

Research Article:

The Role of Motivation in Incidental Vocabulary Learning through Academic Videos

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ABSTRACT

Recent studies suggest incidental vocabulary learning (IVL) through audio-visual input to be effective for ESL vocabulary development. However, no research has been conducted on IVL gains from academic videos, an accessible, cost- and time-efficient educational tool. Furthermore, as studies suggest that students tend to have high motivation when videos are used during teaching, it is suggested that IVL gains could vary according to student motivation levels. Therefore, this research intends to address the gap of potential IVL gains for ESL learners through academic videos and its possible relationship with motivation. A total of 56 ESL pre-university students in an English-medium university in Malaysia participated in this study. IVL gains were measured through a modified Vocabulary Size Test including a target words test before and after watching the 10-minute academic video. Students' motivation level was measured using a video motivation questionnaire. The results indicated a significant IVL gain with 0.78 (3.9%) of the target words learned on an average. However, no correlation was found between student motivation level and IVL gains. Therefore, results from this study may give an insight on how TESOL educators can integrate academic videos into innovative, formal and informal teaching practices to develop the vocabulary of ESL students through IVL.

Keywords: Incidental vocabulary learning, academic videos, video motivation, vocabulary motivation, flipped classroom videos

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INTRODUCTION

Vocabulary knowledge is known to play a vital role in developing second language (L2) proficiency for academic achievement in higher education (Daller & Xue, 2009; Roche & Harrington, 2013; Schuth et al., 2017). However, research has found that tertiary students in English-medium universities (Szabo et al., 2020), including in the Malaysian setting, do not possess the adequate vocabulary size necessary for comprehension of academic texts (Tan & Goh, 2017). Thus, there is a need for vocabulary development, which can be learned intentionally or incidentally, for ESL students in English-medium universities.

While research has acknowledged that intentional vocabulary learning—the purposeful learning of words through meaning-focused tasks—yields high vocabulary gains, due to the substantial amount of vocabulary necessary for language use, it is doubtful that learners are able to learn words exclusively through intentional vocabulary tasks (Webb et al., 2020; Webb, 2019). Consequently, research has found audio-visual input to be rich sources of exposure to English which can effectively develop vocabulary through incidental vocabulary learning (IVL)—the learning of words implicitly as a by-product of a meaning-focused task (Montero Perez, 2020; Peters et al., 2016; Teng, 2021). However, minimal research has been conducted on the benefits of academic videos to enhance IVL for ESL learners. Recently, as academic videos are an accessible, cost and time-efficient tool, its use has increased in teaching through blended learning and flipped classrooms (Nwosisi et al., 2016). It is thus crucial to explore how watching academic videos can facilitate IVL and develop students' vocabulary knowledge.

Additionally, it has been postulated that there is a relationship between motivation and IVL, where intrinsic motivation will yield higher IVL gains compared to extrinsic motivation (Hulstijn & Laufer, 2001; Lu & Huang, 2009) as intrinsically motivated students pace their learning effectively (Zhang et al., 2017). However, the relationship between motivation and IVL has been scarcely explored (Zhao et al., 2016). As research has found that students tend to have a high motivation to watch academic videos (Bravo et al., 2011) and IVL gains could vary according to student motivation level, it is therefore necessary to investigate the relationship between intrinsic motivation and IVL gains.

To address these gaps, the present study investigates the extent of IVL gains from watching a 10-minute academic video and its possible relationship with intrinsic motivation in the context of ESL learners in an English-medium private Malaysian university. By examining if IVL gains occur from academic videos and investigating the relationship between IVL gains and intrinsic motivation, this study aimed to provide insight on how educators can implement strategic lesson planning to incorporate academic videos into their lessons to increase vocabulary knowledge and intrinsic motivation of their students.

LITERATURE REVIEW

Incidental Vocabulary Learning through Audio-Visual Input

IVL refers to the absence of a conscious intention to commit a word to memory, which typically occurs when learners make an educated guess based on context (Rott, 2012). Knowledge gained through IVL is most likely receptive vocabulary knowledge, as it involves the ability to recall a meaning of a word when it is met (Schmitt & Zimmerman, 2002; Webb, 2019). This does not necessarily mean, however, that IVL can only occur through receptive tasks and can only contribute to receptive vocabulary knowledge. Vocabulary can also be learned incidentally when completing productive tasks, i.e., learners incidentally learning words used when writing an article (Lu & Huang, 2009). However, as this study aims to investigate IVL from a receptive task of video watching, the present study will focus on IVL gains through receptive tasks.

The relationship between IVL gains through audio-visual input can be explained using the multimedia principle and the dual-coding theory (DCT). The multimedia principle postulates that aural input combined with visuals break down information into simpler input that improves comprehension of a text (Fletcher & Tobias, 2005). Similarly, the DCT posits that when a word is presented in both verbal (speech) and nonverbal (visual) codes, the word is represented more fully, leading to a more concrete understanding and recall of the word (see Figure 1) (Clark & Paivio, 1987). Thus, the DCT along with the multimedia principle suggests that the simultaneous input of speech and visuals that occurs through audio-visual input, can improve vocabulary learning by forming more concrete, comprehensive understanding of the vocabulary presented (Sadoski, 2005; Teng, 2018).

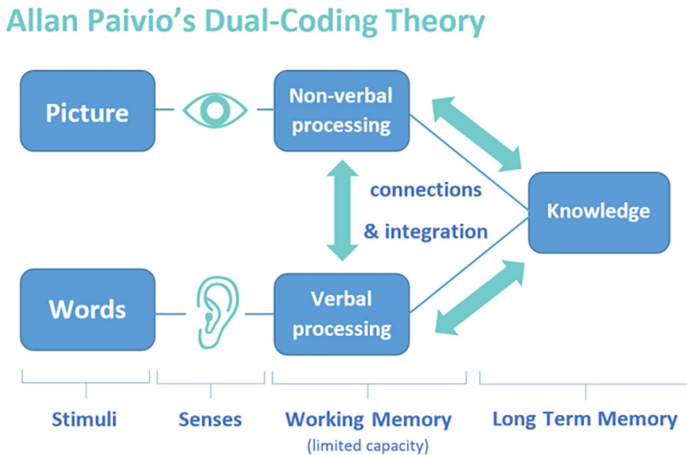


Figure 1. Diagram of the dual-coding theory (Kirschner & Neelen, 2017)

Furthermore, there is strong evidence supporting significant IVL gains from audio-visual input (Montero Perez, 2020; Peters & Webb, 2018). For example, in a study exploring IVL gains, 8% more words were recognised after watching a full-length television series compared to participants who had not watched the series (Peters & Webb, 2018). Similarly, IVL gains from watching a documentary clip found significant gains of 2.64 words more, on average, than the control group for word meaning recognition (Montero Perez, 2020). Together, these studies suggest a strong potential for IVL occurring through audio-visual input to assist in vocabulary development for ESL students. However, while most research have found significant gains from IVL through audio-visual input, the majority of studies had used audio-visual material of entertainment value such as television series (see Peters & Webb, 2018; Rodgers, 2013), as opposed to audio-visual material designed specifically for teaching.

In recent years, the use of academic videos has increased in teaching due to innovative methods such as blended learning and flipped classrooms (Brame, 2017; Nwosisi et al., 2016). Academic videos can be defined as instructional material dedicated to support main content of the lesson by introducing new concepts and recapping important learning points (Almurashi, 2016; Jones & Cuthrell, 2011). The distinction in purpose of academic videos differentiates academic videos from other audio-visual material, such as television, that is primarily purposed for entertainment (Güven, 2017). Furthermore, as research indicates that students are motivated to watch videos when being taught (Bravo et al., 2011), it has been suggested that IVL gains could vary according to student motivation level (Hulstijn & Laufer, 2001; Krashen, 1982; Zhang et al., 2017).

Motivation and IVL

The relationship between motivation and IVL can be elaborated through the involvement load hypothesis (ILH) (Hulstijn & Laufer, 2001), which uses three different motivational-cognitive constructs to explain the different learner-related factors that lead to various levels of IVL gains. Of the three factors, need is most relevant for this study as it is the only motivational construct (Hulstijn & Laufer, 2001). According to Hulstijn and Laufer (2001), there are two degrees of prominence suggested for need: moderate and strong. A learner's need to complete a task is moderate when it is extrinsically motivated (EM) and strong when it is intrinsically motivated (IM), i.e., imposed by learners themselves (Lu & Huang, 2009). Therefore, Hulstijn and Laufer (2001) argue that learners with high IM would gain more vocabulary through IVL from a task.

In a study by Becker et al. (2010), the relationship between IM to read and reading literacy was explored. One of the components for reading literacy was vocabulary knowledge. They found that IM to read had a positive, significant relationship with reading literacy, where students gained more vocabulary knowledge when they were intrinsically motivated. Contrastingly, students that were extrinsically motivated had a negative correlation with reading literacy (Becker et al., 2010). This finding is corroborated by evidence of IM having found to have a significant, positive, direct and indirect effect on participants' vocabulary

knowledge (Zhang et al., 2017). While EM also had a significant, positive effect, it was indirect, with a less influential role on vocabulary learning (Zhang et al., 2017). These studies suggest that IM, as opposed to EM, has a stronger relationship with vocabulary learning. Therefore, this study will focus on the relationship between IVL and IM.

Wigfield and Guthrie (1997) further categorises IM into curiosity, involvement and a preference for challenge. Curiosity is a desire to learn more about a particular topic of personal interest. Involvement is the pleasure gained from an interesting topic. Lastly, preference for challenge is the satisfaction of understanding complex ideas. When curiosity, involvement and preference for challenge are higher, IM increases (Schiefele et al., 2012; Wang & Guthrie, 2004; Wigfield & Guthrie, 1997). This can be attributed to evidence that students with high IM levels tend to pace their own learning, are more persistent in the tasks and take pleasure in rising to challenges and solving problems during a task (Wang & Guthrie, 2004; Zhang et al., 2017). However, limited studies have explored the relationship between general motivation and IVL and none between IM and IVL.

Only one study was found to investigate the relationship between motivation and IVL through reading, but no relationship was found (Zhao et al., 2016). This finding was contradictory to previous studies, as most studies have found a strong relationship between motivation and vocabulary learning (see Fontecha & Gallego, 2012; Sadeghi, 2013; Zhang et al., 2017). However, it could be conjectured that as the study had used reading, it had not incited enough motivation from students as recent studies have found that students are more motivated to learn when videos are used as an educational tool, as opposed to reading textbooks (e.g., Bravo et al., 2011; Gilboy et al., 2015; Yilmaz, 2017). Students report high motivation when watching academic videos as these videos explained complicated concepts simpler and faster, relative to reading (Bravo et al., 2011). Therefore, videos could be a better tool to stimulate students' IM.

The Present Study

While previous research has investigated IVL gains from audio-visual input, none has explored IVL gains from academic videos, that have recently been used more frequently due to blended learning and flipped classroom teaching methods. Furthermore, while students have reported to be more motivated to learn when videos are incorporated in teaching and the involvement load hypothesis proposes for a relationship between IVL and motivation, this relationship has been scarcely explored. Therefore, this study intends to address these research gaps by exploring the relationship between IM to watch videos and potential IVL gains from academic videos through the following questions:

1. To what extent does watching academic videos enable IVL for ESL learners in higher education?
2. What is the relationship between IM to watch videos and IVL through watching academic videos for ESL learners in higher education?

METHODOLOGY

Research Design

This study employed a quasi-experimental repeated measures design where effects of a variable can be clearly observed in a controlled environment (Cohen et al., 2017; Verma, 2015). To address the first research question, quantitative data was collected using a pre- and post-test to measure the vocabulary learned incidentally. To address the second question, quantitative data was collected from a motivation questionnaire to measure students' motivation to watch video.

Sampling

For ease of accessibility, convenience sampling was employed (Farrokhi & Mahmoudi-Hamidabad, 2012). 56 ESL Foundation in Arts and Education and Science students from a private, English-medium, Malaysian university participated in this study. However, for the second research question, only the data of 43 participants who completed the two tests and motivation questionnaire were included in the analysis.

While participants had a CEFR proficiency level of B2 independent users of English, previous studies suggests that Malaysian tertiary students in English-medium universities do not possess the adequate vocabulary size for comprehension of academic text (Tan & Goh, 2017). Therefore, it is likely that participants in this study are representative of ESL tertiary students with a limited vocabulary size. Participant demographics details can be seen in Table 1.

Table 1. Participant demographics

Variable	Research question 1		Research question 2	
	Total participants (<i>n</i> = 56)	%	Total participants (<i>n</i> = 43)	%
Age				
Mean (SD)	18.9 (1.20)		18.9 (1.18)	
16 years old	1	1.79	1	2.33
17 years old	5	8.93	4	9.30
18 years old	15	26.80	9	20.90
19 years old	17	30.40	14	32.60
20 years old	15	26.80	13	30.20
21 years old	1	1.79	1	2.33
22 years old	2	3.57	1	2.33

(Continued on next page)

Table 1. (Continued)

Variable	Research question 1		Research question 2	
	Total participants (<i>n</i> = 56)	%	Total participants (<i>n</i> = 43)	%
First language				
Malay	13	23.30	9	20.90
Mandarin	33	58.90	26	60.50
Tamil	3	5.36	2	4.65
Korean	1	1.79	1	2.33
Japanese	2	3.57	2	4.65
Dhivehi	1	1.79	0	0
Spanish	1	1.79	1	2.33
Arabic	1	1.79	1	2.33
Other	1	1.79	1	2.33

Video

A 10-minute CrashCourse Psychology academic video from YouTube, on the topic of “Social Influence” (CrashCourse, 2014) was selected. This video was related to the participants’ course module therefore classifying it as an academic video, as it can be utilised to support the main content of the lesson or to provide a recap of the lesson (Jones & Cuthrell, 2011).

Target Words

Twenty target words were selected from the video, which were used in the pre- and post-test to measure students’ incidental learning of the target words.

The criteria for choosing the target words were from the New Academic Word List (NAWL) developed by Browne et al. (2013) from the Academic Word List by Coxhead (2000) to present a more recent update to the original list. As the NAWL is specific to academic domains and might be too limited for target word choices, additional words were selected from the British National Corpus using the ‘Compleat Lexical Tutor’ website (<https://www.lextutor.ca/>). As most university students would have already mastered 2000-word frequency (Roche & Harrington, 2013), target words chosen were of mid- to low-frequency range (4,000-word frequency and above). Furthermore, an equal ratio of nouns, verbs and adjectives were selected, which is identified in Table 2 along with the word frequency level and the frequency of occurrence of each target word throughout the academic video.

Table 2. Target items with word class, word frequency level and frequency of occurrence in video

Word	Word class	Word frequency level	Frequency of occurrence in video
Restraint	Noun	4K	1
Publicised	Verb	4K	1
Incompetent	Adjective	4K	1
Subsequent	Adjective	4K	1
Comply	Verb	5K	4
Exert	Verb	5K	1
Deception	Noun	6K	1
Prestigious	Adjective	6K	1
Arouse	Verb	6K	1
Fiascoes	Noun	7K	1
Mesh	Verb	7K	1
Prods	Noun	8K	2
Increments	Noun	8K	1
Mimicry	Noun	8K	2
Lynch	Adjective	9K	1
Contagious	Adjective	9K	1
Underscored	Verb	9K	1
Defiance	Noun	11K	1
Yelps	Noun	13K	1
Normative	Adjective	13K	2

Research Instruments

As the data was collected virtually over a video conference call, all tests were transferred to Qualtrics (<https://www.qualtrics.com>) and was administered online.

Pre- and post-tests

The pre-test consisted of 100 items, 20 of which were the target words and 60 of which were Vocabulary Size Test (VST) (Beglar & Nation, 2007) items. The 60 VST items served as distractors from the target words. Figure 2 displays an example of a VST item.

1. miniature: It is a miniature.
 - a a very small thing of its kind
 - b an instrument for looking at very small objects
 - c a very small living creature
 - d a small line to join letters in hand writing

Figure 2. Extract from 5th 1,000 Word Level of the VST (Beglar & Nation, 2007)

The VST employs a multiple-choice format, whereby participants are provided with the meaning of the word and thus with even a moderately developed knowledge of the word, are able to recognise the meaning when attempting the test (Beglar & Nation, 2007). The VST measures a learner's receptive vocabulary size through form-meaning recognition from the 1st 1,000 to the 14th 1,000 words families of English, consisting of 10 questions per word family (Beglar & Nation, 2007). However, as the primary function of the VST was to serve as distractors and having 140 items has proven to reduce participant interest and motivation (Coxhead et al., 2014; Szabo, 2016), this study halved the VST where each frequency band was reduced from 10 to 5 items to reduce participant fatigue (Szabo et al., 2020). Vocabulary from the 3,000 to 14,000 words frequency level was measured, totaling to 60 VST items.

The target words chosen from the video (see Table 2) was present in the pre-test and was used as the post-test after watching the video. To test for the target words, the same format as the VST was used. The Cronbach's alpha value for both tests indicated that items were within the acceptable range, where the pre-test had an internal consistency of 0.92 ($n = 100$), and the post-test had an internal consistency of 0.75 ($n = 20$).

Intrinsic motivation toward watching videos

The intrinsic motivation towards watching videos questionnaire was adapted from the Motivation for Reading Questionnaire-Revised (MRQ-R) by Wang and Guthrie (2004). The Likert scale was used, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire indicated marginal reliability ($\alpha = 0.61$).

The original questionnaire had eight scales: three related to IM and five related to EM. As this study focused solely on the effects of IM, only IM questions that were related to videos was utilised. In total, three IM scales were used ('curiosity', 'involvement' and 'preference for challenge') based on Wigfield and Guthrie's (1997) study on children's motivation to read. As the questionnaire was initially designed to test for reading motivation of elementary school students (Wang & Guthrie, 2004), the questionnaire was adapted in this study to assess motivation to watch video of university students (see Appendix A).

The original questionnaire had a total of seven items for the involvement scale of IM. However, due to four items having been omitted because they were closely related to reading as opposed to watching videos, there were a total of three items for the involvement scale of IM, and a total of 15 items for the entire questionnaire.

Procedure

The data was collected across two sessions during regular teaching hours in a Foundation in Arts and Education and Science core module.

Participants completed the pre-test to measure their vocabulary knowledge prior to watching the video. After watching the video, participants then completed the post-test to measure the IVL gains from the video. As the largest disadvantage of a repeated measures design is participant fatigue which might decrease participants’ optimal performance (Graves, 1986; Gyllstad et al., 2015; Verma, 2015), the motivation questionnaire was taken during a second session. Table 3 exemplifies the study procedure in a visual format.

Table 3. Experimental procedure

Session	Procedure	Duration (minutes)
1	Consent and information sheet	5
	Modified vocabulary size test	30
	Break	5
	Academic video	10
	Post-target words test	10
1 Week Interval		
2	Intrinsic motivation to watch videos questionnaire	10

RESULTS

Research Question 1: IVL from Academic Videos

As seen in Table 4, target word scores of participants improved, on average, by 0.78 (3.9%) with a maximum of five words learned and a total of 30 participants (53.6%) having positive IVL gains after watching the video.

Table 4. Descriptive statistics of pre- and post-target words tests

Year	Educational video	Test scores	<i>n</i>	<i>M</i> (%)	<i>SD</i>	Min	Max
Foundation in Arts and Education and Science	With captions	Pre-target words	56	15.3 (76.4)	3.05	6	20
		Post-target words	56	16.1 (80.3)	3.05	8	20

The paired samples *t*-test indicated a significant difference ($t = -3.93, p = 0.0002, 95\%CI [-1.19, -0.38]$) with a medium magnitude effect size ($d = -0.79$) using Cohen’s *d*. Therefore, as the data is significant and the effect size is moderate, the null hypothesis is rejected and the data indicates that IVL does occur while watching academic videos. Figure 3 visually illustrates the IVL gains from the academic video.

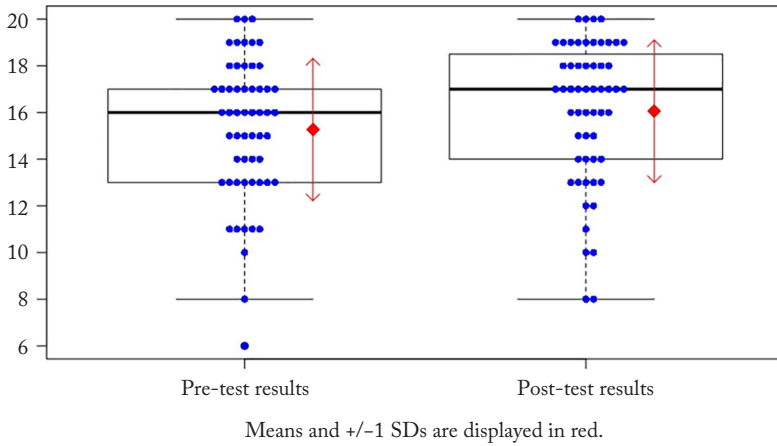


Figure 3. Boxplot of pre- and post-target word score

Research Question 2: The Role of Intrinsic Motivation in IVL from Academic Videos

Descriptive statistics for the intrinsic motivation to watch videos questionnaire results are illustrated in Table 5, where the overall mean score for each construct is above the neural point (3), indicating high motivation levels of participants.

Table 5. Descriptive statistics of adapted motivation for videos questionnaire

Year	Intrinsic motivation constructs	<i>n</i>	Agree (%)	Neutral (%)	Disagree (%)	<i>M</i>	<i>SD</i>
Foundation in Arts and Education and Science	Curiosity	43	35.71 (83.1)	5.57 (13.0)	1.71 (4.0)	4.13	0.42
	Involvement	43	32.30 (75.2)	6.33 (14.7)	4.30 (24.8)	3.95	0.60
	Preference for challenge	43	25.00 (58.1)	12.80 (29.8)	5.20 (12.1)	3.56	0.46

To investigate the relationship between target word scores and motivation scores, a correlation analysis (see Figure 4) was conducted where no correlation was found ($r = -0.02$, $p = 0.88$, 95%CI [-0.32, 0.28]). Therefore, the data fails to reject the null hypothesis as no relationship was found between intrinsic motivation to watch videos and incidental vocabulary learned through watching the academic video.

The histogram in Figure 4 above further exemplifies that while most participants had a high mean motivation score, motivation was not a predictor for IVL gains, which contradicts previous findings that motivation is influential to L2 learning (Becker et al., 2010; Hulstijn & Laufer, 2001; Zhang et al., 2017).

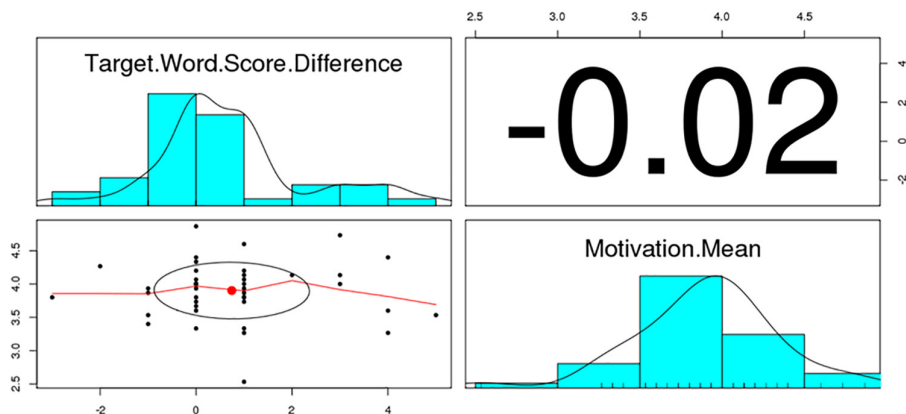


Figure 4. Correlation matrixes of target word score difference and mean motivation score

DISCUSSION

This study expands on previous studies on IVL from audio-visual input by specifying the audio-visual material used to academic videos, a common tool used in the classroom (Nwosisi et al., 2016). It was also one of the first few to focus on the relationship between the IVL gains found and IM. Findings indicated a positive, significant IVL gain from the 10-minute academic video. However, no relationship was found between IVL and IM to watch videos.

The findings for the first research question support previous research (Montero Perez, 2020; Peters & Webb, 2018; Teng, 2021) that audio-visual input does facilitate IVL with a 0.78 (3.9%) average gain of target words after watching the academic video. Although these findings report relatively lower gains compared to previous research which had found greater IVL gains of almost 14%–19.8% (i.e., Montero Perez, 2020; Peters & Webb, 2018), this was likely due to the length of the video used as previous studies had utilised longer videos at 60 minutes (Montero Perez, 2020; Peters & Webb, 2018), compared to the short 10-minute video used in this study.

The positive mean gain in words from this study corroborates with previous studies that propose that, due to the DCT and the multimedia principle, audio-visual input promotes IVL as the simultaneous input of speech and visual improves vocabulary learning through support of concrete and contextual understanding of the vocabulary presented (Ali Mohsen, 2016; Teng, 2018; Türk & Erçetin, 2014).

Furthermore, while most studies explored the learning of IVL through documentaries (Montero Perez, 2020; Montero Perez et al., 2014) or television shows (Peters & Webb, 2018; Puimège & Peters, 2019), this study presented new findings as it had utilised an academic video which differs in purpose, as academic videos provide a support for

the learning of main content of a lesson (Almurashi, 2016; Jones & Cuthrell, 2011). Therefore, this study proposes that academic videos have a secondary function of not only teaching new concepts (Almurashi, 2016; Jones & Cuthrell, 2011), but also in the learning of vocabulary. This finding is crucial especially due to the increase prevalence of the flipped classrooms method, that tend to utilise video watching outside of the classroom (Gilboy et al., 2015, Yilmaz, 2017).

Although this study found that IVL can occur through academic video, findings for the second research question indicated no relationship between the incidental vocabulary learned and the intrinsic motivation of the participants to watch videos. This finding contradicts previous research on IM and its relationship with language learning success (Becker et al., 2010; Noels et al., 2003; Zhang et al., 2017). However, the present findings support some studies that had similarly not found a relationship between motivation and receptive vocabulary learning (Fontecha & Alonso, 2014) and IVL (Zhao et al., 2016).

One possible explanation of this lack of correlation could be that motivation might not have a relationship with receptive tasks compared to productive tasks, as receptive tasks are deemed as less demanding (Nation, 2001). This view is similar to the ILH which emphasises the importance of IM to facilitate IVL during a task, where tasks with higher involvement load (which usually involves productive skills) lead to better retention effects and learning of vocabulary (Hulstijn & Laufer, 2001). Although Krashen (1982) expressed a relationship with language learning and motivation, findings from this study seem to indicate that motivation might not have a relationship with IVL, corroborating with Zhao et al. (2016) who similarly had not found a relationship between IVL and motivation. Thus, these findings appear to indicate that IM might not be as influential to IVL gains where the task has a low involvement load, i.e., viewing a video or reading, compared to other variables such as prior vocabulary knowledge (Montero Perez, 2020; Peters & Webb, 2018), frequency of occurrence and cognates (Peters & Webb, 2018). Further research is therefore necessary to explore the relationship between IM and IVL relative to cognitive and word-related factors, and using tasks with higher involvement loads, such as writing tasks, which is more likely to produce a correlation (Lu & Huang, 2009; Nation, 2001).

It is also likely that there could be a correlation between IVL and IM to learn a language rather than IM to watch video, as previous studies have found a positive relationship between vocabulary knowledge and motivation to learn a language (Fontecha & Alonso, 2014; Sadeghi, 2013; Zhang et al., 2017). Exploring the impact of motivation to learn a language on vocabulary learning, Sadeghi (2013) found that motivated students significantly outperformed less-motivated students in vocabulary knowledge. Similarly, Zhang et al. (2017), had found that IM to learn a language positively predicts vocabulary knowledge. Therefore, the relationship between IVL and IM to learn a language is worth investigating.

Limitations and Recommendations for Future Research

There were several limitations present in this study related to measuring IVL gains and motivation level of participants.

Firstly, the high mean pre-test target words score (15.3 out of 20 items) displayed a ceiling effect. Although this report could be due to participant guessing, it is more likely that the high mean score of the pre-test indicates that most participants had already known the target words, thus limiting learning gains from the video. As previous studies have found that reports of low learning gains are common where there is a small number of target items (Pellicer-Sánchez & Schmitt, 2010), it is thus recommended for future studies to include a higher number of target items. Furthermore, unlike studies such as Peters and Webb (2018) whose participants' mastery level was mostly of the 2-3K band, the participants' mean vocabulary knowledge from this study approached mastery of the 3-8K band (4/5 words). Thus, due to the target words' wide range in frequency level between the 3-11K band, target words might not have been difficult enough for participants, therefore limiting possible vocabulary gains. Further studies could select target words of a particular word frequency range based on participants' initial vocabulary knowledge to increase potential learning gains.

Secondly, previous research findings point toward a positive relationship between frequency of occurrence and vocabulary gains (Peters & Webb, 2018; Peters et al., 2016), as when the frequency of a word increases, the word is likely to be noticed and to become familiar to the individual hearing it (Peters & Webb, 2018). While Peters and Webb (2018) had target words with an occurrence of 1-5 times throughout the audio-visual material used, the present study only had 4 out of 20 target words that occurred more than once (see Table 2). Therefore, potential learning gains might have been limited as participants in this study could have had higher vocabulary gains had the frequency of target words increased. In addition, if the academic video had been used in an authentic setting such as a flipped classroom where students would encounter keywords repeatedly through activities (Bishop & Verleger, 2013), it would raise frequency of encounters and thus might increase IVL gains as well. Therefore, further research is warranted to better understand the relationship between frequency of encounters and vocabulary gains from academic videos.

Recent studies have found that motivation is an inconstant, dynamic construct that fluctuates during learning (Dörnyei & Ushioda, 2011). However, similar to Zhao et al. (2016), this study used only one questionnaire to measure participant motivation and measured motivation at only one point in time, thus treating motivation as a static attribute. Therefore, it is recommended for future research to measure motivational level at different points in time while completing a learning task.

Lastly, as most participants had reported high level of motivation (see Figure 4), the sample lacked variability, exemplified by the low internal consistency found in the motivation questionnaire results ($\alpha = 0.61$). This could perhaps be due to the employment

of convenience sampling where variability is difficult to control (Acharya et al., 2013) or due to the small sample size (Mullineaux & Wheat, 2017) which may not have been representative of the population. Therefore, it is recommended that future studies employ the oversampling sampling method which is more inclusive of the minority population (Hauner et al., 2014) or include a larger sample size to increase variability of the results.

CONCLUSION

While previous studies focused on a multitude of different audio-visual input genres (Montero Perez, 2020; Montero Perez et al., 2014; Peters & Webb, 2018), this study was the first to focus on IVL gains from an academic video. The significant results from the study suggests that participants had acquired vocabulary incidentally, with about 0.78 (3.9%) of the target words learned on an average. In addition, the study is the only study to have explored a relationship between IM and IVL gains from video, and while students had a high IM to watch videos, no relationship was found between IVL gains from the video and IM. Additional research is thus warranted to better understand IVL that occurs from academic videos and its relationship with intrinsic motivation. However, as academic videos are often used in the classroom (Nwosisi, 2016; Yilmaz, 2017), the findings from this study are encouraging, suggesting that academic videos can be used by TESOL educators to not only support the main content of a lesson, but to also raise ESL students' vocabulary knowledge in higher education.

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APPENDIX A

Motivation for Reading Questionnaire: Revised

There are several reasons an individual is intrinsically motivated to watch videos. The following questionnaire will assess your intrinsic motivation level to watch videos. Please circle the number that you agree with of the proposed reasons for watching videos.

1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree,

4 = Agree, 5 = Strongly disagree

Curiosity

1. I like to watch videos because I feel happy when I watch something that is interesting.
2. If the teacher discusses something interesting, I might watch more videos about it after.
3. I have favourite (school/university) subjects that I like to watch videos on.
4. I watch videos to learn new information about topics that are interesting to me.
5. I watch videos about my hobbies to learn more about them.
6. I like to watch videos about new information or topics.
7. I enjoy watching videos about people in different countries.

Involvement

1. If I am watching videos about an interesting topic, I sometimes lose track of time.
2. I feel like I get to know the people (i.e., YouTubers) in the videos I watch.
3. I enjoy watching long videos if I am engaged with the content.

Preference for challenge

1. I like watching hard, challenging videos.
2. If the topic is interesting, I can and will watch difficult videos.
3. I like it when questions in videos make me think.
4. I usually learn difficult things by watching videos.
5. If a video is interesting, I don't care how hard it is to watch to understand it and I will continue watching it.