How Subtitles in Videos Affect Chinese University Students' Incidental Vocabulary Learning?

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Abstract

Video subtitles have become an increasingly popular foreign language learning tool, but their effectiveness in facilitating incidental vocabulary acquisition among Chinese university students has not been extensively studied. In order to investigate the effect of video subtitles on incidental vocabulary acquisition, a quantitative research was conducted with 90 Chinese university students. The research used an experimental research design in which participants were randomly divided into three groups: a no subtitle group, a Chinese subtitles group and an English subtitles group. Each group watched the same videos and completed pre-test and post-test vocabulary assessments to measure their incidental vocabulary acquisition. The results showed that both subtitled groups significantly increased vocabulary compared to the group without subtitles. In addition, the English subtitle group had the most significant effect, suggesting that English subtitles may be the most effective type for incidental vocabulary learning among Chinese university students. These findings have important implications for foreign language education in China, as they suggest that including video subtitles, especially English subtitles, can effectively enhance incidental vocabulary learning. Furthermore, the research's use of an experimental research design strengthens the evidence supporting the effectiveness of video subtitling in language learning. Future research could further investigate the factors that influence the effectiveness of different types of subtitles on vocabulary learning, e.g., dual subtitles and keyword subtitles. In addition, exploring the effects of video with subtitles on other language skills (e.g., listening and pronunciation) is also worth considering.

Keywords: incidental vocabulary learning, English learning

1. Introduction

1.1 Context

This research aimed to investigate the incidental vocabulary learning of 18-23 years old Chinese university students studying at a Chinese university. A total of 90 students were recruited to participate in the research, all of whom passed the compulsory College English Test (CET-4), the national English language proficiency exam that measures English language proficiency for undergraduate and postgraduate students in China. Over the past three decades, the CET has become the most prominent test of English as a foreign language in China, and all participants in this research were required to take the CET-4 when they entered university.

The participants in this research were ideal candidates for the research because they had taken mandatory English language research as part of their academic curriculum. This ensured that they had a level of English that allowed them to use the language through the videos with subtitles used in the research.

To investigate incidental vocabulary learning, the research adopted a methodological approach that operationalised it as learning when students were not informed of an upcoming vocabulary test. The rationale behind this approach is that when students know they will be tested on specific vocabulary, they tend to focus

only on the target word and thus engage in purposeful learning. On the other hand, incidental vocabulary learning refers to knowledge that develops as a by-product of meaning-centred activities. In these exercises, students focused less on learning new words and more on text comprehension.

Defining incidental vocabulary learning is difficult (Mohamed, 2018). In a methodological sense, researchers typically operationalise incidental vocabulary learning as learning that occurs when students are not informed of an upcoming vocabulary test (Uchihara et al., 2019). The claim supports the idea that students will focus more on the target vocabulary and engage in purposeful learning if they know an upcoming vocabulary test (Peters et al., 2009). The emergence of accidental vocabulary learning as a by-product of meaning-centred activities is a second, similar concept (Hulstijn, 2003). In these exercises, students placed less emphasis on learning new words and more on text comprehension. This research defined incidental vocabulary learning as knowledge developed due to a meaning-centred comprehension task in which students were not informed of an upcoming vocabulary test. The research aimed to observe incidental vocabulary learning in the context of language exposure through videos with subtitles. This approach allows for a naturalistic learning environment that mirrors how language is often encountered in real life. Using videos with subtitles also provides a more engaging and interactive approach to learning, which may enhance vocabulary acquisition.

1.2 Rationale

My research is poised to significantly contribute to English language teaching and learning, making it of great interest to both English language teachers and learners. By investigating the impact of subtitles on incidental vocabulary learning, my research offers valuable insights that can inform future language learning and teaching practices.

My research can significantly assist those learning English by letting them know which subtitles most effectively encourage the incidental vocabulary learning. This knowledge can guide their future language learning efforts, allowing them to make more informed choices about the materials they use. Moreover, my research can help English language teachers tailor their teaching practices to facilitate more effective incidental vocabulary learning. Teachers can select materials that better support their students' learning by understanding which subtitles are most conducive to vocabulary acquisition.

In the field of TESOL, it is widely recognized that incidental vocabulary learning is a crucial component of second language vocabulary development (Webb & Chang, 2015). While previous research has focused on reading as a source of input for incidental vocabulary learning (Pellicer-Sánchez, 2015), recent researches have highlighted the significant impact that videos can have on vocabulary acquisition (Montero Perez, 2020). As such, my research fills an important gap in the literature by examining the role of subtitles in facilitating incidental vocabulary learning in video contexts.

I will use Paivio's (2006) dual coding theory to ground my research in a theoretical framework. This theory posits that the linguistic and visual systems can work in tandem to support information processing and recall. Given the interrelated but functionally independent nature of the verbal system (video) and the non-verbal system (subtitle), including subtitles in video materials may facilitate English language learners' recall of the language and help them make connections between text and images.

1.3 Aims

The title of this research is "How subtitles in videos affect Chinese university students' incidental vocabulary learning?" and it was designed to answer two research questions. In this research project I used the following questions to gain the results:

1) Do students remember any words from the subtitles of the videos they have watched?

2) Which type of subtitles helps students remember more words from their watched videos?

This research uses a quantitative approach, and experiment data collection methods were used. Through this method, in-depth answers to the three research questions could be collected.

2. Literature Review

2.1 The Use of Video in Teaching English

Along with the popularity of multimedia in the English classroom, video has been widely used in second-language classrooms as a teaching tool to improve students' English listening skills and interest in learning, introduce the culture of English-speaking countries and open up students' intellectual horizons (Wang, 2014). It has been argued that videos can provide students with authentic examples of English in real-life use, which can help improve their listening and speaking skills (Saed et al., 2021). Most English videos show original English accents and scenarios, and the speed of speech will be faster than the usual practice they do on their own.

By exposing students to real-life examples of how English is used, they can better understand how the language is actually spoken and used in everyday life (POLAT & ERİŞTİ, 2022). This helps to improve their listening skills and comprehension, as well as their speaking skills, as they can hear how native speakers express words and phrases clearly and how they use intonation and stress patterns to convey meaning. It has also been argued that videos can be used to introduce new vocabulary and expressions in context, making them more accessible for students to understand and remember (Fomichenko, 2022). Alharbi's (2015) research shows that introducing new vocabulary and idiomatic expressions in a contextualised way can significantly enhance students' understanding of their usage and meaning. For example, educators can use videos to show how to use these words in a conversation or situational setting instead of just showing a list of words to remember. This approach allows learners to perceive the vocabulary within a larger framework, making it more memorable and relevant. However, Shrosbree's (2021) research claims that educators must be discerning when choosing classroom videos. The suitability of video content should be appropriate to the students' language ability and cultural background and the lesson's learning objectives. For novice students, advanced vocabulary or complex grammatical structures can be overwhelming. Conversely, videos featuring informal language or colloquialisms may not be appropriate for a more formal language learning environment. In addition, videos with too much background music or special effects, fast-paced editing or irrelevant information can be distracting and hinder language acquisition (Eberle & Childress, 2007). Therefore, to ensure that video is an effective and engaging language learning tool, teachers should be selective in planning video content relevant to students' proficiency, cultural background and the course's learning objectives. In addition, video instruction must be complemented by other forms of language practice and pedagogy to provide comprehensive and holistic language education (Yuan et al., 2022). For example, videos can be used to supplement reading and writing activities, speaking and listening exercises, and grammar instruction. This helps to consolidate language concepts and skills and provides students with more opportunities to practise using the language in different contexts. However, many factors in the video speak to their impact on students' English learning. This research focuses on the impact of subtitles on the incidental vocabulary learning of Chinese university students.

2.2 Incidental Vocabulary Learning

Incidental vocabulary learning is the process of acquiring new words or phrases through regular exposure to language in everyday life rather than through deliberate or intentional learning (Laufer & Hulstijn, 2001). This type of learning can occur unconsciously when people read books, watch films, listen to music, engage in conversations or engage in any other language-rich activity. Incidental vocabulary learning occurs during comprehension-oriented activities (Hulstijn, 2013). Related activities include reading and listening, watching and enjoying out of interest. In contrast to activities explicitly targeting students' intentional vocabulary learning, learners achieve implicit vocabulary learning through contact with the target word while involving meaning-focused input. Research has shown that second or foreign-language learners can acquire incidental vocabulary through reading (Teng, 2020) and other modes of input, such as listening materials (Vidal, 2011) and videos (Peters & Webb, 2018).

Incidental vocabulary learning is considered an effective way to expand one's vocabulary because it is less laborious and can be done without conscious effort (Alahirsh, 2014). Incidental vocabulary learning is not an active attempt to learn vocabulary (Ender, 2016). Incidental vocabulary learning can effectively expand one's vocabulary because it can occur unconsciously and with less effort than other forms of vocabulary learning. This helps to support the development of vocabulary knowledge that is more meaningful and relevant to learners, who are more likely to use and remember it over time (Schmitt, 2018). For example, learners exposed to a wide range of English language materials, such as videos, books or recordings, may acquire new vocabulary simply by encountering it in context. This can help them gradually build up their vocabulary without deliberately memorising it. However, it is essential to note that more than incidental vocabulary learning may be required to acquire many new words incredibly quickly and may require more deliberate and focused research (Webb et al., 2013). Incidental vocabulary learning may be a good way of acquiring new words. However, it may not be sufficient for individuals who need to learn many words quickly, such as language learners preparing for exams or professionals who need specific technical vocabulary. Although incidental vocabulary learning helps to acquire new words, it may not always provide a deep understanding of word meaning and context (Joseph & Nation, 2018), nor does it improve correct spelling (Ana & Norbert, 2010). It may affect the ability to use words accurately and effectively in real-life situations. When individuals hear words but do not see them written down, they may not fully understand their correct spelling, which can lead to misspellings. This is why individuals engage in both listening and reading activities to maximise the benefits of incidental vocabulary learning and minimise the risk of spelling errors (Teng, 2018). For example, suppose an individual hears a new word in the conversation. In that case, they can look it up in a dictionary or online and see the correct spelling, helping to consolidate their memory of the word.

Most relevant researches have considered the possible value of written texts for vocabulary development;

however, few have examined the incidental learning of vocabulary from L2 spoken input, mainly through watching captioned videos. This research, therefore, focuses on the effect of subtitles on incidental vocabulary learning among Chinese university students.

2.3 The Use of Subtitles in English Teaching

Subtitles are textual versions of the dialogue in films, videos, television programmes or any other form of audiovisual content (Dìàz-Cintas & Remael, 2014, p. 8). They are usually displayed at the bottom of the screen and provide a written representation of the speech in the audio track (Dìàz-Cintas & Remael, 2014, p. 9). Subtitling can be used for various purposes, such as providing translation for non-native speakers, helping people with hearing impairments or providing a written representation of spoken language to aid comprehension. Subtitling can also be used in English language teaching to make it easier for students to understand English content. The use of subtitles in English language teaching is an effective way to help students improve their language skills. Subtitles can help students understand spoken language in English films, television programmes and other audiovisual content (Pujadas & Muñoz, 2019). Subtitles are written texts displayed on the screen that provides a spoken dialogue transcription. They are beneficial to language learners because they can listen and read simultaneously, which helps them understand the story and comprehend what is being said, even if they have difficulty listening comprehension. This is particularly useful when watching films, TV programmes and other audiovisual content in English. By providing a written representation of the dialogue, subtitles enable students to follow the spoken word and help them to improve their understanding and fluency in English. Using subtitles can also provide students with pronunciation examples (Sanjadireja, 2020). Using subtitles as a language learning tool, students can improve their comprehension skills and gain valuable exposure to the nuances of spoken English. When they compare written subtitles with spoken dialogue, they can gain a better understanding of vocabulary, grammar and syntax. In addition, exposure to authentic spoken language in context can help students improve their listening skills and develop a more natural speaking style. Integrating subtitles into language teaching is a valuable way to enhance students' language acquisition and help them improve their English. However, the use of subtitles is only one of many ways to teach English, and the effectiveness of subtitles will depend on the individual student and their specific language needs (Winke et al., 2013). Furthermore, when using subtitles in English teaching, some students may rely too much on them rather than actively listening and trying to understand the spoken language (Grgurović & Hegelheimer, 2007). Although subtitles can provide a written representation of spoken language, they may not accurately represent spoken languages' nuances, such as intonation, intonation changes and stress patterns. The benefits of using subtitles in English teaching will depend on the subtitles' quality and the needs and learning styles of individual students (Winke et al., 2010). Therefore, teachers should not arbitrarily affirm or deny the use of subtitles but should tailor it to the students' English level and emphasis a balanced approach to language teaching that incorporates various techniques and tools to help students improve their language skills. Therefore, the question of whether to use subtitles and which to use remains to be clarified for teachers, and this is what this research examines.

2.4 Incidental Vocabulary Learning from Subtitles

Theoretical frameworks supporting incidental vocabulary learning from subtitles include Paivio's dual encoding theory (2006) and Mayer's multimedia principle (2009). Paivio's dual encoding theory (2006) suggests that information is primarily encoded through the existence of two different encoding systems in the human brain, the verbal system and the visual system, which interact with each other to enable people to remember more. According to Mayer's multimedia principle (2009), text and graphics may facilitate learning more than either medium alone since cognitive processing of the material, deconstruction of it into cognitive representations, and analysis of it based on existing knowledge may facilitate learners' understanding. These two frameworks highlight the integration of text and graphics and theoretically support the potential of subtitles to enhance vocabulary learning for L2 learners of English. Subtitles exposes students to new words and phrases they may not have encountered in language classes. By viewing the written representation of spoken words in context, students can learn the meaning of new words in a way that is more meaningful and easier to remember than simply memorising vocabulary lists. Teng (2019) showed that full subtitles leads to more significant incidental vocabulary learning than keyword subtitles. This approach has shown promise in improving incidental vocabulary learning despite the controversy regarding full subtitles. It has been suggested that the differential effect of subtitles may be due to learners' attention (Winke et al., 2010). Students typically learn words better; however, when the linguistic input to a captioned video is complex, a series of complicated inputs may cause students to focus on specific parts of the language rather than comprehending it as a whole. When the language input in a video with subtitles is complex, it can be difficult for students to understand everything being said, especially if they are not yet proficient. In these cases, students may focus on specific parts of the language, such as vocabulary or grammar, rather than an overall understanding of the content.

However, other researches have questioned the use of videos with subtitles, suggesting that students rely too

much on reading subtitles and that most researches ignore the soundtrack, resulting in only a slight increase in comprehension of the video content (LATİFİ et al., 2016). Similarly, it has also been found that when watching captioned videos, students rely too much on reading the text on the screen; they become passive to incoming information, which leads to superficial learning of complex words (Grgurović & Hegelheimer, 2007). Taylor (2005) argues that presenting pictures (animations) and text (subtitles) at the same time may lead to visual input overwhelming students because of their limited ability to process audiovisual material. There is, therefore, no empirical evidence on the use of videos with subtitles for L2 collocated incidental learning, but researches using videos with subtitles for incidental vocabulary learning may provide relevant insights. Captioned videos may be a powerful means of encouraging collocated learning for L2 students. This research, therefore, focuses on the effect of subtitles on incidental vocabulary learning among Chinese university students.

3. Methodology

3.1 Research Design

3.1.1 Approach

My research approach is quantitative. Most quantitative educational research is expressed in numbers and measurements (Cohen et al., 2018, p. 246). Although quantitative research needs more detail in research compared to qualitative research (Cohen et al., 2018, p. 246). However, the most significant advantage of quantitative research is that it provides descriptive data (Yilmaz, 2013), such as the number of questions that participants answered correctly. Descriptive data is numerical or categorical information that describes a specific phenomenon or group of individuals (Fraenkel et al., 2018, p. 181). It provides a summary of the critical characteristics of the sample (Fraenkel et al., 2018, p. 182), such as mean, median. These data allow me to generalise conclusions more easily. Furthermore, the quantitative method is automated to collect information, and participants can use their mobile phones or computers, enabling respondents from all over the world to participate in the survey simultaneously (Punch & Oancea, 2014, p. 268). This can be both cost and time efficient for the research. It was beneficial to both the participants and me. Therefore, this was the appropriate method for my research.

3.1.2 Strategy

This research uses an experimental strategy, and participants will be given pre-test and post-test. The data collected will be the number of correct answers by participants. The questions mainly include multiple-choice questions and checking the correct options. Compare the number of multiple-choice questions answered correctly with the number of answer words heard in the post-test to see if subtitles help participants develop incidental vocabulary learning. The main advantage of experimental research is the control of external factors, which can determine the causal relationship between the two factors (Muijs, 2010, p. 19). Experimental research is the best way to test causality because it allows me to see the main questions that need to be answered in the affirmative before people can say that one variable leads to another (Muijs, 2010, p. 26). My research is to verify the relationship between subtitles in videos and accidental vocabulary learning, so experiments are one of the best methods for my research. Educational experiment research is a method in which researchers use the principles and methods of scientific experiments to manipulate variables to obtain causality purposefully (Cohen et al., 2018, p. 391). There are usually control groups and experimental groups in experiments. The control group remains the same — nothing is done to it, and all variables that might affect it remain the same (Cohen et al., 2018, p. 391). The other group, the experimental group, has some changes in conditions (Cohen et al., 2018, p. 391). In my research, I will use a control group, the group without subtitles, two experimental groups, one experimental group with English subtitles and the other with Chinese subtitles.

3.2 Participants

A total of 90 different students were asked to participate in this research. A convenience sample was used to select participants. Convenience sampling is often a quick and cost-effective way to recruit research participants (Leiner, 2017). A convenience sample was appropriate for my research because I had limited time or resources and difficulty identifying or obtaining a representative sample of the population being studied. Depending on the research question and the population being studied, it may be necessary to include participants of both genders to ensure that the results are generalisable and applicable to all individuals (Heidari et al., 2019). Half of the participants in this research are male, and half are female. Therefore, the research sample is representative. Snowball sampling will also be used in this research, with some participants being friends of friends. Snowball sampling allows researchers to reach hard-to-reach populations and recruit research participants who may not be identified through other methods, which is a cost-effective way to recruit participants (Shaghaghi et al., 2011). Snowball sampling was a suitable method for my research from an economical and time-cost perspective. In the research, it will be ensured that all participants are between 18-23 years old. Moreover, according to the Common European Framework of Reference, participants will self-rate their English language proficiency at the

B1-B2 level. Thus, despite snowball sampling and convenience samples, participants are still a representative sample and can represent the general situation of Chinese university students. The research design included three groups to which participants were randomly assigned. All participants spoke Chinese as a native language and English as a foreign language.

3.3 Methodology

The experiment is used to collect data for this research.

3.3.1 Experiment

An experimental approach was used to collect data for this research.

The experiment involves both a pre-test and a post-test. The pre-test consists of 30 multiple-choice questions from the CET-4 vocabulary section, which translates the words into English, and the participants will choose the correct option. The post-test will be divided into two parts, with the first part asking the participants to mark the words they hear in order to The first part of the Post-test will be divided into two parts. The second part uses 30 multiple-choice questions, a variation of the pre-test, asking students to select Chinese translations to ensure that the subtitles effectively identify and translate incidental vocabulary for Chinese university students. Words selected for the Post-test appear twice or more in the text, allowing participants to have a greater chance of remembering and understanding the words. If the words appeared only once, the participants might not be able to remember the words or make false memories due to distractions or uncontrollable factors during the experiment. In addition, the pre-test did not help the students to get the post-test right during the research because the pre-test was only to test the participants' vocabulary, and the participants would not know the correct answers during the experiment. Therefore, participants would not be helped by the pre-test in doing the post-test. For the options in both tests, there are four options for each question, and I have designed the process to involve one answer with a similar meaning or similar spelling, and the other two answers are not linked to the question.

3.4 Reliability and Validity

3.4.1 Reliability

Reliability is a necessary but not sufficient condition for research validity; it is a necessary prerequisite for validity (Cohen et al., 2018, p. 245). Reliability refers to consistency and replicability across instruments and groups (Mohajan, 2017). Research results are reliable if replicated (Atkin & Wallace, 2012). Reliability in an experiment is the consistency of results or the degree to which an experiment produces similar results each time it is repeated under the same conditions (Cohen et al., 2018, p. 276). A reliable experiment produces consistent results across different trials. For an experiment to be reliable, all variables present in the experiment must remain constant, and any changes in the experiment must be noted and accounted for (Muijs, 2010, p. 18). Therefore, this research will strictly control the experimental variables to ensure reliability.

3.4.2 Validity

This research draws on two researches by Teng (2019; 2022). This research is not a simple repetition but a combination and improvement based on his research. While Teng's (2019) experiment only used multiple choice questions, in my research, the addition of ticking off the words heard enabled the subtitles to be seen to enable participants to notice and understand more words and learn incidental vocabulary. Therefore, in terms of experimental design, my research corroborated the findings in more ways than one.

Validity is the degree of assurance of delineation of the theory and evidence comparison data used (Ary et al., 2019, p. 267). For an experiment, validity involves the extent to which the tool measures its claimed measurement and the meaning and delineation of the data collection and tool measurements (Ary et al., 2019, p. 242). The validity of an experiment can be divided into internal and external validity. Internal validity refers to whether the experimental treatment impacts the experimental process, and external validity refers to whether the experiment can reach general conclusions and be generalized to other populations and environments (Cohen et al., 2018, p. 276). An experiment can be said to be internally valid, and its results are credible within its scope, but for these results to be valid, they must go beyond the scope of a particular experiment; in short, they must also be externally valid (Cartwright & Hardie, 2012, pp. 137-139). Therefore, in my research, the participants' practices will be strictly controlled during the experimental process. Moreover, the experimental steps will be recorded in detail so that other researchers can also conduct experiments to extend the influence of subtitles on accidental vocabulary learning to other populations and environments, such as Turkish primary school students. Strive for implementation of internal and external validity.

3.5 Ethics

Ethics is an essential element of research (Denscombe, 2017, p. 4). In addition, it is persistent in educational research (Bartlett & Burton, 2016, p. 45). Ethics aims at set qualifications for conducting research to minimise the risk that researchers may cause harm rather than benefit (Brakewood & Poldrack, 2013).

Participants willingly and enthusiastically agreed to participate in the research without being informed of specific interventions. The research team took great care to ensure that the research was conducted in a way that eliminated potential biases in statistics during data collection and analysis, in line with Cohen et al.'s (2018, p. 393) guidelines. The research followed the principles of Randomized Controlled Trials (RCTs) (Cohen et al., 2018, p. 392), meaning that while participants were not informed of the research topic, they were informed of what they needed to do during the experiment. This was to prevent participants from paying undue attention to the subtitles and vocabulary in the video, which potentially skewed the experimental data and compromised the integrity of the research. It was also clear that participants had the right to withdraw from the research at any time without fear of consequences or repercussions.

Confidentiality and anonymity are paramount when conducting research, so the team ensured that all participant data and information would be kept confidential and not made public (BERA, 2018, p. 21). The team also emphasized the importance of safeguarding the data to ensure its safe storage. When the research is complete, and the results are produced, the team will inform participants of the results while maintaining anonymity and confidentiality of data. The research implications could be significant, and participants will have the opportunity to learn how their involvement contributed to the research and its findings.

3.6 Data Collection

3.6.1 Sampling Technique

It is a purposive sample because I selected the participants based on two characteristics (Cottrell, 2014). Participants in this research speak English as a Second Language and study English at a university.

3.6.2 Research Plan

Table 1. Research plan

Time	Activity
January	- Research proposal - E-forms
February	- Draft of Methodology chapter - Draft of Literature review chapter - Instrument submission - Conduct of experiment
March	- Draft of Conclusion chapter - Draft of Introduction chapter
April	- Draft of Analysis chapter -Amendment in light of feedback
May	Final submission

3.6.3 Conduct of the Research

The duration of the activity was conducted according to the research plan. All of the participants were cooperative in the implementation of this project.

3.7 Research Analysis Method

3.7.1 Quantitative Data

The data obtained from the experiments are quantitative. Quantitative data analysis is based on statistical and numerical descriptions and interpretation of objects as it aims to interpret data collected through numerical variables and statistics (Mandel, 2012). Descriptive data will be collected in this research. They provide absolute numbers obtained from a sample but do not necessarily explain the underlying rationale behind the numbers and are primarily used to analyse individual variables (Mandel, 2012). This research uses Microsoft Excel software for quantitative analysis. The results are then presented in the form of a graph.

4. Analysis

4.1 Research Question 1: Do Students Remember Any Words from the Subtitles of the Videos They Have Watched?

4.1.1 The Improvement of English Vocabulary Learning Efficiency of University Students in China by Video Teaching

I made basic descriptive statistics on the data collected before the experiment. Similarly, descriptive statistics are made on the data collected after the experiment to test the effectiveness of video English teaching in improving the vocabulary learning efficiency of university students in China. Specifically, I compared the scores before and after the experiment to determine whether vocabulary learning significantly improved after video English teaching.

Descriptive statistics of data after the experiment provide insight into the distribution and concentration trend of scores. These statistics include the average, median, mode, range and standard deviation of scores. By analyzing these statistics, I can determine whether the participants' vocabulary learning efficiency has significantly improved after the experiment. The results of descriptive statistics and the different test results before and after the experiment will help me understand the effectiveness of video English teaching in improving the vocabulary learning of university students in China.

The following is a descriptive statistical table of the scores of 90 participants before and after the experiment.

Table 2. Descriptive statistics of score data before the experiment

Variable name	Sample size	Median	Mean	Standard deviation
Pre-test score	90	22	21.178	4.408

Table 3. Descriptive statistics of score data after the experiment

Variable name	Sample size	Median	Mean	Standard deviation
Post-test score	90	26	25.133	2.39

To enhance the visual representation and better understand the data, I visualised the statistical measures of the total pre-test and post-test scores. In other words, I turned the scattered data into tables and bar charts, which allowed for a more visual representation of the data, distribution and trends. The graph below shows the distribution of the total scores for the pre-test and post-test groups.
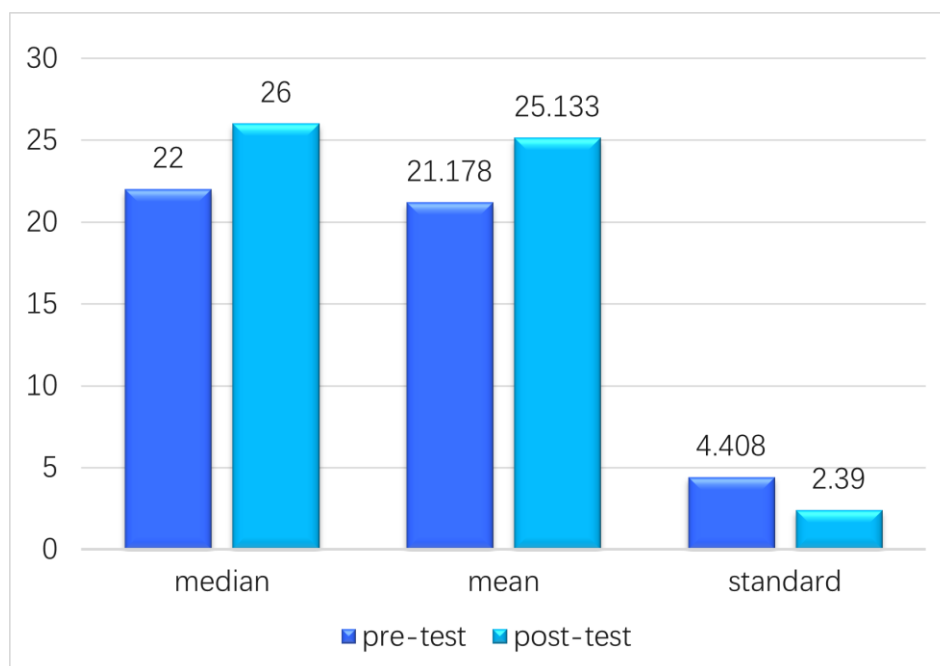

Figure 1.

In this descriptive statistic, the mean values represent the participants' average scores before and after the

experiment, indicating the number of correct answers answered by the participants. These data reflect the participants' proficiency in English vocabulary and attest to the accuracy of their answers to the questions. The pre-experimental descriptive statistics show that the mean score was only 21.178, while the mean score significantly increased to 25.133 after the experiment. This indicates that the participants' accuracy in answering the questions increased significantly, i.e., watching the video improved the Chinese university students' vocabulary learning efficiency and thus their accuracy in answering the questions. The participants' scores were similar in each group in the pre-test, so it can be said that the participants' English vocabulary levels were similar before they participated in the experiment.

The mean score indicates a concentrated trend often used in descriptive statistics, representing the arithmetic mean of a set of values, giving me more data. In this case, the mean score indicates the participants' overall achievement in the vocabulary learning activity, as indicated by their ability to answer the questions accurately. The increase in mean scores from the pre-test to the post-test indicates a considerable increase in participants' vocabulary proficiency.

Similarly, the median is a statistical measure that indicates the median value of a set of data. In the case of the vocabulary learning task, the median reflects the participants' intermediate level of English vocabulary proficiency, as indicated by the number of questions they answered correctly before and after the experiment. Unlike the mean, which is influenced by extreme values in the data, the median is less influenced by outliers and can better represent the typical performance of participants. As the mean is susceptible to the influence of extreme values, it is essential to consider both the mean and median when analyzing the data. From Figure 1, it is evident that the participants' median score increased significantly from 22 before the experiment to 26 after the experiment, indicating an overall improvement in their intermediate level of English vocabulary proficiency through watching the video.

The median is a useful measure of central tendency that provides a more robust measure of the participants' typical performance, as it is less affected by the presence of outliers. In this research, the median score is an essential complement to the mean score, providing additional evidence of the effectiveness of video-based vocabulary learning for Chinese university students.

The variance is a statistical measure that quantifies the deviation of the correct number of questions answered by participants before and after the experiment from their respective means. A more considerable variance indicates more excellent data dispersion, which reflects more significant differences in English vocabulary proficiency among participants. In this research, I observed that the variance in the correct number of questions answered by participants after the experiment was lower than before, which indicates a reduction in the differences in English vocabulary proficiency among participants after the experiment.

Variance is a crucial statistical measure that helps to understand the spread of data and the extent to which individual scores differ from the average score. In this context, examining the variance of participants' English vocabulary proficiency pre-test and post-experiment can help determine whether the variance in proficiency levels among participants has decreased. This can aid in evaluating the effectiveness of video-based vocabulary learning in enhancing overall English proficiency.

4.1.2 The Improvement of English Learning Efficiency of University Students in China by Subtitles

This research aimed to examine how video subtitles affect the vocabulary learning outcomes of Chinese university students. This research divided participants into three groups: two experimental groups, a Chinese subtitled group and an English subtitled group, and a control group with no subtitles. The experimental group consisted of 60 participants watching the videos with English or Chinese subtitles, with 30 participants in each group. Moreover, the control group consisted of 30 participants watching the video without subtitles.

I analysed the three groups statistically to compare their vocabulary learning efficiency. The results of this analysis will provide insights into the impact of subtitling on vocabulary learning efficiency. They will provide the basis for developing effective teaching strategies to improve the vocabulary learning of Chinese university students.

Descriptive statistics are as follows:

Table 4. Table of statistics of each group

Variable name	sample size	maximum	minimum	median	mean	Standard deviation
English subtitles	30	28	22	27	26.467	1.358
Chinese subtitle	30	30	22	26	25.833	1.84
No subtitles	30	27	17	24	23.1	2.383

The maximum and minimum values represent the maximum and minimum number of correct responses for each group, respectively, reflecting the highest and lowest levels of participants' English vocabulary ability. As shown in Table 4, the maximum values for the group with subtitles were 30 and 28 (i.e., the number of all correct questions), and the minimum values were both 22, both higher than the group without subtitles. This indicates that both the maximum and minimum levels of incidental vocabulary learning were higher for the participants in the experimental group with subtitles than for the group without subtitles.

In addition, the means of the group with subtitles were higher than those without subtitles, suggesting that watching videos with subtitles increased participants' average English vocabulary levels. This finding suggests that subtitles had a positive effect on participants' incidental vocabulary learning, which answers the first research question of this research.

This research shows that video subtitles can improve Chinese university students' vocabulary, especially incidental vocabulary learning. In other words, subtitling can better help them learn incidental vocabulary.

4.2 Research Question 2: Which Type of Subtitles Helps Students Remember More Words from the Videos They Have Watched?

4.2.1 Based on Multiple Choice Questions

In my research, I divided the experimental group into three groups, each with 30 participants. One group watched the video without subtitles, one group watched the video with Chinese subtitles, and the other group watched the video with English subtitles. This division aimed to investigate the impact of different types of subtitles on language learning outcomes.

It is important to note that all participants were Chinese university students whose native language was Mandarin. In the research methodology section, it is made clear that the participants learned English as a foreign language, meaning that English was not their first language and that they learned English as a target language. This information is included to ensure the transparency and validity of the research.

To assess the effects of different types of subtitles, I conducted descriptive statistical analyses on two experimental subgroups. This involved collecting and summarising data on the participants' incidental vocabulary learning outcomes. To further illustrate my research's impact, I included descriptive statistics for the no subtitle group in the tables. The no subtitle group watched the videos without any subtitles. By comparing the group's results with and without subtitles, I can assess the impact of different types of subtitles on language learning outcomes.

The tables in my research provide a comprehensive summary of the data collected and analysed, enabling a clear understanding of the findings and their implications in language learning research. In addition, I have identified the participants as Chinese university students learning English as a foreign language, which is essential information for the research methodology and its validity.

The histogram is a useful tool to represent data distribution in a frequency distribution visually. This research used histograms to compare the mean scores of the three experimental groups regarding incidental vocabulary learning outcomes. The histogram's x-axis indicates the range of scores, while the y-axis indicates the frequency of occurrence. The histograms provide a clear and concise summary of the data by plotting the mean scores for each group. This allows me to understand better the distribution of scores and the effect of different types of subtitles on language learning outcomes.
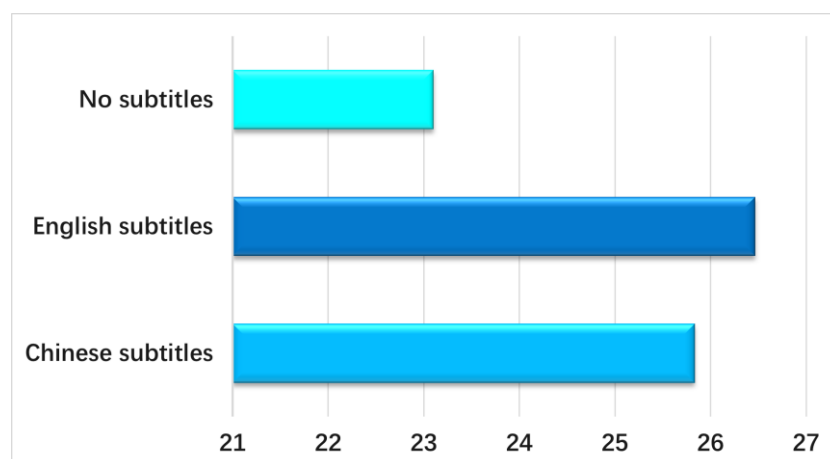

Figure 2. Histogram of mean score of each group

According to Table 4 and the histogram, the mean score was higher for the group that watched the English subtitles than the group that watched the Chinese subtitles. However, the two groups had no significant difference between the minimum and maximum values. The mean scores of both groups were significantly higher than those of the control group without subtitles. These results suggest that using English subtitles in videos can improve the incidental vocabulary learning of Chinese university students.

4.2.2 Based on the Number of Words Heard

In my previous analyses, I focused on the number of correct multiple-choice questions for the three participants, reflecting the effectiveness of vocabulary acquisition. To further investigate why different language subtitles lead to improved vocabulary acquisition, I designed a question in the post-test that asked participants to select the words they heard in the video. I then counted the number of words selected by each participant and aggregated the data to obtain the average number of words selected by each group.

Based on these results, I created histograms to compare the average number of words selected by participants in the no subtitle, Chinese and English groups. These histograms visually represent the number of words perceived by each group and help to explain the differences in incidental vocabulary learning outcomes observed in previous researches.
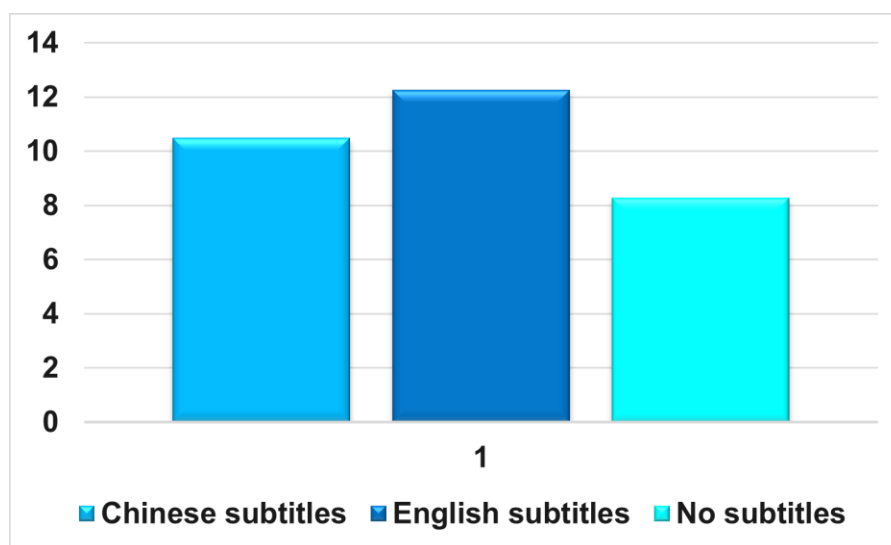

Figure 3. Histogram of the number of words heard by each group

According to Figure 3, participants in the English subtitled group heard the highest average number of words, followed by the Chinese subtitled group. The no subtitle group heard the lowest average number of words. These results suggest that video instruction with subtitles can improve students' audiovisual memory and facilitate incidental vocabulary learning.

Overall, my findings suggest that using English subtitles is most effective in improving the incidental vocabulary learning of Chinese university students.

5. Discussion of Results

5.1 Research Question 1: Do Students Remember Any Words from the Subtitles of the Videos They Have Watched?

The use of video as a teaching tool has become increasingly popular in recent years, particularly in language learning. With technological advances, adding subtitles to videos has become common practice.

This research explores whether students can remember words from the subtitles of videos they have watched. The findings suggest that subtitles can significantly improve participants' learning. At the end of the experiment, participants in the group with subtitles could recall more English words and had more correct answers to the Chinese meanings of English words.

These results are consistent with previous research in which Teng (2022) used experimental research to investigate the effects of watching television documentaries on incidental vocabulary learning. The research also explored whether watching documentaries with subtitles would affect incidental vocabulary learning. The research concluded that videos with subtitles could effectively enhance students' vocabulary learning,

comprehension and appreciation. Furthermore, the findings of this research suggest that subtitles is useful for incidental vocabulary learning. Videos with subtitles are becoming increasingly popular in language classrooms, and Teng's research further supports their effectiveness. By providing visual and auditory input, subtitles can help learners reinforce the meaning and spelling of words and facilitate the memorisation of new vocabulary. My findings echo those of Teng's research.

Sanjadireja (2020) conducted research using subtitles to teach video pronunciation — the research aimed to investigate the effectiveness of subtitles in improving students' pronunciation skills. The results showed that the use of subtitles in pronunciation instruction had a significant effect on students' pronunciation skills. The experimental group that received video lessons with subtitles showed better pronunciation skills than the control group. This research suggests that using subtitles in pronunciation instruction can be an effective tool for language learning.

These researches suggest that the use of subtitles in videos can have a positive impact on incidental vocabulary learning. However, the retention of words presented in subtitles may decline over time. These findings are consistent with the idea that learners need repeated exposure to new vocabulary to remember it (Schmitt, 2002).

However, when subtitle is used in ELT, some students may rely excessively on the subtitles rather than actively listening and trying to understand the spoken language (Grgurović & Hegelheimer, 2007). The benefits of using subtitles in ELT will depend on the quality of the subtitles and the needs and learning styles of individual students (Winke et al., 2010). Nevertheless, using subtitles is essential to consider specific conditions and factors. The effectiveness of subtitles may depend on various factors such as the type of subtitles, placement, duration and the student's language level (Shrosbree, 2021).

In conclusion, research has shown that the use of subtitles in videos can have a positive impact on incidental vocabulary learning. Therefore, teachers should consider using subtitles as a teaching tool but also to provide repeated exposure to new vocabulary and consider the subtitles' proficiency and design when using them. Teachers still need to consider many factors when using them, however, such as the type of subtitles, which I will discuss in the next section and the size and colour of the subtitles.

5.2 Research Question 2: Which Type of Subtitles Helps Students Remember More Words from the Videos They Have Watched?

Using subtitles in videos has become widespread in language learning classrooms as they provide additional support for students to understand spoken language. However, which subtitling is more effective in helping students remember new vocabulary is still being determined. In this discussion, I will compare the effectiveness of Chinese and English subtitles in helping vocabulary recall.

The research by Fang, Zhang and Yuan (2019) compared the effectiveness of using bilingual and English subtitles when teaching English as a foreign language to Chinese university students. The results showed that both groups of students improved their vocabulary and listening comprehension after watching the videos with subtitles. The research found that the students who watched the English subtitled videos showed more significant improvements in incidental vocabulary learning than those who watched the bilingual ones. The researchers suggest that this difference may be because the group with bilingual subtitles relied more on Chinese subtitles, which may have hindered their ability to learn English vocabulary.

The research found that the students who watched the English subtitled videos showed more significant improvements in incidental vocabulary learning than those who watched the bilingual ones. The researchers suggest that this difference may be because the group with bilingual subtitles relied more on Chinese subtitles, which may have hindered their ability to learn English vocabulary.

Some researchers have suggested that the effectiveness of subtitles in facilitating vocabulary learning may depend on the learners' proficiency level. For example, Teng (2022) conducted an experimental research to examine the effect of watching a subtitled television documentary on incidental vocabulary learning. It also investigated whether watching television documentaries with subtitles affected incidental word learning. This research demonstrated that language learners with outstanding ability outperformed others when recognising and remembering word forms and meanings in videos with subtitles. It also mentions that teachers need to remember that students have different levels of language proficiency. Supporting subtitles may benefit learners with lower proficiency.

In conclusion, English subtitles may be more effective than Chinese subtitles in aiding vocabulary recall. Language differences between English and Chinese, as well as the design of the subtitles, may account for this difference. However, further research is needed to explore the optimal design and use of subtitles to acquire and retain vocabulary in different contexts and with different learners. In addition, considering learners' proficiency when selecting Chinese and English subtitles is also a factor for teachers when considering which subtitles to use.

6. Conclusion and Recommendations

6.1 Aims

6.1.1 Main Purposes of the Research

The purpose of this research was to examine how the use of subtitles in videos affects incidental vocabulary learning, to assess whether subtitles have an impact on incidental vocabulary learning, and to determine which types of subtitles are most effective for incidental vocabulary learning.

6.1.2 Main Outcomes in Relation to the Aims of the Research

The findings show that video subtitles significantly impact Chinese university students' incidental vocabulary learning, with English subtitles having the best effect.

6.2 Recommendations

The results of this research suggest that including subtitles in videos can effectively enhance incidental vocabulary learning among Chinese university students. The findings suggest that video subtitles can be essential to facilitate incidental vocabulary learning for language learners. Specifically, the research found that those with English subtitles learned significantly more words than videos without or with Chinese subtitles. Based on these findings, I recommend that educators and curriculum designers consider using English subtitles in research lab videos for language learning. English subtitles provide additional language input and support for learners with limited exposure to English daily and can enhance their incidental vocabulary learning.

6.3 Developments

This development section has been written using the reflection model of Kolb (2014).

6.3.1 Professional Developments

This research has contributed to incidental vocabulary learning. I will be studying different types of subtitles in the future and learning how to use them effectively to improve incidental vocabulary learning for my students. I was also provided with resources and support in this research to help me integrate these strategies into my daily teaching practice. In the future, I will adapt them to suit my students' abilities. Greater confidence in using subtitles effectively in teaching practice and improved incidental vocabulary learning outcomes for students will have long-term benefits for their language proficiency and academic success.

6.3.2 Personal Development

In addition to career development, using subtitles in videos with accompanying vocabulary learning by Chinese university students could also benefit my personal development. As a learner of English as a second language, I have also gained some experience conducting this research. The choice of subtitles will also be a technique to improve my English when watching videos in the future. In addition to this, my academic writing has significantly improved due to the writing process.

6.4 Evaluation for Further Research

6.4.1 Evaluation of this Research

One limitation of this research is the over-reliance on quantitative methods; mixed methods research can better reveal learners' incidental vocabulary learning through video with subtitles. In this research, quantitative methods can measure the amount of vocabulary learning, while qualitative methods can be used to explore the learning process and influencing factors. Mixed methods research can provide a more nuanced understanding of learners' incidental vocabulary learning through video with subtitles. Another limitation of this research is that only descriptive statistics and not inferential statistics were used when analysing the data. This means that the findings of this research can only be drawn from the participants in this research, and there is no way to extend the descriptive statistics to the sample as a whole to advance the descriptive statistics further. Also, my sample was limited to Chinese university students. Further research is needed to explore the effectiveness of subtitles in research lab videos for different types of learners and contexts.

Despite the limitations, this research makes a new contribution to incidental vocabulary learning. This research supports the value of in-video subtitles in enhancing incidental vocabulary learning among Chinese university students, particularly regarding recognition and recall of word meanings. The findings have important implications for language teaching practice and contribute to developing more effective language learning strategies. The subtitles in the video can be used as a source of experience for vocabulary development among Chinese university students. This research further proves that subtitles can influence incidental vocabulary learning in videos.

6.4.2 Extend Subsequent Research

This research only looked at Chinese university students; future research could change the variables and expand

the scope to include Chinese university students of all English levels. It is also not just limited to China. Learners of English as a second language from all over the world could be participants in the research.

Future research should include a more diverse sample of participants to expand understanding of the impact of captioning on vocabulary learning. This may involve investigating the effectiveness of different types of subtitles, such as keywords and dual subtitles, and exploring additional variables that may influence the efficacy of subtitles, such as the complexity of the vocabulary, the type of video content, and the duration and frequency of exposure to subtitles. These efforts could help to identify the optimal conditions for incorporating subtitles in language learning laboratory videos.

Future research could also explore the potential of video with subtitles to enhance other language skills beyond vocabulary learning. For instance, subtitles in foreign language learning can help improve learners' listening comprehension by providing visual cues that supplement auditory input. The use of video with subtitles enables learners to both see and hear the language being used simultaneously, thereby helping them identify and learn new phrases and words, understand the contextual meaning, and develop their listening skills. Moreover, video subtitles can also influence pronunciation by providing learners with visual cues for correct pronunciation. Seeing the phonetic sounds of words can help learners better comprehend the language's pronunciation, which may result in more accurate pronunciation. Further research could investigate the effects of video with subtitles on these language skills and compare the effects across languages and learners of different levels. This could help inform best practices in using video subtitling in foreign language learning and provide valuable insights for language educators and learners alike.

6.5 Summary

The final chapter re-examines the main aims and findings of this research. Moreover, it makes recommendations based on the research. In addition, the chapter discusses the development of the researcher and the evaluation of this research and future research.

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