Article

The Development of Academic and Plain English Parallel Word Lists and Subtitles for Undergraduate Students

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Abstract

Subtitles in tertiary education can enhance language inclusivity. This study compares the effectiveness of academic versus plain English subtitles in discipline-specific videos, using a corpus-based approach to create and evaluate word lists. The findings suggest that plain English subtitles, supported by word lists, clarify scientific terms, especially when following subtitling conventions. However, adjustments are needed when plain English subtitles deviate from these conventions. Additionally, academic subtitles often contain complex terms in Latin and Greek, making a parallel plain English word list essential for aiding students in specialised fields.

Keywords: academic vocabulary; language inclusivity; plain English; subtitling; subtitling conventions; technical terms; undergraduate students; word lists

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1. Introduction

Subtitles and academic word lists are tools that enhance students' understanding and vocabulary in scientific disciplines. Subtitles are a bridge between spoken and written language, helping students grasp scientific content in lectures and videos. Academic word lists, consisting of high-frequency terms in academic texts, build students' vocabulary, which is critical for engaging with scholarly articles (Greene 2013, 36).

This study focuses on developing academic and plain English word lists from subtitled academic videos in one of the modules for natural and agricultural sciences (NAS) students at the University of Pretoria. This study aims to develop parallel word lists (academic and plain English) tailored for the comprehension of academic content through subtitles, with a focus on aiding undergraduate students in NAS. Academic English refers to the formal style of writing and speaking used in educational settings. Plain English refers to a straightforward way of writing that avoids jargon, complex sentences, and technical terms (Cutts 2020, xxiv).

The videos featured three subtitle types: academic English, plain English, and keyword subtitles, explained in the literature review and methodology sections. The study compares the effectiveness of academic versus plain English subtitles in supporting tertiary education, particularly within discipline-specific contexts. Word lists were created using a corpus-based approach to examine subject-specific vocabulary in context.

The study is motivated by the language clause in South Africa's Constitution (Republic of South Africa 1996), which has led to research on the use of subtitles in educational settings (Ayonghe 2009, iii; Hefer 2011, 1; Kruger and Kruger 2004, 111; Kruger and Rafapa 2002, n.p.; Kruger-Roux and Angu 2020, 63; Lacroix 2012, 1; Mahlasela 2012, 12). Subtitles in tertiary education can address language inclusivity, and plain English and keyword subtitles are proposed as solutions to overcome language barriers (DHET 2020). The article discusses the development of word lists that serve as a foundation for creating subtitles, based on methodologies used in corpus-based studies. While traditional academic word lists are derived from a mix of spoken and written sources, this study focuses on subtitled videos to address the unique linguistic features and vocabulary needs of students engaging with spoken academic content. The parallel word lists aim to enhance students' comprehension of spoken academic language specifically within NAS. Subtitled academic videos are employed because they provide a context for spoken language that reflects the terminology and phrasing encountered in real academic settings.

In a previous study, subtitle reception was analysed among NAS students. In that study, videos in an animal anatomy course were subtitled in academic English, plain English, and keyword formats (Kruger-Marais and Kruger-Roux 2023, 2). The plain English subtitles were crafted by editing academic subtitles according to Cutts's guidelines

(2020, xxiv). This article, however, centres on the creation of these subtitles, resulting in the word lists presented in the appendices.

The article examines how subtitles benefit South Africa's multilingual education, discusses plain English principles in subtitling, and considers corpus-based methods in academic subtitling. A corpus is a collection of written texts or transcribed speech used for linguistic analysis. A corpus-based approach is instrumental in developing word lists to better understand academic language usage.

For this study, the following research questions were formulated:

(1) How can academic and plain English word lists be developed from subtitled academic videos for undergraduate NAS students?

(2) What are the linguistic differences between academic English and plain English subtitles in terms of vocabulary and structure?

(3) To what extent do plain English and keyword subtitles address language barriers and enhance language inclusivity in South African tertiary education?

2. Literature Review

In South Africa, non-English-speaking background (NESB) students face the challenge of not being taught in their home language, unlike their English-speaking peers for whom register is key (Prieels et al. 2015, 210). Subtitled materials can help because they improve decoding skills and create "a natural learning situation" (Hefer 2011, 7, 49), enhancing both language and subject understanding.

Secondly, subtitled material in multilingual education settings in South Africa can improve students' reading comprehension (Kruger-Roux and Angu 2020, 64). This is beneficial because it highlights "other ancillary issues such as readability of text and vocabulary issues" in a specific subject (Mahlasela 2012, 30). This helps to justify the need for educational subtitling in South Africa because, as Coetzee-Van Rooy (2009, 18) states, English is rooting itself as an international lingua franca. South Africans link English proficiency to "upward economic mobility … education … [and] liberation" (Coetzee-Van Rooy and Verhoef 2000, 164). Despite this reverence for the language, English proficiency levels are still low among South African speakers, especially second language speakers (Coetzee-Van Rooy and Verhoef 2000, 164; Schaefer and Kotzé 2019, 2). Interventions such as educational subtitling could aid in alleviating these issues.

Thirdly, subtitling could direct attention to issues connected to language (and particularly in the case of institutions where English is the medium of instruction (MOI), which include "inaccessibility of information and illiteracy" (Kruger and Kruger 2004,

111). Kruger and Kruger also argue that addressing these issues will aid "in the implementation of language rights and the promotion of multilingualism" (2004, 111). This assertion highlights another important benefit of subtitled material in multilingual education settings in South Africa, namely improved inclusion of those who have been previously excluded from certain forms of information due to language barriers.

Before exploring the use of plain English subtitles, it is important to clarify what plain English refers to. Plain English is a style of writing which uses simple, unambiguous language to convey information (Cutts 2020, xxiv). This style aims to communicate information in a way that is easy to understand, regardless of a reader's education or background. Plain English reduces ambiguity and makes information accessible to a wider audience, including those with lower literacy levels.

Several studies have been conducted on the use of plain English subtitles, with a focus on their effect on audience comprehension and engagement. One such study by Bernabé Caro and Orero (2019, 55) investigated the possibility of plain English ("Easy to Read") subtitles to be used as an accessibility tool. The researchers concluded that plain English subtitles can improve audience comprehension and should be used more widely in subtitling, especially as an accessibility measure which can be used in conjunction with existing technology.

Thrush notes that while, at the time of her writing, several studies on static plain English texts had been conducted, they were based on "non-technical" texts, and did not include language which would be encountered "in the workplace" (Thrush 2001, 292). Thrush suggests that further research is needed on "how readers from different cultures and language backgrounds interact with texts, and how specific features of English technical writing facilitate or interfere with comprehension" (2001, 292). It is proposed that viewers' engagement with plain English subtitling is one way in which this facilitation or interference can be measured.

In addition to the use of plain English subtitles, there has been little research on the use of plain English conventions in subtitling. This study aims to broaden the existing research on this topic. Plain English conventions involve simplifying the language used in the subtitles to make them more accessible to a wider audience.

2.1 "Translating" Subtitles into Plain English

In relation to the translation of subtitles, Perego (2009, 59) uses the term "explicitation" to describe an instance where the inferred information in a text is expressed more directly in the translated version of the text "… without altering the source message, but making it clearer and more informative." According to Perego (2009, 59), three types of "explicitation" contribute to the "codification of nonverbal information": addition, reformulation, and specification. These types of "explicitation" also occur in the process of converting academic English to plain English and can therefore be applied in this context.

In terms of addition, Cutts (2020, 57) notes that "verbal economy" is good plain language practice. However, since plain English conventions often call for the reduction of technical terms on the grounds that such terms tend to "retain their foreignness" (Blamires 2000, 107), these might need to be replaced with longer, more descriptive terms or even phrases. Since the videos in question were about animal anatomy, several Latin words and phrases were included in the verbatim academic English transcript. Initially, converting these Latin terms into plain English proved challenging, as the English definitions for these terms are often not nearly as concise as their Latin counterparts. Nevertheless, it was essential for clarity that Latin-based technical terms were adapted or replaced.

Making a sentence more descriptive, with less technical language, often makes it clearer and more comprehensible, especially in scientific writing (Greene 2013, 36). In the present study, for instance, the term "nasopharynx" was changed to "upper part of the throat behind the nose" for the sake of clarity and comprehension (Appendix A). While "nasopharynx" embodies Cutts's notion of "verbal economy" (2020, 57), it is not necessarily a clear term that can be understood by all readers. In terms of subtitling standards, the phrase which has replaced "nasopharynx" is longer than 35 characters per line (Karamitroglou 1997, 1). Perego asserts that at times, "… the important subtitling requirement for conciseness can be overruled by the need for explicitness and textual dilution" (2009, 63). For this reason, the extension of the term "nasopharynx" justifiably adds meaning to the scene on the screen, and therefore this term and others like it have been expanded instead of shortened.

The concept of reformulation is used in the compilation of the plain English subtitles in this study. Reformulation sets out explicitly what is inferred by an on-screen speaker (Perego 2009, 63). Perego describes this notion as "the tendency—or rather, the need—for subtitles to be self-contained and autonomous, as if they were the only information carrier for the viewers and the latter did not have access to other communicative channels" (2009, 63).

In the context of subtitling videos in plain English for students in the natural sciences, the "overuse" of Latin and Greek terms should be avoided, as the goal of the plain English subtitles is accessibility. In NAS, Latin and Greek terms form a substantial part of scientific terminology. However, this practice may be viewed as exclusionary, as it is often difficult for students to articulate themselves in a second or even third language, let alone an ancient language such as Latin (Madzimbamuto 2012, 132). The reduction of Latin terms in plain English subtitles is in line with the general plain English guideline of simplicity and avoiding wordiness (Cutts 2020, 57). Therefore, when revising the plain English subtitles, certain Latin terms in the original academic English transcript were changed into more straightforward English terms, as shown above. Although some of these terms are now longer than their Latin equivalents, they do provide more clarity. However, subtitling conventions have still been considered during the "simplification" of these terms. This means that each subtitle line still aims to

contain about 35 characters per line to avoid font size reduction and a slower reading speed among the audience (Karamitroglou 1997, 1; Kruger et al. 2022, 211).

In many cases, the expansion of the plain English subtitles used in this study also serves the purpose of specification. Perego describes specification as "substituting a lexical unit in the [source text] with a different one in the [target text] that is more precise" (Perego 2009, 59). Specification often serves the purpose of "deneutralising" certain terms (Perego 2009, 62), and serves the goal (consciously or not) of target text precision. While specification is often used in transcultural contexts, this principle could be applied in academic English to plain English "translation." An example from the subtitles used in the current study is the change of "*foramen magnum*" to "hole in the skull where the spine goes through" (Appendix A). While the academic English term is more formal and "neutral," the plain English phrase—while not informal—is more exact and easier to understand.

It is with this in mind that select terms in this study's plain English subtitles were sometimes "reformulated." For instance, in a video discussing an animal's reproductive system, the speaker refers to the "perineum" of a male animal. For the plain English subtitles, this term was changed to "area between the genitals and the anus." While not a fully scientific description, the expanded term elaborates on the speaker's implied meaning, especially since reproduction is often a taboo subject for students from certain cultural backgrounds. The plain English phrase is more direct, which aids in clarifying the term (and similar terms) for students.

2.2 Preparing a Corpus-Based Analysis of Academic English and Plain English Subtitles

Corpus linguistics is applicable to the study of media accessibility, especially in the field of subtitling. For subtitling purposes, corpus-based approaches have several benefits since they may be useful in examining the conventions used in subtitling (Baños et al. 2013, 487). In light of this, a corpus-based study of academic English subtitles and plain English subtitles should highlight any differences between the two types of English and could therefore act as a basis from which plain English subtitles in other fields can be developed.

Previously, corpus-based approaches have been applied to subtitling in the context of translation (Baños et al. 2013, 487). While academic English and plain English are not different languages, their conventions are nevertheless different. A parallel word list of both academic English subtitles and plain English subtitles is therefore useful in identifying "translation solutions," just as it would be when working with languages other than English (Baños et al. 2013, 487).

In line with the corpus-based nature of the study, this article follows the work of Van Rooy (2013, 10), Díaz-Cintas (2004, 50) and Gambier and Gottlieb (2001, viii), who focus specifically on corpus linguistics in a multiliterate context. Van Rooy (2013, 10)

notes that a particular challenge in the compilation of a corpus in Africa, and in South Africa specifically, involves taking into consideration the "language proficiency and language backgrounds" of various groups. Van Rooy (2019, 71) further points out that a lot of the South African corpora are already outdated, and South African educators would benefit from the development of new corpora with updated perceptions of how writing adapts to a changing society. Placing the focus of the current research on South Africa's multiliterate context could therefore provide an updated corpus which takes South Africa's diverse language backgrounds into account.

Another focus of this study is Lindquist's (2009) work on corpus-based linguistics. Lindquist highlights why consulting corpora is useful to linguistic studies and describes corpus linguistics as "a methodology … with a certain outlook … [indicating] that the rules of language are usage-based and that changes occur when speakers use language to communicate" (2009, 1). Lindquist further notes that, if one is "interested in the workings of a particular language … it is a good idea to study [that language] in use" (2009, 1). Subtitling, therefore, can be viewed as a useful tool for studying language in terms of how it is used and the context in which it is used. Corpus linguistics can be used to create academic word lists by analysing large collections of academic texts and identifying the most frequent and salient words used in academic discourse.

Academic word lists are compiled on the principle that they contain words which are not frequently seen in "non-academic" texts, but that these words "[occur] regularly throughout academic texts across all disciplines," as is the case with most academic vocabulary (Cooper 2017, 134). Coxhead and Nation (2001, 252) assert that English vocabulary can be split into four categories, and academic vocabulary forms one of these distinct categories. The other three categories include frequently used words, technical or subject-specific terms, and less frequently used words (Coxhead and Nation 2001, 252). The use of academic vocabulary and the compilation of word lists based on academic vocabulary must therefore take these four categories into consideration to ensure that words identified as academic conform to the requirements for that category. Examples of academic vocabulary from Coxhead's (2000, 232) academic word list (AWL) include *chemical*, *emphasis*, *proceed*, and *sustain*.

Frequency is vital for vocabulary acquisition, yet inconsistently defined (Reynolds and Wible 2014). Their study emphasises the impact of frequency interpretation on incidental learning. The current research uses a corpus-based approach to clarify frequency measures for academic and plain English subtitle word lists, supporting better comprehension and testing the effect of repeated exposure on understanding in discipline-specific contexts like NAS.

The videos used in the current study contain more technical terms which are expressed in Latin. These terms are used as academic vocabulary items, but they are not accounted for by Coxhead and Nation. Coxhead's AWL is intentionally broad and general. Other, more specific, word lists include Latin terms as academic vocabulary since they pertain

to the medical field, which relies on Graeco-Latin terminology for its academic vocabulary and, by extension, its subject-specific terms. Therefore, for the purposes of this study, these terms need to be addressed by extending Coxhead and Nation's definition of "academic vocabulary" (Coxhead and Nation 2001, 253). Examples of academic vocabulary from the videos used in this study include Latin terms (e.g. *vena cava*, *cavum oris*) and terms which students would not encounter in everyday English (e.g. *palpate*, *palmar*).

2.3 The Principles of Subtitling

To create subtitles for the videos used in the present study, subtitling conventions as set out by Karamitroglou (1997, 1) were used. These conventions include how many line numbers are allowed on-screen, where the subtitles are positioned on-screen, how many characters and words are allowed per line, fonts, and how long a particular subtitle remains visible on-screen (Kramitroglou 1997, 2).

2.4 The Principles of Plain English and Their Application to Academic Subtitling

This study considers the contrast between plain English and academic English subtitles based on the number of differences between them, including the criterion that there should be fewer scientific terms in plain English. As a result, editing plain English subtitles requires a different approach to that of editing academic English subtitles. Cutts presents guidelines for writing in plain English, arguing that "plain English is not an absolute: what is plain to an audience of scientists … may be obscure to everyone else" (Cutts 2020, xix). This was taken into consideration when creating the plain English subtitles for the videos in this study.

Some of the major principles of plain English writing were considered when formulating the revised plain English subtitles for this study as they pertained to the subtitling process and its conventions. These principles include concision (shortening sentences where possible), giving preference to plain English words over scientific terms, and converting sentences (whether written or spoken) from passive to active voice (Cutts 2020, xxiv).

3. Methodology

As mentioned in the introduction to this article, the subtitles for this study were created based on videos used by students in an animal anatomy module. These subtitles and the resulting word lists encompass two of Coxhead and Nation's categories of vocabulary items (2001, 252), as they are both academic and subject-specific.

The videos were selected based on the criterion that they were created to replace anatomy classes during the COVID-19 pandemic, making them a valuable resource. These videos were originally created because students could not dissect a fresh animal cadaver during each anatomy class, as this was impractical.

The students of this module also acted as the participants of the study. The students were largely NESB learners. In a questionnaire used as part of a larger study (Kruger-Marais and Kruger-Roux 2023, 2) linked to the present study, participants were asked to specify their mother tongue (L1). In response, 52.33% said Afrikaans was their mother tongue, 33.72% identified English as their L1, 5.81% stated that Sepedi was their L1, 2.33% said Southern Sotho, 2.33% Tsonga, 1.16% Xhosa, 1.16% Setswana, and 1.16% gave "Other" as their L1. These results illustrate that the participants' mother tongues were unevenly distributed, but that the majority spoke an African language as their mother tongue (with Afrikaans included as one of the African languages).

Considering the participants' language backgrounds, guidelines were considered when compiling the subtitles and the subsequent word lists. As the academic English subtitles were transcribed verbatim, few edits were introduced. These subtitles followed the general subtitling standardisation guidelines as set out by Karamitroglou (1997, 1). These principles include the subtitles' position on the screen, limiting the number of subtitle lines on-screen, adhering to a limit of 35 characters per line, and adjusting the duration of subtitles based on the word count of each line (Karamitroglou 1997, 2–3).

Conversely, the plain English subtitles required changes on two levels: firstly, the subtitles had to adhere to Karamitroglou's subtitling conventions. Secondly, the subtitles needed to follow plain English guidelines, and were often changed to fit these guidelines (Cutts 2020, xxiv). The principles for plain English as set out by Cutts (2020, xxiv–xxv) were followed selectively, depending on their relevance and applicability to subtitles as a "genre" of text.

The first general principle of plain English adopted from Cutts (2020, xxv) is the use of short sentences. Owing to their momentary nature, subtitles naturally gravitate towards this principle. Karamitroglou (1997, 2) suggests that subtitles should not exceed two lines, with up to 35 characters per line and a maximum duration of approximately three seconds. Cutts (2020, 22) suggests keeping sentences at a length of approximately 15–20 words, which is often much more than the suggested 35 characters for subtitles. The subtitles used in this study, when transferred to plain English, were therefore often shortened versions of the academic English spoken in the videos. For example, in a video discussing the general plan of the animal body, the presenter says the following (time stamps are included to show how long the subtitle appeared on-screen):

> 0:14:07–.06 - 0:14:11.98: Now we can look inside the joint, and this joint has two compartments.

The above is a verbatim transcription of the words used on-screen. This sentence had to be spread over approximately four seconds, and while it contains 13 words, which adheres to Cutts's guidelines, the sentence consists of 70 characters. As a result, to adhere to subtitling conventions and plain English conventions, this subtitle required

editing. The plain English version of the subtitle was therefore changed in the following way (note that the symbol *n* denotes a new line of text):

> 0:14:07.05–0:14:10.48: Look inside the joint now. *n* It has two compartments.

For the edited, plain English subtitle, the sentence was shortened to adhere to subtitling conventions. Firstly, the subtitle is now spread over approximately three seconds, in accordance with Karamitroglou's guidelines (1997, 2). The sentence is also split over two lines, and into two separate sentences. Both sentences combined now only contain nine words, with 27 characters in the first line and 24 characters in the second line—well within the 35 character per line limit.

The next principle adopted from Cutts (2020, 154) involved the preferential use of English terms over scientific terms in other languages. In some cases, as shown in the plain English word list, some of the non-English scientific terms used in the videos remain unchanged in the plain English subtitles. This is generally because these terms are either already well-known, or their meaning may change when translated. Cutts (2020, 154) asserts that unless an author is aware of their audience's skill level in a subject, it is best to avoid non-English words altogether. For the purposes of this study, a specific animal anatomy module's videos were used, and therefore the viewers of these videos were considered to have the appropriate knowledge to deal with non-English scientific terms. Where appropriate, however, some Latin and Greek terms were translated if a more widely-used English translation was available. For example, in a video about the animal's gastrointestinal tract, the presenter notes:

> 0:00:24–82 - 0:00:30.54: and then the *cavum oris* proper, that is the proper cavity between the teeth and the tongue.

When the plain English subtitles were created, this sentence was once again split over two lines. Its length of 91 characters was also shortened. In addition, some of the anatomical terms in the sentence were changed:

> 0:00:24–82 - 0:00:30.54: and then the oral space, */n* the space between the teeth and tongue.

Having been split into two lines, the first line now contains 23 characters, while the second contains 39 characters. Although the second line is slightly longer than Karamitroglou's recommended 35 characters, it is nevertheless shorter than the original 59 characters, and the meaning of the sentence has been retained. Cutts's guideline about non-English terms has been applied in this instance. In the case of the term "oral," the word remains unchanged. This is because it is anticipated that students in an animal anatomy module at tertiary level would understand this term. However, the term "cavity," while also a relatively common scientific term, does have a widely-recognised, simpler English counterpart ("space"). Therefore, in adherence to plain English

guidelines, "space" was used instead. In this sense, the Latin term "*cavum oris*" is changed to read as "oral space" in its simple English iteration.

Lastly, the subtitles incorporated Cutts's principle of changing passive voice statements into active voice, where applicable. Cutts (2020, 68) argues that active voice writing is more personal and less obscure, although he does not advocate for doing away with passive voice altogether. Consequently, some subtitles which were in the passive voice in their academic English versions remained unchanged in their plain English versions. The most prominent reason for this decision is based on Cutts's recommendations that the passive voice can "focus attention on the receiver of the action by putting it first [or it can] help in positioning old or known information at the start of a sentence or clause, and new information at the end" (2020, 77). For instance, the use of the passive voice in the following subtitle remains unchanged as the focus is on the object rather than the subject of the sentence:

> 0:00:55–.46 - 0:00:58.50: On this side of the animal, *n* half of the skull has been removed.

The passive voice has been retained in this plain English subtitle to place the focus on the animal's skull, and not on the lecturer making the statement. However, in cases where the students perform a specific action, the subtitles are written in the active voice. In this example, the original subtitle in the passive voice reads as follows:

> 0:03:17–.44 - 0:03:20.62: Each of them ends in a Fallopian tube, which can be seen like this …

This sentence focuses on the students, who need to see the anatomical process for later recall. On-screen, the presenter is also pointing to the part of the anatomy (the uterine horn), showing it to the camera. Therefore, the plain English subtitle has been changed to the active voice to reflect this:

> 0:03:17–.44 - 0:03:20.62: They each end in a Fallopian tube, *n* which you can see looks like this …

3.1 Presentation of Subtitles to Study Participants

When presenting subtitled study materials to participants in the study, a preparatory instructional video was made available for the participants to watch. Under the guidance of the lecturer of the module in question, the participants were instructed to watch the preparatory video first, to ensure they knew which subtitles were available and how to activate them.

Each video has three sets of subtitles: academic register, plain English, and keywords. The academic English subtitles were a verbatim transcription of what is said in the videos, including the discipline-specific terminology, while the plain English subtitles aimed to "translate" the academic English text into simple English terms. The verbatim

academic English subtitles follow the abovementioned subtitling guidelines as set out by Karamitroglou (1997, 2). For example:

> 0:04:54–02 - 0:05:01.86: Air then goes down over the epiglottis, \n straight into the trachea to come out there.

The plain English subtitles follow the abovementioned guidelines as set out by Cutts (2020, xxiv–xxv). For example:

> 0:04:54–02 - 0:05:01.86: Air goes over the epiglottis, \n into the windpipe and comes out there.

The keyword subtitles contain certain important terms selected by the module's lecturer based on their frequency, their role in the students' understanding of certain concepts explained in the videos, and the students' likelihood of encountering these terms in practice. For example:

> 0:04:54–02 - 0:04:56.84: Epiglottis
>
> 0:04:56–88 - 0:05:01.22: Trachea

The videos' academic English and plain English subtitles form the basis for the word lists which resulted from the current study. The academic English word list for this study (Appendix B) was created using WordSmith Tools version 5.0. Concordance tools such as WordSmith Tools are already linked to established corpora and word lists, which aid in the identification of words according to frequency lists: the most frequently occurring 1000 words, then those in the 2000 and 3000 most frequently occurring word lists, as well as in the AWL, as identified by Coxhead (2000). However, the specificity of the phrases used in this research makes it more advantageous to employ the Medical Academic Word List (MAWL) (Wang et al. 2008), the Medical Academic Vocabulary List (MAVL) (Lei and Liu 2016) and, in some cases, the Chemistry Academic Word List (CAWL) (Valipouri and Nassaji 2013) instead of the AWL. In addition, since the terminology which forms the focus of this study comes from the field of animal anatomy, a veterinary word list such as the Veterinary Nursing Medical Chart Corpus (VNMC) (Ohashi et al. 2018) has been deemed as a useful point of comparison.

Word lists help distinguish plain from academic English. Using 1000–3000-word lists for plain English subtitles may improve clarity, though academic language can only be simplified to a point without losing meaning. This study's word lists allow comparison between "academic" subtitles—rich in technical terms—and their plain English versions (as noted earlier in this article).

3.2 The Development of a Word Frequency List Based On Academic English Subtitles

To create a word frequency list based on the academic English subtitles used in this study, certain criteria needed to be followed. Firstly, the keyword subtitles provided by the module lecturer from the course material/videos were used as input for WordSmith Tools version 5.0. These keywords consisted of significant terms deemed important by the relevant lecturer on the basis that the keyword subtitles contained only the most important words required by students for the module. Secondly, the keyword subtitles excluded proper nouns, which are deemed "less important for language learners" (Ashrafzadeh 2021, 251).

The academic English subtitle word list is based on subtitles which were created for a set of 12 videos pertaining to animal anatomy. The frequency of these words, as determined by WordSmith Tools, is therefore based on the occurrence of the words within the subtitles. Some phrases which contain two words were separated by WordSmith Tools. Examples include terms such as *vena cava* and *hiatus aorticus*. These words were left separate in these cases, as they are not always used together (for example, *hiatus* is sometimes used together with "oesophagus"). Below is a list of the 20 most frequently occurring words.

Table 1: The 20 most frequently occurring words in academic English subtitles used in 12 animal anatomy videos

Word	Freq.	%	Videos
NERVE	40	1.767	4
LYMPH	38	1.678	3
CAVITY	33	1.458	5
CRANIAL	32	1.413	5
NODE	29	1.281	2
CAUDAL	28	1.237	8
CAVA	65	1.104	4
VENA	25	1.104	4
ARTERY	22	0.972	4
REGION	22	0.972	5
MUSCLE	21	0.928	5
PENIS	21	0.928	1
JOINT	19	0.839	3
AORTA	18	0.795	3
ENDOCRINE	17	0.751	1
SPINAL	17	0.751	2
NERVES	15	0.663	2
PLEURAL	15	0.663	2
SYSTEM	15	0.663	5
CAUDALIS	14	0.618	4

Based on the information in Table 1, the list of frequently occurring academic words in the animal anatomy field are far removed from the most frequently occurring words in the AWL (Coxhead 2000, 213). Whereas the most frequently occurring words in the AWL are more general words such as *identify*, *distribute*, and *analyse* (Coxhead 2000, 232–233), the frequent words in the videos used in this study are much more specific owing to their technical and specialised nature (e.g. *cranial*, *aorta*, *endocrine*). This is in line with the notion that word lists which consider a variety of words in a specific field will produce lists which are most useful to that field (Cooper 2000, 18; Nation 1990, 105). Because of their specialised nature, 178 (29%) of the words on the list in Appendix B were adjusted for the plain English subtitles where appropriate.

4. Findings and Discussion

While widely used in film and television, subtitling remains underutilised in academic contexts. Academic subtitles often contain complex language and technical terms, making comprehension difficult. Plain English conventions help to simplify language, thereby improving accessibility. This study examined the impact of these conventions through word lists, highlighting their benefits in educational videos. Combining plain English subtitles with word lists can enhance accessibility and effectiveness in learning scientific and technical content.

Table 1 indicates the 20 most frequently occurring words from the academic subtitles used in this study. As is shown in the table, the most frequently occurring word was *nerve* (40 occurrences), which does not occur in the AWL (Coxhead 2000), as the AWL does not include subject-specific terms. In fact, of the 20 most frequently occurring words, none appear in the AWL. For some of these words (e.g. *artery*, *pleural*, *caudal*), it can be argued that they are too discipline-specific to appear in the AWL. For words such as *system*, *region*, and *muscle*, this explanation is insufficient, since they are considered common words. When compared with Coxhead's AWL (2000), there is only a 2% overlap between the AWL and the academic English subtitle word list. This is probably because the word list based on the subtitles contains largely Latin and Greek terms, and these terms are specific to the field of animal anatomy. As mentioned previously, because of the specificity of the terms used in this study, it was deemed better to instead rely on the MAWL (Wang et al. 2008), the MAVL (Lei and Liu 2016) and the CAWL (Valipouri and Nassaji 2013). Since the terms used in this study focus on the field of animal anatomy, the VNMC (Ohashi et. al. 2018) has also been used.

The MAWL was developed using a corpus of 1.09 million words from medical research articles and, like the AWL, the MAWL was formulated by excluding words from the General Service List (GSL) (Wang et al. 2008, 443). Of the 615 words in Appendix B, 49 words (8%) also appear in the MAWL. This makes the MAWL a more reliable point of comparison than the AWL in this study. Words from Appendix B which also occur in the MAWL include *abdomen*, *area*, *cell*, *circulation*, *diffuse*, *external*, *fluid*, *gland*, *internal*, and *membrane*. These terms, while technical, do not cover the broader scope

of terms available in Appendix B, and are not necessarily the most important terms students would need to be familiar with. This necessitates the comparison of Appendix B with a different word list. For this reason, the MAVL was chosen, as it is a more updated version of the MAWL (Lei and Liu 2016, 43).

Unlike the MAWL, the MAVL was developed using both English medical textbooks and articles. The MAVL also accounts for all English words, unlike the MAWL (Lei and Liu 2016, 43). When comparing the word list in Appendix B with the MAVL, there is an overlap of 62 words (10%). Words which overlap between Appendix B and the MAVL include *arterial*, *distal*, *hormones*, *lateral*, *pulmonary*, *respiratory*, *tissue*, and *ventricular.* While some of these words are more specialised, Latin terms are not included since both the MAWL and the MAVL only consider words in English.

Similar to the MAWL and the MAVL, the CAWL also considers English words only, and excludes abbreviations (e.g. CO_2) and words that were considered "too technical" such as *aldehyde* or *hydroxyl* (Valipouri and Nassaji 2013). There is an overlap of 73 words (12%) between Appendix B and the CAWL—the highest overlap percentage between the three abovementioned word lists. The words which overlap are not necessarily subject-specific words. Overlapping words include *chain*, *extend*, *fact*, and *shoulder*. These comparisons show that the MAWL, MAVL, and CAWL include a wider variety of terms, making them useful points of reference for future word lists in similar disciplines. However, the lack of animal-specific terms still excluded many terms from Appendix B when preparing comparisons with the above lists. Therefore, the VNMC (Ohashi et. al. 2018) has also been consulted.

The VNMC was developed because of a perceived need for specialised corpora and consists of data gathered from medical charts and information recorded by veterinary nurses. In terms of comparing Appendix B with the VNMC, it is important to note that the VNMC consists of distinct "categories," namely canine terms, feline terms, and a list of combined canine and feline terms (Ohashi et. al. 2018, 313). This has proven to be a limitation to this list since the subject-specific videos focused largely on the ovine body. Partly because of this exclusionary factor, there is an overlap of only eight words (1%) between Appendix B and the canine VNMC list, which included words such as *caudal*, *salivary*, and *thoracic*. Between Appendix B and the feline VNMC list, there was an overlap of only two words (0.3%)—*fat* and *pancreas*. Along with the difference in terminology between canine, feline, and ovine subjects, the VNMC also focuses on medical reports, not necessarily journal articles (as is the focus of the MAWL, MAVL, and CAWL). This could also be a contributing factor as to why the overlap between Appendix B and the VNMC is so low. Another contributing factor is once again the broad use of Latin terms in the videos which were watched during this study.

The findings of this study offer valuable implications for NAS educators and students. By developing parallel academic and plain English word lists, educators can create more accessible subtitles, aiding students in understanding complex scientific terminology.

Plain English subtitles help bridge language barriers, promoting inclusivity for multilingual students. Additionally, corpus-based word lists can be used to tailor vocabulary instruction, enhancing student engagement with scholarly content. For students, exposure to these subtitles can improve vocabulary retention and facilitate better comprehension of subject-specific material, ultimately supporting academic success.

4.1 The Importance of Word List Comparisons to the Compilation of Plain English Subtitles

The creation of the word list presented in Appendix B and its comparison with the MAWL, MAVL, CAWL, and VNMC has been instrumental in compiling the plain English subtitles used in this study. Comparing various frequently used words from different disciplines gave a clearer indication of which technical words needed to be simplified to best benefit students.

Academic word lists are important for subtitles because they contain high-frequency words used in academic and professional contexts. They simplify the process of using the right language and terminology for the topic, and help viewers understand the specialised terms used in their area of study.

4.2 The Advantages of Word Lists for Students

Using high-frequency words improves students' comprehension of academic texts (Ha 2021, 4; Blamires 2000, 13) and supports clearer writing (Choo et al. 2017, 56). Replacing complex terms with plain English aids understanding, while frequently used academic words convey specific meanings crucial for complex ideas (Ohashi et al. 2018).

4.3 The Advantages of Subtitles for NAS Students

In terms of academic literacy, subtitles can be beneficial for teaching and learning in NAS. They offer a further level of support for students, promote language development, clarify technical terms, and introduce students to specialised terminology in context (Van der Zee et al. 2017, 3). Students may develop a wider disciplinary vocabulary as a result. Subtitles are a valuable tool for academic literacy, enabling more effective and inclusive student engagement with and understanding of scientific concepts.

5. Conclusion

The development of parallel word lists using subtitled videos provides a useful tool for vocabulary acquisition, especially in subject-specific fields like animal anatomy. While these lists are hard to compare directly with generalised academic lists like the AWL, creating a plain English version helps students navigate technical terminology. The use of the corpus-based approach has been essential, and parallel word lists can also be used

to measure the effectiveness of subtitling by assessing comprehension and recall of key words.

Future research should explore the long-term effects of academic and plain English subtitles on student comprehension and vocabulary retention. Comparative studies on subtitle effectiveness across different formats could provide deeper insights, especially for multilingual learners in South Africa. Further work could refine corpus-based methods for developing discipline-specific word lists and assess their impact across various academic fields. Additionally, research on student perceptions and preferences regarding subtitles could inform their practical use in higher education. These directions would enhance subtitle design, promote language inclusivity, and improve learning outcomes in NAS as well as in other academic fields.

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Appendix A: Academic Audio-Visual Learning Material: Common Word Replacements From Academic English to Plain English

Below is an alphabetical list of scientific and/or Latin/Greek terms and phrases which were commonly used in the academic English transcripts of the videos, with the words selected as equivalents in plain English.

A
Abdomen – stomach
Accessory nerve – eleventh cranial nerve
Adduction – movement to the animal's midsection
Adhesio thalami – tissue linking both thalamus parts
Adipocytes – fat cells
Alveoli – air sacs
Arcus lumbocostalis – lumbocostal arch
Arcus palatopharyngeus – palatopharyngeal arch
Areolar – loose
Arrector pili muscles – hair erector muscles
Arteria celiaca – celiac artery
Ansa subclavia – loop below the collarbone
Antebrachium – area between the elbow and wrist
Apical/apex – tip
Arteri carotis interna – internal carotid artery
B
Brachium – upper forelimb segment
Bronchi/bronchus – airways
Bursa – fluid sac
C
Cardiovascular system – heart and circulatory system
Carpus – small forelimb bones
Carpal – wrist
Caudal – back
Caudodorsal – near the back of the tail
Cavity – space
Cavum oris – oral space
Cecum – first part of the large intestine
Choanae – back nasal opening
Chordae tendineae – tendinous cords
Conus arteriosus – no replacement (cannot replace with *infundibulum* as it is also part of the tooth, pituitary stalk,
hair follicles, lungs, sinuses, gallbladder, uterine tube, renal pelvis).
Costodiaphragmatic – lowest end of the chest membrane sac
Coccyx – tail bone
Coeliac ganglia – upper stomach ganglia
Cortex – outer layer of…
Coxae/tuber coxae/os coxae – hip bone
Cranial – upper
Cremaster – muscle that raises the testes
Cruciate ligaments – ligaments connecting the thighbone and shinbone
Cupola pleura - dome-shaped layer lining the top of the rib cage
D
Diaphragm – midriff
Diastole – when the heart relaxes
Dissect – cut up

Distal – further from the body
Dorsal – top
Dorsum sellae – square bone plate
Duct – tube
Duodenum – first part of the small intestine
E
Embryological/Embryology – foetal stage
Epiglottis – no replacement (commonly known term)
Epiphysis – pineal gland
Eustachian tube – passage linking the throat and middle ear
Extensor carpi radialis – radial forelimb muscle
Extensor carpi ulnaris – ulnar forelimb muscle
Extracapsular ligaments – ligaments on the outer surface of the knee joint
F
Fascia – thin connective tissue
Fascia *endothoracica* – thin connective tissue of the spaces between the ribs
Fascia *transversa* – thin connective tissue of the front and sidelong stomach wall
Femoral nerve – large leg nerve
Femur – thigh bone
Fibrous – threadlike
Flexion – bending
Flexor carpi ulnaris – front ulnar forearm muscle
Foramen jugulare – jugular foramen
Foramen magnum – hole in the skull where the spine goes through
Fossa - indentation
Funicular – rope-like
Fuse – combine
G
Gastrocnemius – calf muscle that flexes the knee and foot
Glomerulus – ball-shaped loop of capillaries
Glossopharyngeal nerve – ninth cranial nerve
Gluteus muscle – buttock muscle
H
Hepatic – liver
Hiatus aorticus/aortic hiatus – entrance hole in the midriff
Hiatus oesophagus – midriff opening where the gullet passes from the chest to the stomach opening
Histologically/histological/ histology – relating to tissues and their structure
Humerus – upper forelimb bone
Hyoid bone – bone that supports the tongue
Hypophyseal fossa – pituitary indentation
I
Ileum – last part of the small intestine
Iliopsoas muscle – main flexor of the hip joint
Inferior vena cava/vena cava caudalis – vein carrying blood from the lower body
Infraspinatus muscle – triangular muscle of the rotator cuff
Inguinal – groin
Intercostal spaces – spaces between the ribs
Intervertebral foramen – opening between every two vertebrae where nerve roots exit the spine
Intracapsular ligaments – ligaments on the inner surface of the knee joint
Ischiadic nerve – sciatic nerve
Isthmus – narrowing between organs
J
Jejunum - middle part of the small intestine
Juxtaglomerular cells – granular cells

L
Lateral – to the side
Latissimus dorsi – lats
Ligamentum arteriosum – arterial ligament
Ligamentum nuchae – nuchal ligament
Lobe – section
Longitudinal - lengthwise
Lumbar – lower back
Lumbar vertebrae - vertebrae between the rib cage and the pelvis
Lumbocostal – sidelong curved ligament
M
Macroscopic – visible to the naked eye
Mandibular/mandible – lower jaw
Meatus – opening
Median – middle
Mediastinal/mediastinum - The area between the lungs
Medulla – inner area of…
Meninges – membrane layers
Meniscus ligaments/*menisci* – knee joint ligaments between the thighbone and shinbone
Mesoderm – germ layer present in developing animals
Mesothelial – pavement-like cells that line the internal organs
Metacarpophalangeal – fetlock
Myocard/myocardial – muscular tissue of the heart
N
Nasolacrimal duct – tear duct
Nasal *meatus* – air passage
Nasopharynx – upper part of the throat behind the nose
Nervi pelvini – pelvic nerves
Nervus pudendus – pudendal nerve
Nervus rectalis caudalis – inferior rectal nerves
O
Obturator internus – deep muscle of the hip joint
Oesophagus – gullet
Olfactory epithelium – tissue that runs along the top of the nasal cavity
Olfactory nerve – scent nerve
Omasum – third stomach
Omotransversarius muscle – omotransverse muscle
Optic nerve – visual nerve
Osseous – bony
Osteology – study of bones
P
Palmar side – grasping side
Palpate – touch/examine
Parietal – body wall
Parotid – next to the ear
Patella – kneecap
Pericardial/pericardium – sac around the heart
Peritoneal/peritoneum – stomach membrane
Perineum - area between the genitals and the anus
Phalanx – digital bones
Pleural/pleura – membrane lining the chest
Pleuropericardial - front fold of the torso
Plexus – network
Plica – fold
Prescapular – to the front of the shoulder blade

Proprioception – kinaesthesia
Proximal – closer to the body
Pudendus – internal pudic nerve
R
Ramus communicans – communicating branch
Recess – corner
Recessus supraomentalis – supraomental space
Rectus abdominis – abdominal muscle
Reflect – bend back
Regio parotidea – parotid region
Respiratory – breathing
S
Sacralis mediana – middle sacral artery
Sagittal – lengthwise
Salivary – spit
Scapula – shoulder blade
Semimembranosus – most medial hamstring
Semitendinosus muscle – superficial hamstring
Septum – divider
Serratus ventralis – ventral serrate muscle
Sesamoid bones – round bones in the tendon
Spina ischiadica – ischial spine
Stellate ganglion – cervicothoracic ganglion
Subclavian artery – artery below the collarbone
Syssarcosis – muscle that joins bones
T
Thorax/thoracic – chest
Tibia – shinbone
Torus pyloricus – pyloric torus
Trabecula(e) – dividing columns of connective tissue
Trachea – windpipe
Transverse – across
Trochlear nerve – fourth cranial nerve
Trunk – torso
Tuber *ischiadicum* – sit bones
V
Vascular system – circulatory system
Vena cava – large vein that carries blood to the heart from other areas of the body
Vena cava foramen – midriff opening
Venae hepaticae – hepatic veins
Ventral – under
Vertebral column – spinal column
Vestibulocochlear nerve – auditory nerve
Vestibulum oris – oral vestibule
Visceral – internal

Appendix B: Word Frequency List based on Academic English Subtitles

Word	Freq.	%	Videos	Word	Freq.	%	Videos
Abdomen	1	0.044	1	Magnum	1	0.044	1
Abdominal	11	0.486	4	Major	1	0.044	1
Abdominis	4	0.177	1	Mammary	1	0.044	1
Abductor	1	0.044	1	Mandibular	3	0.133	1
Able	1	0.044	1	Marrow	1	0.044	1
Abomasal	1	0.044	1	Maxilla	2	0.088	1
Abomasum	2	0.088	1	Maxillary	2	0.088	1
Accessory	3	0.133	1	Mean	1	0.044	1
Adduct	1	0.044	1	Meatus	4	0.177	1
Adduction	2	0.088	2	Meatuses	2	0.088	1
Adductor	3	0.133	2	Medial	9	0.398	3
Adductors	1	0.044	1	Medially	1	0.044	1
Adipocytes	1	0.044	1	Median	2	0.088	1
Adrenal	1	0.044	1	Mediana	1	0.044	1
Adrenals	1	0.044	1	Mediastinal	3	0.133	2
Airway	1	0.044	1	Mediastini	1	0.044	1
Airways	3	0.133	1	Mediastinum	14	0.618	3
Albuginea	3	0.133	1	Medius	1	0.044	1
Also	1	0.044	1	Medulla	5	0.221	3
Alveoli	1	0.044	1	Membrana	1	0.044	1
Ampulla	3	0.133	1	Membrane	1	0.044	1
And	13	0.574	6	Menisci	2	0.088	1
Annulus	1	0.044	1	Mesenteric	8	0.353	3
Antagonistic	6	0.265	1	Mesoderm	1	0.044	1
Antebrachium	1	0.044	1	Mesoduodenum	2	0.088	1
Aorta	18	0.795	3	Mesorectum	1	0.044	1
Aorticus	5	0.221	3	Mesovarium	1	0.044	1
Aponeurosis	2	0.088	1	Metacarpophalangeal	1	0.044	1
Arch	1	0.044	1	Middle	4	0.177	2
Arches	1	0.044	1	Minor	1	0.044	1
Arcus	5	0.221	4	Muscle	21	0.928	5
Area	1	0.044	1	Muscles	13	0.574	4
Areas	1	0.044	1	My	1	0.044	1
Areolar	2	0.088	1	Myocard	1	0.044	1
Arrector	1	0.044	1	Myocardial	3	0.133	1
Arteri	2	0.088	2	Nasal	12	0.530	1
Arteria	4	0.177	2	Nasolacrimal	1	0.044	1
Arterial	6	0.265	1	Nasopharynx	8	0.353	2

Word	Freq.	%	Videos	Word	Freq.	%	Videos
Arteries	1	0.044	1	Nerve	40	1.767	4
Arteriosum	3	0.133	1	Nerves	15	0.663	2
Arteriosus	5	0.221	2	Nervi	4	0.177	2
Artery	22	0.972	4	Nervous	7	0.309	2
Ascendens	1	0.044	1	Nervus	2	0.088	1
Ascending	5	0.221	1	Neuroendocrine	2	0.088	1
Aspect	3	0.133	1	Node	29	1.281	2
Associated	1	0.044	1	Nodes	9	0.398	3
Atrioventricular	1	0.044	1	Nuchae	2	0.088	1
Atrium	4	0.177	2	Oblique	9	0.398	2
Axillary	7	0.309	3	Obturator	2	0.088	2
Baroreceptors	1	0.044	1	Oesophagus	10	0.442	4
Be	1	0.044	1	Oestrogens	1	0.044	1
Bicarotid	2	0.088	1	Of	12	0.530	2
Biceps	2	0.088	1	Olfactory	2	0.088	1
Bifurcation	1	0.044	1	Omasal	1	0.044	1
Bladder	2	0.088	1	Omasum	1	0.044	1
Blood	3	0.133	1	Omotransversarius	1	0.044	1
Body	2	0.088	2	Only	1	0.044	1
Bone	1	0.044	1	Optic	1	0.044	1
Bones	1	0.044	1	Or	1	0.044	1
Border	1	0.044	1	Organs	3	0.133	2
Brachial	2	0.088	2	Oris	2	0.088	1
Brachialis	3	0.133	1	Ostium	3	0.133	1
Brachiocephalic	5	0.221	2	Outflow	4	0.177	1
Brachium	1	0.044	1	Ovariales	1	0.044	1
Brain	3	0.133	1	Ovarias	1	0.044	1
Bronchial	1	0.044	1	Ovarium	1	0.044	1
Bulb	6	0.265	1	Ovary	4	0.177	2
Bulbourethral	1	0.044	1	Palatal	1	0.044	1
Bursa	5	0.221	1	Palatine	1	0.044	1
By	1	0.044	1	Palatopharyngeus	1	0.044	1
Can	1	0.044	1	Palette	5	0.221	1
Canal	2	0.088	2	Palmar	1	0.044	1
Carotid	7	0.309	3	Pampiniform	1	0.044	1
Carpal	4	0.177	2	Pampiniformis	1	0.044	1
Carpi	5	0.221	2	Pancreas	5	0.221	1
Cartilaginous	1	0.044	1	Parafollicular	3	0.133	1
Caruncle	1	0.044	1	Paraganglia	1	0.044	1

Word	Freq.	%	Videos	Word	Freq.	%	Videos
Caudal	28	1.237	8	Paranasal	2	0.088	1
Caudalis	14	0.618	4	Parasympathetic	8	0.353	2
Caudally	9	0.398	3	Parathyroid	5	0.221	1
Cava	25	1.104	4	Parathyroids	1	0.044	1
Cavernosum	1	0.044	1	Parenchyma	3	0.133	1
Cavities	2	0.088	1	Parietal	1	0.044	1
Cavity	33	1.458	5	Parotid	3	0.133	1
Cavum	1	0.044	1	Part	1	0.044	1
Cecum	2	0.088	1	Pastern	2	0.088	1
Celiac	1	0.044	1	Patches	2	0.088	2
Celiaca	2	0.088	1	Patella	1	0.044	1
Cell	1	0.044	1	Pathway	1	0.044	1
Cells	10	0.442	1	Pectoral	1	0.044	1
Central	1	0.044	1	Pelvic	7	0.309	4
Cerebellum	1	0.044	1	Pelvini	5	0.221	3
Cervical	7	0.309	4	Pelvis	5	0.221	2
Cervix	5	0.221	1	Penis	21	0.928	1
Chain	1	0.044	1	Pericardial	5	0.221	2
Chemoreceptors	1	0.044	1	Pericardium	1	0.044	1
Choanae	2	0.088	1	Perineum	1	0.044	1
Chordae	1	0.044	1	Peripheral	1	0.044	1
Circulation	7	0.309	2	Peritoneal	12	0.530	3
Close	1	0.044	1	Peritonei	6	0.265	2
Coeliac	1	0.044	1	Peritoneum	4	0.177	2
Coelom	3	0.133	2	Peroneus	2	0.088	1
Coffin	2	0.088	1	Peyer	1	0.044	1
Collateral	4	0.177	2	Peyer's	1	0.044	1
Colon	8	0.353	1	Phalanx	2	0.088	1
Column	1	0.044	1	Pharyngeal	2	0.088	2
Common	5	0.221	2	Phrenic	3	0.133	1
Communicans	1	0.044	1	Pili	1	0.044	1
Component	1	0.044	1	Placenta	2	0.088	1
Components	3	0.133	2	Plane	3	0.133	1
Concha	4	0.177	1	Planes	1	0.044	1
Conchae	5	0.221	1	Plate	1	0.044	1
Connective	3	0.133	2	Pleura	3	0.133	2
Contorti	2	0.088	1	Pleurae	1	0.044	1
Contract	1	0.044	1	Pleural	15	0.663	2
Contracts	1	0.044	1	Pleuropericardial	3	0.133	2

Word	Freq.	%	Videos	Word	Freq.	%	Videos
Conus	2	0.088	2	Plexus	9	0.398	4
Copula	1	0.044	1	Plica	4	0.177	3
Cord	11	0.486	3	Popliteal	3	0.133	1
Cords	5	0.221	1	Postganglionic	3	0.133	1
Cornu	1	0.044	1	Preganglionic	3	0.133	1
Coronary	2	0.088	1	Preputium	7	0.309	1
Corpus	14	0.618	2	Prescapular	2	0.088	1
Cortex	5	0.221	3	Pressure	1	0.044	1
Costal	2	0.088	1	Processus	8	0.353	2
Costodiaphragmaticus	3	0.133	2	Progesterone	1	0.044	1
Coxae	1	0.044	1	Proper	2	0.088	1
Cranial	32	1.413	5	Proprioception	2	0.088	1
Cranialis	2	0.088	1	Proprium	1	0.044	1
Cranially	3	0.133	2	Protract	1	0.044	1
Cremaster	4	0.177	1	Protraction	1	0.044	1
Cribriform	1	0.044	1	Protractor	2	0.088	1
Cruciate	5	0.221	1	Proximal	3	0.133	3
Cruciates	1	0.044	1	Proximally	1	0.044	1
Cupola	1	0.044	1	Puber	1	0.044	1
Curvature	1	0.044	1	Pudendus	3	0.133	2
Dartos	3	0.133	1	Pulmonalis	1	0.044	1
Deep	6	0.265	1	Pulmonary	10	0.442	2
Deferens	9	0.398	1	Pyloricus	1	0.044	1
Deferent	1	0.044	1	Quadriceps	2	0.088	1
Deltoid	1	0.044	1	Radialis	3	0.133	2
Descendens	1	0.044	1	Ramus	1	0.044	1
Descending	5	0.221	1	Recessus	5	0.221	3
Development	1	0.044	1	Rectalis	3	0.133	2
Diaphragm	4	0.177	3	Recti	1	0.044	1
Diffuse	2	0.088	1	Rectogenitalis	1	0.044	1
Digestive	2	0.088	1	Rectum	3	0.133	1
Digital	7	0.309	2	Rectus	2	0.088	1
Distal	2	0.088	2	Red	1	0.044	1
Dorsal	10	0.442	7	Reflection	2	0.088	1
Dorsi	1	0.044	1	Region	22	0.972	5
Dorsum	1	0.044	1	Renal	1	0.044	1
Drainage	6	0.265	1	Renalis	1	0.044	1
Duct	6	0.265	2	Renin	1	0.044	1
Ductus	12	0.530	3	Respiration	1	0.044	1

Word	Freq.	%	Videos	Word	Freq.	%	Videos
Duodenum	7	0.309	2	Respiratory	3	0.133	2
Ejaculatory	1	0.044	1	Retraction	1	0.044	1
Elbow	5	0.221	1	Retractor	8	0.353	2
Embryological	1	0.044	1	Retropharyngeal	2	0.088	1
Endocoelom	1	0.044	1	Rhomboidus	4	0.177	1
Endocrine	17	0.751	1	Right	5	0.221	3
Endothoracica	1	0.044	1	Root	1	0.044	1
Epididymis	4	0.177	1	Roots	1	0.044	1
Epiglottis	9	0.398	2	Rumen	5	0.221	2
Epiphysis	3	0.133	1	Sac	5	0.221	2
Epithelium	2	0.088	2	Sacral	8	0.353	2
Equina	1	0.044	1	Sacralis	1	0.044	1
Ethmoidal	4	0.177	1	Sacrotuberous	1	0.044	1
Eustachian	3	0.133	1	Sacrum	3	0.133	3
Excavatio	2	0.088	1	Saddle	1	0.044	1
Exocrine	1	0.044	1	Sagittal	1	0.044	1
Extend	2	0.088	1	Salivary	3	0.133	2
Extension	3	0.133	2	Scapula	2	0.088	1
Extensor	9	0.398	3	Scrotal	1	0.044	1
Extensors	4	0.177	2	Scrotum	2	0.088	1
External	10	0.442	2	Secretes	1	0.044	1
Extracapsular	1	0.044	1	Sella	2	0.088	1
Extrinsic	4	0.177	1	Sellae	1	0.044	1
Fact	1	0.044	1	Semilunar	2	0.088	1
Fallopian	2	0.088	1	Semimembranosus	3	0.133	1
Fascia	14	0.618	2	Seminiferi	4	0.177	1
Fat	1	0.044	1	Semitendinosus	1	0.044	1
Feel	1	0.044	1	Septum	2	0.088	2
Femoral	5	0.221	3	Serratus	3	0.133	1
Femoris	3	0.133	1	Sesamoid	1	0.044	1
Femur	1	0.044	1	Sheath	6	0.265	2
Fetlock	4	0.177	2	Sheaths	1	0.044	1
Fibre	2	0.088	1	Should	1	0.044	1
Fibres	3	0.133	1	Shoulder	7	0.309	1
Fibrosum	1	0.044	1	Sigmoid	6	0.265	1
Fimbriae	1	0.044	1	Sinus	6	0.265	2
Fingers	1	0.044	1	Sinuses	2	0.088	1
Flex	1	0.044	1	Sinusoids	1	0.044	1
Flexion	6	0.265	3	Soft	4	0.177	1

Word	Freq.	%	Videos	Word	Freq.	%	Videos
Flexor	5	0.221	2	Sperm	7	0.309	1
Flexors	6	0.265	2	Spermatic	1	0.044	1
Flexure	5	0.221	1	Spina	1	0.044	1
Fluid	2	0.088	1	Spinal	17	0.751	2
Follicle	5	0.221	1	Spiral	3	0.133	1
Follicles	3	0.133	3	Spleen	3	0.133	2
Foramen	6	0.265	4	Splenic	1	0.044	1
Fornix	2	0.088	1	Spongiosum	6	0.265	1
Fossa	1	0.044	1	Stalk	3	0.133	1
Front	2	0.088	2	Stellate	3	0.133	2
Frontal	4	0.177	1	Stem	2	0.088	1
Ganglia	7	0.309	1	Stifle	1	0.044	1
Ganglion	5	0.221	2	Structure	2	0.088	2
Gastrocnemius	3	0.133	1	Subclavia	1	0.044	1
Genitalis	2	0.088	1	Subclavian	5	0.221	3
Girdle	2	0.088	1	Subiliac	3	0.133	1
Gland	13	0.574	3	Subluxation	1	0.044	1
Glands	3	0.133	2	Subpleural	1	0.044	1
Glans	3	0.133	1	Subscapularis	1	0.044	1
Glossopharyngeal	3	0.133	1	Sulcus	1	0.044	1
Gluteobiceps	2	0.088	1	Superficial	5	0.221	3
Gluteus	1	0.044	1	Supply	8	0.353	3
Got	2	0.088	1	Supraomentalis	1	0.044	1
Graafian	1	0.044	1	Supraspinatus	2	0.088	1
Gracilis	1	0.044	1	Surface	2	0.088	1
Groove	2	0.088	2	Sympathetic	7	0.309	2
Group	1	0.044	1	Synapse	2	0.088	1
Groups	4	0.177	1	Synapses	1	0.044	1
Gut	1	0.044	1	Synovial	13	0.574	2
Hard	1	0.044	1	Syssarcosis	1	0.044	1
Heart	2	0.088	2	System	15	0.663	5
Hemal	2	0.088	1	Systemic	3	0.133	2
Hepatic	1	0.044	1	Tendineae	1	0.044	1
Hepaticae	1	0.044	1	Tendinous	1	0.044	1
Hiatus	8	0.353	4	Tendons	2	0.088	1
Hind	1	0.044	1	Tension	1	0.044	1
Hock	1	0.044	1	Tensor	1	0.044	1
Hormones	1	0.044	1	Teres	3	0.133	2
Horn	2	0.088	1	Tertius	1	0.044	1

Word	Freq.	%	Videos	Word	Freq.	%	Videos
Horns	3	0.133	1	Teste	1	0.044	1
Humerus	1	0.044	1	Testes	6	0.265	1
Hyoid	1	0.044	1	Thalamus	1	0.044	1
Hypogastric	1	0.044	1	That	2	0.088	2
Hypophyseal	1	0.044	1	The	17	0.751	5
Hypophysis	2	0.088	1	Thoracic	13	0.574	6
Hypothalamus	3	0.133	1	Thoraco	2	0.088	1
Iischiocavernosus	1	0.044	1	Thoracolumbar	1	0.044	1
Ileum	2	0.088	1	Thorax	6	0.265	2
Iliac	10	0.442	2	Thymus	4	0.177	2
Iliopsoas	2	0.088	1	Thypophysis	1	0.044	1
In	1	0.044	1	Thyroid	6	0.265	1
Incision	1	0.044	1	Tibialis	2	0.088	1
Infraspinatus	2	0.088	1	Tissue	12	0.530	4
Infundibulum	3	0.133	1	To	1	0.044	1
Inguinal	3	0.133	3	Tonsillar	3	0.133	1
Inguinalis	1	0.044	1	Tonsils	1	0.044	1
Inlet	1	0.044	1	Torus	1	0.044	1
Intercostal	3	0.133	1	Trabeculae	1	0.044	1
Interna	7	0.309	2	Trachea	6	0.265	3
Internal	10	0.442	3	Tracheal	1	0.044	1
Internus	1	0.044	1	Tract	1	0.044	1
Intervertebral	1	0.044	1	Tracts	1	0.044	1
Intracapsular	2	0.088	1	Transversa	1	0.044	1
Intraosseous	1	0.044	1	Transverse	5	0.221	3
Intrapelvic	5	0.221	1	Trapezius	1	0.044	1
Intrapharyngium	3	0.133	1	Triceps	2	0.088	1
Intrinsic	5	0.221	1	Trigeminal	1	0.044	1
Is	1	0.044	1	Trochlear	3	0.133	1
Ischiadic	2	0.088	1	Truncus	1	0.044	1
Ischiadica	1	0.044	1	Trunk	8	0.353	4
Ischiadicum	1	0.044	1	Tube	4	0.177	2
Ischiadicus	1	0.044	1	Tuber	2	0.088	1
Ischiatic	5	0.221	2	Tubuli	4	0.177	1
Ischiocavernosus	2	0.088	1	Tunica	6	0.265	1
Islets	1	0.044	1	Turcica	2	0.088	1
Isthmus	1	0.044	1	Turkish	1	0.044	1
Ithorax	1	0.044	1	Tympanica	1	0.044	1
I've	1	0.044	1	Ulnaris	2	0.088	1

Word	Freq.	%	Videos	Word	Freq.	%	Videos
Jejunum	6	0.265	1	Umbilicalis	1	0.044	1
Joint	19	0.839	3	Upper	4	0.177	1
Joints	4	0.177	2	Urachus	1	0.044	1
Jugulare	1	0.044	1	Ureters	3	0.133	1
Juxtaglomerular	2	0.088	1	Urethra	10	0.442	1
Kidney	1	0.044	1	Urethral	2	0.088	1
Kidneys	4	0.177	2	Urethralis	4	0.177	1
Knee	2	0.088	1	Urogenital	1	0.044	1
Labia	1	0.044	1	Uteri	4	0.177	1
Lamina	6	0.265	1	Uterine	3	0.133	1
Langerhans	1	0.044	1	Uterus	4	0.177	1
Lata	1	0.044	1	Vagal	1	0.044	1
Later	1	0.044	1	Vagina	2	0.088	1
Lateral	11	0.486	6	Vaginae	2	0.088	1
Laterally	1	0.044	1	Vaginalis	6	0.265	2
Latissimus	2	0.088	1	Vagus	8	0.353	2
Latum	1	0.044	1	Valves	3	0.133	1
Left	6	0.265	3	Variable	1	0.044	1
Ligament	3	0.133	2	Vein	4	0.177	1
Ligaments	8	0.353	2	Veins	4	0.177	2
Ligamentum	7	0.309	3	Vena	25	1.104	4
Limb	3	0.133	2	Venae	1	0.044	1
Longitudinal	1	0.044	1	Venous	5	0.221	2
Lower	3	0.133	1	Ventral	11	0.486	5
Lumbar	12	0.530	3	Ventralis	3	0.133	1
Lumbo	2	0.088	1	Ventricle	10	0.442	2
Lumbocostalis	3	0.133	2	Ventricular	1	0.044	1
Lumbocostalus	1	0.044	1	Venum	1	0.044	1
Lumbosacral	1	0.044	1	Vertebrae	1	0.044	1
Luteum	6	0.265	2	Vertebral	1	0.044	1
Lymph	38	1.678	3	Vesico	1	0.044	1
Lymphatic	2	0.088	1	Vesicular	3	0.133	1
Lymphatics	1	0.044	1	Vessels	2	0.088	1
				Vestibulocochlear	1	0.044	1
				Vestibulum	5	0.221	3
				Viscera	4	0.177	2
				Visceral	1	0.044	1
				Vocal	5	0.221	1