on creativity. Creativity is a crucial skill for advertising students. The research design drawing from Li (2021) study which emphasized the critical role of mind map in DingTalk, likely contributes to this enhancement. Delving deeper into its impact on each item, formative e-assessment with DingTalk had a higher effect on improving the items representing higher-order ability (understanding and originality). Likewise, Mahendra (2020) reported similar finding that formative assessment is able to access students' high-order thinking skills.

Engagement

The study indicated that there was a significant difference of students' engagement between the traditional class and the class utilizing formative e-assessment with DingTalk. The mean score of engagement in the experimental groups was 0.24 higher than it in the control groups. This supports the findings of Jiao (2015), indicating the improvement of participating through formative e-assessment. Further, the results suggested that formative e-assessment with DingTalk can give students more emotional support including hope, relief, and pride, and improve students' behavioral engagement including attention and activity. However, it seems to have little improve effect on cognitive engagement. This may be related to treatment design which contained constructive and affective feedback, lots of activities, and lacked of reflection. Future research needs to examine existing literature and understand the underlying reason behind the differences.

Satisfaction

The research results found that students in experimental groups were satisfied when learning through DingTalk. 85% students expressed a high level of satisfaction. The results obtained conform with the findings in previous research of Jiao (2015), Chen, Jiao and Hu (2021), which have reported students' positive attitudes towards formative e-assessment. It is worth noting that the mean score of information content quality was a little lower, indicating that specific strategy still needs some improvements. Additionally, not all students are satisfied with system quality of DingTalk.

Conclusion

The results of this research demonstrate that formative e-assessment with DingTalk positively impacts students' academic achievement, engagement and satisfaction.

Formative e-assessment with DingTalk facilitates prompt refinement of students' thought processes, contributing to the development of conceptual knowledge, creativity, and writing ability. Through the incorporation of sub-tasks, regular submission and mind map on DingTalk, teachers gain insight into students' creative thinking, allowing timely identification of errors. Scoring and feedback mechanisms aid students in gauging their ability and planning for future improvement. The process of sending back and resubmit encourages iterative enhancements to their work.

Furthermore, formative e-assessment with DingTalk offers diverse communication channels for students to interact with teachers and peers, fostering heightened enthusiasm for class participation. Students, in the research context, displayed a proclivity for timely inquiries to teachers, engaging in discussions regarding success criteria and sharing their work with peers. This increased student engagement stands in stark contrast to traditional classroom settings. Additionally, students exhibit a positive attitude towards formative e-assessment with DingTalk, particularly in terms of instructor attitudes and service quality, resulting in high satisfaction levels.

These studies offer valuable insights into effective strategies for technology integration, enhancing the realm of formative e-assessment and offering guidance for future research and practices.

Suggestions

Based on the discussion and conclusion drawn from the research, there are some suggestions for future researchers in the field of advertising formative e-assessment.

Firstly, based on the existing experimental design, the researcher can enhance some assessment strategies to ascertain potential improvements in the study's effectiveness. For example, following the draft of each practical task, students could undergo a brief test assessing their basic knowledge in the form of choice questions. It is a quick test of draft. This rapid evaluation can not only efficiently identify and address students' low-level issues but also avoid burdening teachers with additional workload. Reflection need to be added to improve students' cognitive engagement as it was not significant in research. In addition, attention should be paid to the words and multimedia used on DingTalk to improve the content quality.

Secondly, an imperative research area is to determine whether formative e-assessment with DingTalk enhances abilities at different levels with varying effects. This requires further validation across diverse advertising courses. Such research can guide educators on more effective integration of formative e-assessment with DingTalk into the curriculum.

Thirdly, the researcher should explore alternative tools to assess if better results can be achieved. DingTalk currently lacks sufficient system stability, as well as specialized functions for advertising courses. Exploring or integrating other tools into the course might enhance effectiveness. For instance, incorporating a professional writing training tool could elevate students' writing proficiency.

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