A Frequency Analysis of Linear Versus Non-Linear Images as Persuasive Tools in Students' Presentation Slides

Harris Mirza Mohd Rosli[1], Amir Lukman Abd Rahman[2*], Hairul Azhar Mohamad[3], Muhammad Haziq Abd Rashid[4], Muhammad Luthfi Mohaini[5], Tanakarn Pataburee[6]

[1]Kuarters Polis E-G-2, Lorong Chempaka 1, Taman Perumahan Polis Diraja Malaysia Kuala Klawang, 71600 Negeri Sembilan, Malaysia,

[2,3,4,5]Akademi Pengajian Bahasa, Universiti Teknologi MARA, Shah Alam, Malaysia,

[6]Faculty of Liberal Arts, Rajamangala University of Technology Srivijaya, Muang District, Songkhla 90000, Thailand

***Corresponding Author**

DOI: https://dx.doi.org/10.47772/IJRISS.2025.924ILEIID006

Received: 23 September 2025; Accepted: 24 September 2025; Published: 29 October 2025

ABSTRACT

Visual aids such as linear and non-linear images have been used in students' presentation slides to keep the audience engaged, motivated, and attentive. As the research uses Dual Coding Theory and Elaboration Likelihood Model (ELM) as both theoretical and conceptual frameworks, this study aims to conduct a frequency analysis of linear versus non-linear images as persuasive tools in students' presentation slides to determine which type of image is more prominently used by students to convey the idea of their presentation. Through conducting qualitative research with a content analysis design, twenty-six (26) presentation slides created by LG2405D students from UiTM Shah Alam will be collected and become the main key to examine the frequency of linear and non-linear images in students' presentation slides. The findings of this research are important since they will reflect on why students decide to use either type of image and how they associate it with different persuasion techniques. Based on the findings, student presenters have a strong tendency to use linear images compared to non-linear images in their slides. Next, common types identified in this research for linear images include charts, graphs, and tables, meanwhile, non-linear images such as icons, logos and memes. Lastly, linear image is mostly associated with the Heuristic Systematic Model, whereas non-linear images can be associated with the Elaboration Likelihood Model. Further studies regarding the usage of linear and non-linear images are needed to give clearer insights for future researchers and also to explore the field of study in a broader context.

Keywords: visual aids, linear images, non-linear images, persuasion technique, presentation slides

INTRODUCTION

The evolution of technology makes life easier in every aspect as time progresses. The education field can benefit from the implementation of technology in students' learning. This can be seen through the usage of digital presentation in students' education systems, especially in higher education settings. According to Jelemenska et al. (2011), digital presentation helps students understand a topic depending on how it is being utilized for conveying information. In this context of the study, it is quite common for English-major students to carry out presentations as their ongoing assessments to evaluate their oral presentation skills. Students mostly use PowerPoint or Canva as a medium to convey information on the topic that they have been assigned for the assessment.

For them to fully utilize the effectiveness of this presentation medium, they must incorporate a lot of visual aids like charts, graphs, and other resources as they keep their peers engaged, motivated, and attentive during the presentation session. According to Jamal and Mustaffa (2023), numeral visual aids like diagrams, charts or graphic designs can be fully utilized to understand the idea of the topic once they understand how to convey the

message efficiently by grasping the core concept of visual communication. These aids not only enhance creative thinking to clarify ideas but also encourage understanding (Mohammed, 2024). This research focuses on two types of images, linear and non-linear images. A linear image is an image that presents information through sequential order, meanwhile, a non-linear image is an image that presents information in abstract ways. These images play an important role in complementing the ideas presented, so the audience can be persuaded effectively.

Although it is undeniable that incorporating visual aids in presentation slides is crucial for students to support their points during oral presentation sessions, problems start to arise when they lack knowledge of how to fully utilize the effectiveness of visual aids. Willyarto et al. (2020) stated that presentation slides that incorporated visual aids are able to improve audiences' comprehension and engagement. However, the research does not delve too much into how the visual aids can be fully utilized in terms of persuasion.

Recent research on visual communication generally highlights the impact of using visual aids to make the presentation more engaging or focusing more on advertisements, but it never discusses specifically the effectiveness of using linear or non-linear images. This might be a challenge for students because they tend to randomly select these types of imagery without taking into consideration whether they are suitable for the topic of their discussion. Wijayanti et al. (2025) stated that factors such as irrelevant images and disharmonious color combinations between images and text can reduce the quality of the slides, which makes it unengaging and monotonous.

It can be concluded that the reviewed past studies showed a lack of diversity in subjects and contexts and limited research comparing the effectiveness of different types of visual aids, with an arising need for a frequency analysis of the role of images as persuasive tools in students' presentation slides. This study aims to address the gaps by discovering and investigating the role of images when conveying complex ideas to persuade the audience. Due to a lack of previous studies for these image types, students are still uncertain about how to use linear or non-linear images effectively to convey their ideas while persuading the audience. Hence, this study was done to answer the following research questions:

1. What is the frequency of linear versus non-linear images in students' presentation slides on persuasion?
2. What are the common types of linear and non-linear images in students' presentation slides on persuasion?
3. In what ways are the linear and non-linear images associated with the usage of different persuasion techniques used in each of the students' presentation slides?

LITERATURE REVIEW

Theoretical Framework

There are two existing theories that are suitable to be the theoretical framework of the study. Both theories demonstrate how individuals perceive and are persuaded by the information through pictures, whether linear or non-linear. The two theories applied are the Dual Coding Theory and the Elaboration Likelihood Model Theory.
Dual Coding Theory

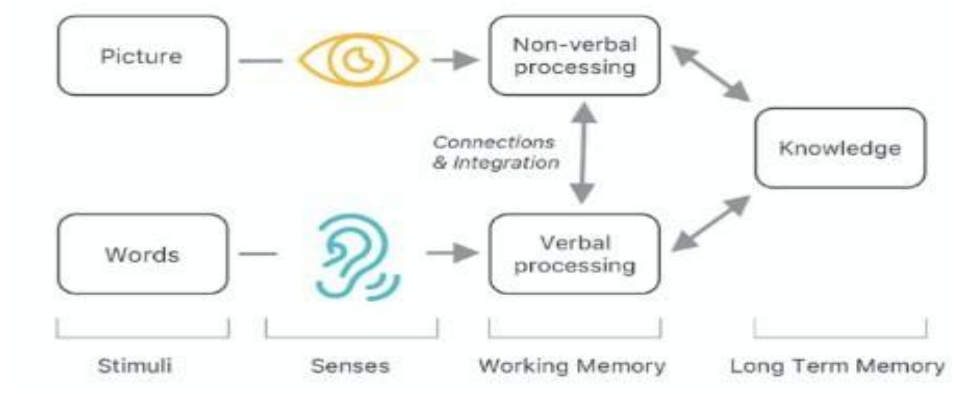

Figure 1 The Framework of Dual Coding Theory

The first theory that is relevant to the framework of this study is the Dual Coding Theory. Clark and Paivio (1991) proposed the "Dual Coding Theory", which shows the human mind processes information through verbal and non-verbal cues and processes. Although these channels operate independently, they can also work together to establish connections between words and images. These connections enhance our ability to recall and use information more effectively than relying solely on either words or images.

According to theory, there are two representation units called "imagens" for mental images and "logogens" for verbal information. The mental codes will correspond to these representations to help organize incoming information, making it easier to act upon, store, and retrieve later. Both imagery and verbal codes can be utilized during the recall process. It can be concluded that combining verbal and visual explanations can help students process and retain information more effectively since it minimizes cognitive overload while maximizing memory capacity, making it particularly valuable in educational settings.

By applying this theory in their study, Filieri et al. (2021) discussed that visual cues such as usergenerated pictures of a destination or attraction that were shared in social media can influence the decision of other tourists to visit the place since it is more reliable to facilitate systematic message processing. In the context of the present research, only pictures, being the first source of information, are coded by a human mind, which is perceived by their eyes to be the non-verbal cues. Thus, it is closely relevant to the concepts of imagery that can be used to affect people's thought processes and persuade them. However, words as the second source of information presented through verbal form are not covered in the present research. Hence, according to this theory, only part of the theory allows for a possible explanation of why people feel persuaded. Elaboration Likelihood Model (ELM)

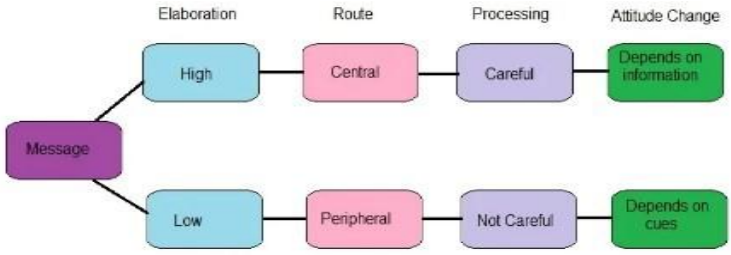

Figure 2 The Framework of Elaboration Likelihood Model (ELM)

The second theory that is suitable to be applied in this study is the Elaboration Likelihood Model (ELM). Petty and Cacioppo (1986) originated a dual-process model of persuasion called the Elaboration Likelihood Model (ELM), which describes and suggests that people manage their information processing in two routes: central and peripheral. The theory suggests that message receivers move along an elaboration continuum, from significant effort to no effort, and may occupy different points between the two ends, including the central or peripheral route.

First, the central route occurs when individuals have a high level of motivation, especially when they are invested in the topic and willing to process information. These individuals who went for this route tended to focus on logical and well-supported information that was presented at that moment, since they always use their critical thinking to make the best decision. Thus, attitudes formed through this route are strong and stable over time.

Next, the peripheral route occurs when individuals have a low level of motivation since they have little to no interest in the topic and cannot process information, compared to those who went for the central route. In addition, they relied on external cues such as speaker credibility, emotional appeals, visual design, or celebrity endorsements. Therefore, attitudes formed through this route are weak and most likely to change over time.

Sarfraz and Irfan (2025) apply the Elaboration Likelihood Model (ELM) theory in their study to discuss how shampoo advertisements can persuade viewers through central and peripheral routes. For example, they found out that catchy and memorable taglines or cues can persuade the viewers through a peripheral route since they create mental shortcuts that can influence their decision to buy the products. Next, they also discussed that factual

data or testimonials presented in the advertisement can persuade the viewers through a central route since it encourages their evaluation before buying the product.

In the context of the present research, the audience depends on cues like pictures, whether linear or nonlinear, to process information. Since the audience has low-level elaboration, the pictures help in supporting the main ideas of the discussed topic through peripheral routes. Thus, it is closely relevant to the concepts of imagery that can be used to affect people's thought processes and persuade them. However, the idea of processing information through a central route is not covered in the present research. Hence, according to this theory, only part of the theory allows for a possible explanation of why people feel persuaded.

Both of these theories are suitable to be applied in this study. For example, in terms of Dual Coding Theory, the students use both verbal and non-verbal cues, which are their oral skills and both linear and nonlinear images that are included in their presentation slides respectively, to persuade their peers based on the information that is being presented by them. Next, in terms of the Elaboration Likelihood Model (ELM), the students are fully utilizing the application of this model in their presentation slides to ensure that their peers can comprehend so much information easily in such a short time while maintaining their engagement from the start until the end of the presentation.

Role of Visual Aids in Academic Settings

Visual aids are extensively used in academic settings due to their significant impact on learning. Numerous studies have demonstrated their effectiveness in enhancing educational outcomes. For instance, Nghitoolwa et al. (2024) explored the role of teaching aids, particularly visual ones, on students' academic performance. The study used a qualitative approach with a case study design and selected 2 natural science teachers and 10 grade 7 learners from a school in Kunene Region, Namibia, through purposive sampling. It was revealed that when used effectively, visual aids can promote deeper learning, helping students retain information better and perform well in assessments. However, the study faces a challenge regarding limited generalizability since the sample consists of 2 teachers and 10 students only.

Similarly, Jatautaite et al. (2023) examined the impact of electronic visual tools on metacognitive learning in higher education. The authors used a qualitative approach with semi-structured anonymous written reflections from 22 respondents who studied English as a foreign language for Business English and English for law enforcement. Based on the critical analysis of the reflection, they found that such tools foster meaningful interactions and improve problem-solving skills among students. The issue that possibly surfaces is that the reliability of the study findings may be questionable, as it only relies on subjective reflections.

Qasserras (2024) investigated the influence of visual aids on various learning styles in high school education. He employed a qualitative approach with a systematic review design of existing literature regarding a similar topic. It is concluded that these tools enhance student engagement by encouraging critical evaluation of the material presented. However, the study lacks original data because the findings only depend on existing literature's data.

Lastly, Hamad (2023) studied the impact of visual aids in promoting learning processes in Pakistani schools. He conducted this study with a qualitative approach through desk research, in which he analyzed and synthesized secondary sources such as online journals and libraries. The findings highlighted that visual aids not only make classroom sessions more dynamic and enjoyable but also improve learning effectiveness when directly aligned with the topic being taught. There might be an issue in this study as the data collected from the desk research approach may be theoretical and not grounded when it comes to real-time classroom observations.

Correlation between Visual Aids and Persuasion

Visual aids have long been recognized as powerful tools for persuasion, commonly used across various fields. Research has consistently shown a strong connection between visual elements and their persuasive impact. For example, Mohamad et al. (2024) studied how textual and visual metadiscourse contribute to persuasion in digital academic posters. They applied a mixed-method approach by using a software called ATLAS.ti to analyse visual

metadiscourse qualitatively and another software called Antconc to calculate the textual metadiscourse quantitatively. The sampling used in this research is 10 digital academic posters created by undergraduate students from the English professional communication programme. Their findings revealed that students frequently used visual aids to capture readers' attention. These visual elements engaged readers more deeply with the content of the posters. However, this study lacks in terms of representation as the researchers only use a small sample for the study.

Similarly, Seo (2020) explored the role of visual persuasion and found that adding images to texts can significantly enhance persuasive impact. By using the quantitative approach, the author uses 20 case studies with a total of 2,515 participants who were exposed to visual + verbal messages and verbal-only messages. Photographs, in particular, were shown to convey messages more concretely and realistically, while drawings, cartoons, and line illustrations, despite their symbolic nature, were less effective in representing direct references. The researcher does not explore enough in terms of audience or cultural context that may limit the generalizability of the sample.

Sampson and Sampon (2020) focused on the use of graphic images in advertisements, highlighting their ability to convey ideas and emotions through both visual and verbal communication. Their study emphasized the iconic relationship between an image's content and meaning, showing how visual metaphors can simplify complex messages and increase persuasive effectiveness. This underscores the importance of visual communication, as the human brain processes images faster than text. However, this study only focuses on the advertising field, hence, the findings may not be suitable for application in an academic context.

Another study on visual aids, focusing on advertisement conducted by Abd Rahman et al. (2024) investigated viewers' perspectives on a controversial Malaysian skincare advertisement by applying Lester's Six Perspectives in Visual Communication. The study employed a quantitative survey involving 250 respondents, who evaluated the skincare TV advertisement through personal, technical, ethical, cultural, and critical lenses. Findings revealed that personal, technical, and ethical perspectives significantly shaped viewers' attitudes, while cultural and critical perspectives had minimal influence. Interestingly, gender did not affect how viewers perceived the controversial elements of the advertisement. While the study offers valuable insights for advertisers and students in understanding how audiences interpret controversial advertising, its focus on a single skincare commercial may limit the applicability of the findings to broader advertising contexts.

Based on the findings from these studies, we can see that they are aligned with each other in terms of emphasizing the persuasiveness of visual images in different contexts, such as academic and marketing. For example, Mohamad et al. (2024) and Sampson and Sampon (2020) state that visual images significantly enhance the persuasiveness of the message in respective domains. While Abd Rahman (2024) emphasized that even a controversial visual can influence viewers in many elements or aspects either positively or negatively, and persuade the audience either to take into consideration of the item or the meaning behind the visual used. These studies also contribute to offering a comprehensive understanding of visual images as persuasive tools across those domains.

Research Gap

Several research gaps emerge from the past studies reviewed. One common gap is the lack of diversity in subjects and contexts. Most studies focus broadly on general audiences or specific educational levels, such as high school or higher education. This study addresses that gap by focusing narrowly on students' presentation slides, offering a deeper understanding of the role of visual aids in academic settings.

Another gap lies in the limited research comparing the effectiveness of different types of visual aids. For example, Seo (2020) examines only photographs and illustrations, leaving other visual formats unexplored. This study aims to bridge that gap by directly comparing linear and non-linear images, providing valuable insights into their effectiveness in academic presentations.

In summary, this study contributes to the field by broadening the understanding of visual aids in academic settings and offering a comparative analysis of linear and non-linear images, an area that remains relatively underexplored in the context of students' slides.

Conceptual Framework

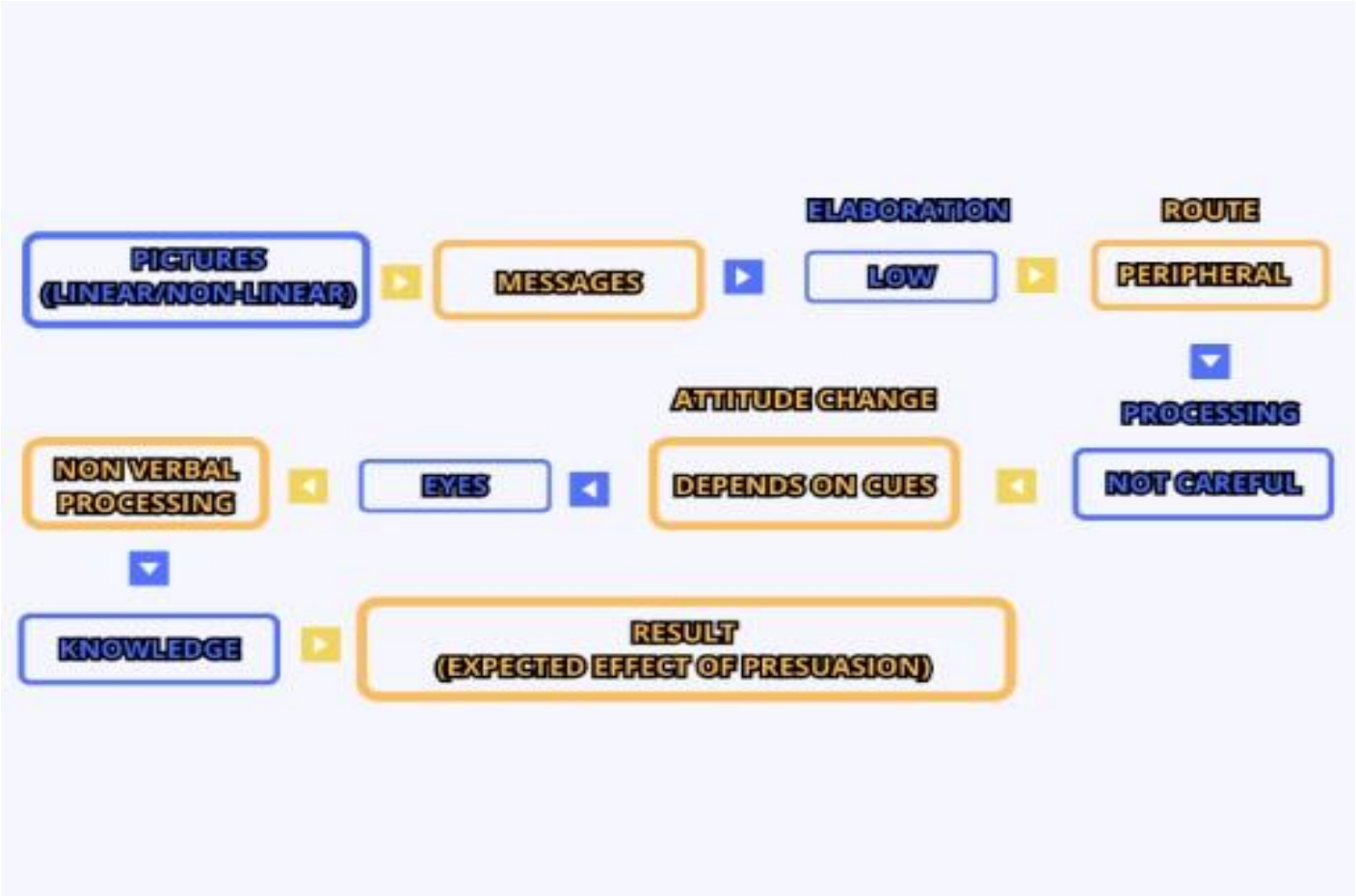

Figure 3 The Conceptual Framework of the Study Using Dual Coding Theory and Elaboration Likelihood Model

Since the study focuses on how linear (structured images) and non-linear (abstract images) are utilized as persuasive tools in students' presentation slides, the conceptual framework will be based on the relationship between the type and frequency of images as independent variables and persuasive techniques used as dependent variables.

This framework is backed by the Dual Coding Theory proposed by Clark and Paivio (1991) to explain the process of students retaining information through visual (text and images). In the context of this study, linear images and non-linear images convey information through visual presentation of texts, charts, icons and more.

In addition, the Elaboration Likelihood Model advanced by Petty and Cacioppo (1986) helps explain the use of linear and non-linear images as persuasive tools located along peripheral routes because they depend on emotional stimuli and aesthetic value in their impact while supporting logical information processing.

To conclude, this framework will help the study to determine which image type is more persuasive by giving more insights into how it can be optimized in students' presentation slides.

METHODOLOGY

Research Design

A qualitative approach with a content analysis design has been chosen to address the research questions previously mentioned in the study. Creswell and Creswell (2018) stated that the methodology used to conduct qualitative research differs significantly from quantitative research and employs textual and image data in analysis, specific steps of analysis, and varying designs. For example, Hyll et al. (2019) used a qualitative

approach to explore medical students' experiences in using digital presentation (Prezi) for their studies through semi-structured interview guides, which were then analyzed by using the qualitative content analysis method.

In addition, Hsieh and Shannon (2005) mentioned that the content analysis approach is suggested because it can investigate any type of communication material, such as non-closed-end questions, interviews, focus group discussions, observation, and printed media texts such as articles, books, or manuals.

For this study, the qualitative design is suitable to explore the common types of non-linear images in students' presentation slides on persuasion, whereas the content analysis was conducted to discuss the frequency of linear versus non-linear images in students' presentation slides.

Research Sample

According to Campbell et al. (2020), purposive sampling helps in selecting respondents who can provide useful information for a limited research. The purposive sampling method was used in this study as it focused on the target sample from students who enrolled in the Bachelor of Applied Language Studies (Hons.) English For Professional Communication (LG240) in UiTM Shah Alam. The sample size for this study was set to 26, which is the number of students from the LG2405D class who are taking the Persuasion and Negotiation (EPC646) subject. The subject requires the students to create a presentation slide for a case study on the topic "The Importance of Good Financial Planning" and include at least three persuasion techniques in the slides as their ongoing assessment. The samples were collected from the selected students through their submission in the Google Drive folder with the assistance of the lecturer. The requirements set by the lecturer when the students created the slides were that the slides had a maximum of 3 to 4 pages, contained images that were related to the content that was presented, and lastly, the content of the presentation had to apply at least three theory-driven persuasion techniques that had been learned in the Persuasion and Negotiation class. There are three common theory-driven persuasion techniques used by the students in their presentation, which are the Elaboration Likelihood Model, the Heuristic Systematic Model and the Social Judgement Theory. The average page counts for each slide are 4 pages, hence, the overall total of pages that need to be analyzed is 104 pages. The slides are collected because the data provide a representation of how the students utilized the visual aids, specifically linear and non-linear images in their slides for persuasive communication, especially in the academic context. Research Instrument

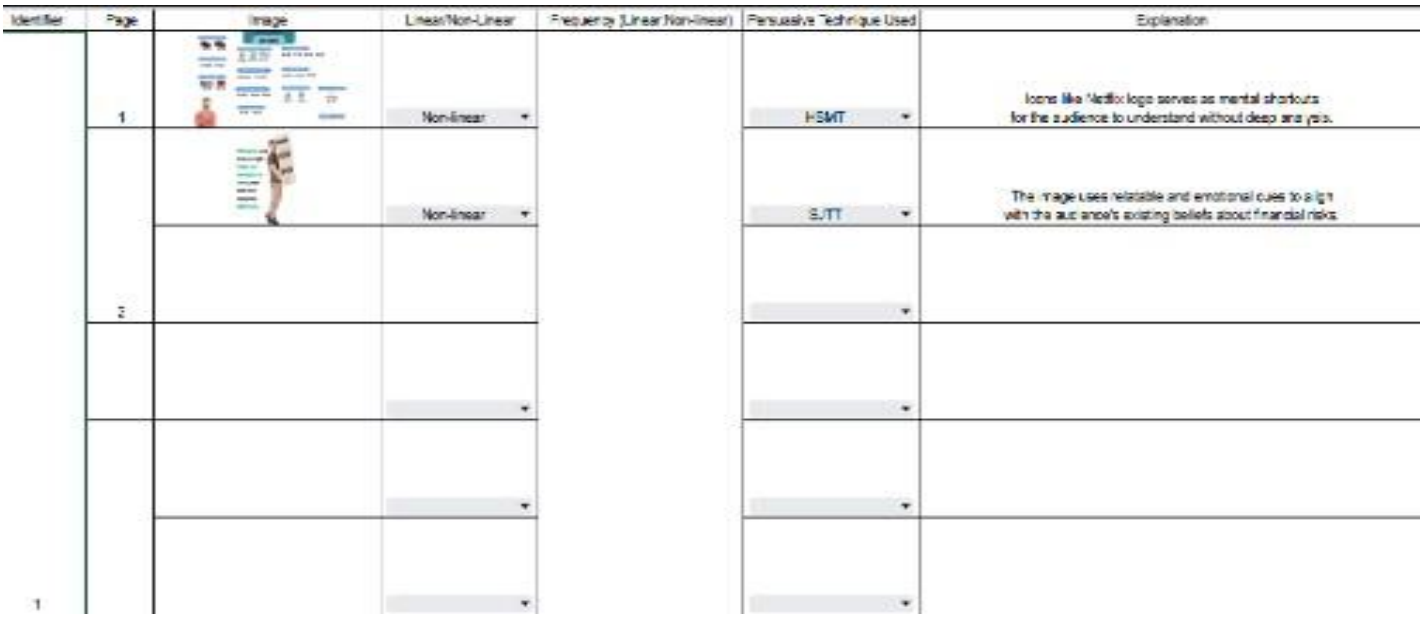

Figure 4 An Overview of the Frequency Analysis Table Made in Microsoft Excel

Microsoft Excel has been chosen as the research instrument for this study. Sbampato et al. (2025) stated that Microsoft Excel has evolved into an extensive platform for analysis visualization, and automation beyond basic data management capabilities. Microsoft Excel serves as the dataset management tool to categorize linear and non-linear images found throughout students' presentation slides for this study. The table generated by Excel for

the analysis will contain six specific columns: Identifier, Page, Linear /Non-linear, Frequency (Linear:Nonlinear), Persuasive Technique Used and Explanation. The "Identifier" column generates unique labelling for each sample presentation slide for effective monitoring. The "Page" column shows the current positioning based on page count. The "Linear/ Non-linear" column identifies whether images used are linear images in sample presentation slides. The "Frequency (Linear:Non-linear)" column determines the frequency count of linear/nonlinear images in each sample presentation slide. The "Persuasive Technique Used" column identifies the theorydriven persuasive techniques in the sample presentation slides. The three techniques will be created as types of codes in Excel by giving a unique labelling for each technique. For example, Elaboration Likelihood Model Technique = ELMT, Heuristic Systematic Model Technique = HSMT and Social Judgement Theory Technique = SJTT. Lastly, the "Explanation" column is a qualitative analysis to measure the relationship between linear/non-linear image types and theory-driven persuasive techniques employed.

Data Collection

The data collection for this study involved gathering presentation slides relevant to the research topic and created by students who utilize linear and non-linear images in their slides. The objective of the collection was to analyze the frequency of the usage of linear and non-linear images and determine how both types of images can serve as persuasion tools.

For the slide collection process, the designated lecturer of the subject required the students to submit the presentation slides on the topic "The Importance of Good Financial Planning" through the Google Drive folder. The lecturer had to ensure that all 26 students had submitted their slides, since it would be the sample size for this study. Then, the lecturer shared the folder with the researcher for easier access to the presentation slides when analyzing the data. Lastly, the study had to ensure confidentiality and anonymity by not disclosing any personal information of the selected participants. Informed consent was considered after the participants submitted their presentation slides through the Google Drive folder.

Data Analysis

This study aims to conduct a frequency analysis of linear versus non-linear images as persuasive tools in presentation slides. Each of the slides was reviewed based on the visual content applied by the students on every page of the slides. The linear and non-linear images were identified in the "Linear/ Non-linear" column. Linear images were classified if the visuals used were step-by-step diagrams or flowcharts, whereas non-linear images were classified if the visuals used were graphs or charts. Then, a frequency analysis was carried out in the "Frequency (Linear:Non-linear)" column to compare the total number of identified linear and non-linear images from each slide. The types of theory-driven persuasion techniques were identified in the "Persuasive Techniques Used" column. The frequency counts of the techniques were also conducted in the same column. Lastly, the association between linear and non-linear images with the theory-driven persuasion techniques applied in the slides were explained in the "Explanation" column. Research Validity and Reliability

Both internal and external validity will be ensured to ensure the validity of this study. Andrade et al. (2018) stated that research methodology accuracy in answering the research questions depends on internal validity, whereas external validity helps measure the universal applicability of research results. In terms of internal validity, an audit trail method was deployed by documenting the whole research process, starting from the data collection until the data analysis process. This method helps in maintaining consistency when verifying the analysis of the data. In terms of external validity, the thick description method was conducted to interpret the persuasiveness of linear and non-linear images used by the students, since it reflects how familiar the students are with digital media. This method helps in transferring the present findings to other comparable contexts or settings.

Next, this study demonstrates reliability through two methods, which include intra-rater and inter-rater reliability. Such methods provide key security to prevent coding procedure inconsistency. Scheel et al. (2018) explain that intra-rater reliability requires a single rater to perform multiple assessment trials within a short timeframe to ensure data consistency, but inter-rater reliability requires two raters to conduct one assessment to confirm their data match. In terms of intra-rater reliability, a two-week delay period was implemented for each coder to reassess a portion of the slides to evaluate the stability of their coding process. A reliability analysis was performed to

interpret the consistency of their classification process through test-retest methodology. The researchers examined and solved each inconsistency to establish a strong coding framework. In terms of external validity, two experienced researchers learned the coding system and then independently categorized images under the linear or non-linear categories. The analysis used Cohen's kappa coefficient to measure agreement from independent slide evaluations conducted by two trained raters. A kappa value higher than 0.8 was aimed at this point to verify that coders had consistent results.

RESULTS AND DISCUSSION

The Frequency of Linear Versus Non-Linear Images in Students' Presentation Slides on Persuasion

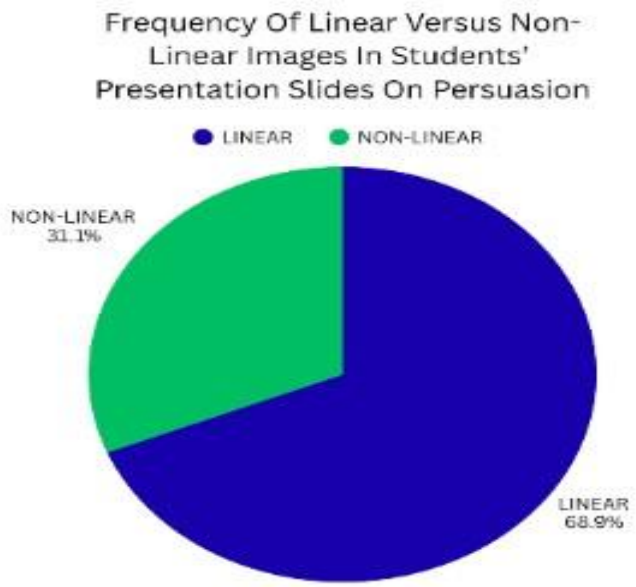

Figure 5 Frequency of Linear Versus Non-Linear Images in Students' Presentation Slides on Persuasion

A total of 106 images across 26 presentation slides are analyzed and classified into two types of images, linear and non-linear images. Based on Figure 4.1, linear images have a higher frequency of usage in students' presentation slides, which is 68.9% compared to the frequency of non-linear images, which is 31.1%. This may suggest that student presenters have a strong tendency to use linear images when explaining their ideas and points to the audience, due to how they were taught that to express their ideas or points, they must be backed with evidence or logical reasoning. This also shows that student presenters may have a perception that a strong persuasion or argument must have a structured format so the audience can grasp the ideas better. In addition, linear images are also widely used in traditional academic presentations, which students are more comfortable using without any worry. However, the low percentage of non-linear image usage in presentation slides may indicate that student presenters are still not confident enough to utilize visuals as supporting cues to help elaborate their abstract points in their presentation.

The first major finding of the study is that the students used linear images more frequently compared to non-linear images. The finding corroborates with the studies by Nghitoolwa et al. (2024) and Hamad (2023), in which both similarly stated that visual aids elevate engagement and comprehension of the audience. However, it did clash with the studies by Jatautaite et al. (2023) and Qasseras (2024) that highlight how important visuals, commonly non-linear images, can initiate critical thinking, which is underutilized in the present study. Hence, the finding not only emphasizes the effectiveness of linear and non-linear images for audience engagement, but also discovers the students' lack of confidence in utlizing more non-linear images in their presentation.

The Common Types of Linear and Non-Linear Images in Students' Presentation Slides on Persuasion

Table 1 The Common Types of Linear and Non-Linear Images in Students' Presentation Slides on Persuasion

Type of Image	Examples Found in Analysis
Linear Image	Charts, graphs, tables, and step-by-step diagrams
Non-linear image	Illustrations, visual metaphors, icons, logo, symbols, and meme

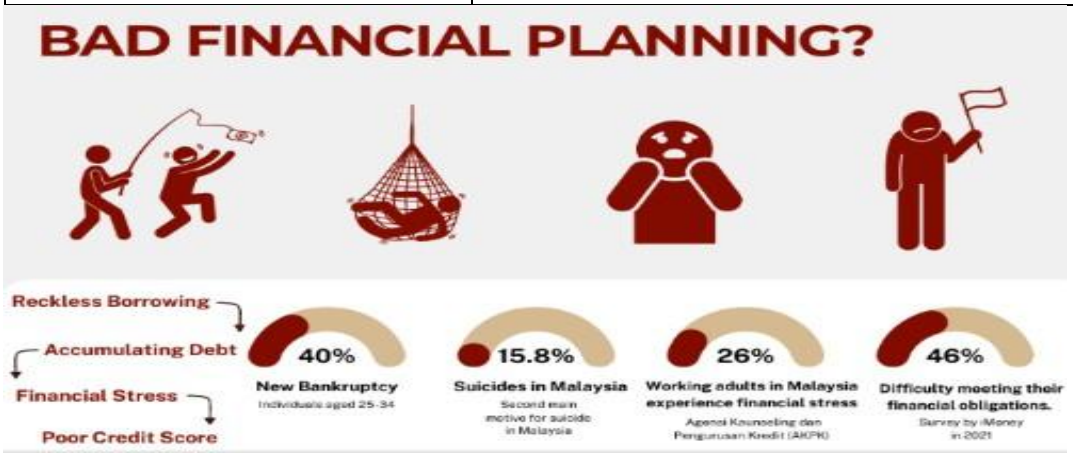

Figure 6 Examples of Linear Images used in Students' Presentation Slides

Figure 7 Examples of Non-Linear Images used in Students' Presentation Slides

Table 1 shows the common types of linear and non-linear images found in students' presentation slides after analysis is conducted. Linear images, such as charts, graphs, and tables, are commonly used by students to present data and statistics related to their topic, enabling them to convey factual information to the audience. For example, Figure 6 shows how one of the students incorporates statistics in their presentation to strengthen their point by showing the cause and effect of bad financial management. Next, non-linear images, including illustrations, icons or memes, are also utilized in some of the presentation slides since they function as a way to evoke their audience's emotion or for aesthetic purposes. For example, Figure 7 illustrates how one student utilises familiar icons and brands as a mental shortcut to help them determine which products to avoid to save money.

The second major finding is about the common types of linear (charts, graphs) and non-linear images (icons, memes) identified across all presentation slides that were analyzed. The finding supports the study by Sampson and Sampson (2020), which focuses on symbolic or abstract images can serve as persuasive tools. However, the underutilization of non-linear images from the present study is not enough to support the same study, which suggests that it helps with the emotional persuasion of the audience. In short, the findings both corroborate and clash with the previous study since it discusses how the types of imagery help with persuasion, but also lacks in explaining further the emotional impact of the imagery.

Ways the Linear and Non-Linear Images Associated with the Usage of Different Theor-Driven Persuasion Techniques are Used in Each of the Students' Presentation Slides

Table 2 Association between Linear Images and Theory-Driven Persuasion Techniques Used

Theory-Driven Persuasion Techniques	Frequency	Percentage (%)
Elaboration Likelihood Model Technique (ELMT)	23	31.5
Heuristic Systematic Model Technique (HSMT)	26	35.6
Social Judgement Theory Technique (SJTT)	24	32.9

Table 3 Association between Non-Linear Images and Theory-Driven Persuasion Techniques Used

Theory-Driven Persuasion Techniques	Frequency	Percentage (%)
Elaboration Likelihood Model Technique (ELMT)	14	42.4
Heuristic Systematic Model Technique (HSMT)	9	27.3
Social Judgement Theory Technique (SJTT)	10	30.3

Table 2 and Table 3 illustrate the association between linear and non-linear images with the theory-driven persuasion techniques employed by students in their presentation slides, respectively. For linear images, they are mostly associated with the Heuristic Systematic Model Technique (HSMT). Since these images consist of charts or graphs, they helped in supporting the logical reasoning of their idea. For non-linear images, they are greatly associated with the Elaboration Likelihood Model Technique (ELMT) due to their nature in emotion and familiarity appeals. In addition, non-linear images primarily serve as mental shortcuts, allowing the audience to rely on them without in-depth elaboration on the information received. Hence, ELMT is suitable to incorporate when using non-linear images.

The final major finding is the association between linear and non-linear images and different persuasion techniques, in which linear images are associated with the Heuristic Systematic Model Technique and non-linear images are associated with the Elaboration Likelihood Model Technique. It aligns with studies by Mohamad et al. (2024) and Seo (2022), who stated that visual aids can support the ideas logically and emotionally, depending on their usage. Although a previous study by Sarfraz and Irfan (2025) touches on how Elaboration Likelihood is applied in advertising in general, it is still not enough to explain how to apply persuasion techniques based on the images used in a specific field. To conclude, both findings and previous studies highlight that the students tend to use visuals that align with the peripheral route.

CONCLUSION

This study aims to investigate the frequency of linear and non-linear images as persuasive tools in students' presentation slides due to the lack of research on the usage of linear and non-linear images in general, which this problem is then recognized as the research gap of the study. By focusing on 26 presentation slides created by LG2405D students on the Negotiation and Persuasion subject, this study provides a qualitative content analysis to identify how linear and non-linear images are effective as persuasion tools, with Dual Coding Theory and Elaboration Likelihood Model serving as a framework for this study.

106 images were analyzed, and the result shows that the students prefer to incorporate linear images rather than non-linear images due to their familiarity with presenting an idea in such a structured manner. The lack of usage of non-linear images may reflect the fear of the students since abstract images can easily be misinterpreted. Next, the extracted data also identifies the common types of linear images (eg. charts, graphs, tables) and non-linear images (eg. icons, logos, memes), which helps in finding certain trends of visual usage by the students in the making of their presentation slides. This information is also essential as it may reflect on students' understanding

of the role of both image types, for example, linear images are commonly used for statistics, whereas non-linear images are used for emotional appeal. Lastly, the findings show how linear images and non-linear images can be associated with different persuasion techniques based on how they utilize the images. For example, linear images are strongly associated with the Heuristic Systematic Model Technique, whereas non-linear images are mostly associated with the Elaboration Likelihood Model Technique.

REFERENCES

1. Abd Rahman, A. L., Mohamad, H. A., Abdul Wahab, N. H., & Abd Rashid, M. H. (2024). Shockvertising– Viewers' visual communication perspectives of a controversial skincare advertisement. Masyarakat, Kebudayaan dan Politik (MKP), 37(2), 208-220. https://doi.org/10.20473/mkp.V37I22024.208-220
2. Andrade, C. (2018). Internal, external, and ecological validity in research design, conduct, and evaluation. Indian Journal of Psychological Medicine, 40(5), 498-499. https://doi.org/10.4103/IJPSYM.IJPSYM_334_18
3. Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: Complex or Simple? Research case examples. Journal of Research in Nursing, 25(8), 652-661. https://doi.org/10.1177/1744987120927206
4. Clark, J., & Paivio, A. (1991). Dual coding theory and education. Educational Psychology Review, 3(3), 149-210. http://dx.doi.org/10.1007/BF01320076
5. Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative and mixed method approaches (5th ed.). SAGE Publications
6. Filieri, R., Lin, Z., Pino, G., Alguezaui, S., & Inversini, A. (2021). The role of visual cues in eWOM on consumers' behavioral intention and decisions. Journal of Business Research, 135, 663-675. https://doi.org/10.1016/j.jbusres.2021.06.055
7. Hamad, J. I. (2023). The impacts of visual aids in promoting the learning processes in schools in Pakistan. African Journal of Education and Practice, 9(1), 51-60. http://dx.doi.org/10.47604/ajep.1912 Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. Qualitative Health Research, 15(9), 1277-1288. http://dx.doi.org/10.1177/1049732305276687
8. Hyll, M., Schvarcz, R., & Manninen, K. (2019). Exploring how medical students learn with the help of a digital presentation: A qualitative study. BMC Medical Education, 19(1), 1-8. https://doi.org/10.1186/s12909-019-1569-z
9. Jamal, I. N., & Mustaffa, N. (2023). The impact of visual communication on students' learning experience towards memory recognition and enhancement. Journal of Contemporary Islamic Communication and Media, 3(1), 179-195. https://doi.org/10.33102/j
10. Jatautaite, D., Butrime, E., & Zuzeviciute, V. (2023). Electronic visual learning aids for the effective class in higher education towards metacognitive learning. International Conferences e-Learning and Digital Learning 2023 and Sustainability, Technology and Education 2023, 75-82. https://doi.org/10.33965/EL_STE2023_202303L010
11. Jelemenska, K., Cicak, P., & Ducky, V. (2011). Interactive presentation towards students' engagement. Procedia – Social and Behavioral Sciences, 29, 1645-1653. https://doi.org/10.1016/j.sbspro.2011.11.407
12. Mohamad, N. A., Ab Aziz, A. A., Razali, N. A., Juned, A. M., & Abdullah, M. (2024). Metadiscourse in the digital academic poster: Examining the textual and visual metadiscourse in the construction of persuasion. Issues in Language Studies, 13(1), 284-303. http://dx.doi.org/10.33736/ils.5739.2024
13. Mohammed, R. J. (2024). Visual aids as a tool to stimulate creative thinking in the language teaching process. Journal of Language Studies, 8(9), 278-289. https://doi.org/10.25130/Lang.8.9.18
14. Nghitoolwa, H. T. S., Chirimbana, M., & Medusalem, M. (2024). The impact of teaching aids on the academic performance of learners in natural science. Journal of Education for Sustainable Innovation, 2(1), 74-83. https://doi.org/10.56916/jesi.v2i1.835
15. Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. Advances in Experimental Social Psychology, 19(1), 124-205.

16. Qasserras, L. (2024). The role of visual learning aids across diverse learning styles in high school education. European Journal of Applied Linguistic Studies, 7(2), 68-81. http://dx.doi.org/10.46827/ejals.v7i2.550
17. Sampson, A. J., & Sampson, E. A. (2020). Visual communication: A review of the persuasive properties of graphic images for advertisements. GRASPACT Journal of Arts and Technology, 1(1), 29-39
18. Sarfraz, Z., & Irfan, H. (2025). Linguistic analysis of strategies used by Pakistani shampoo brands for marketing purposes in advertisements. Al-Jamei Research Journal, 2(2), 17-34.
19. Sbampato, K., Arruda, H., & Silva, E. R. (2025). ChatGPT, Phython, and Microsoft Excel. Journal of the Medical Library Association, 113(1), 110-112. https://doi.org/10.5195/jmla.2025.2065
20. Scheel, C., Mecham, J., Zuccarello, V., & Mattes, R. (2018). An evaluation of the inter-rater and intrarater reliability of OccuPro's functional capacity evaluation. WORK: A Journal of Prevention, Assesment & Rehabilitation, 60(3), 465-473. https://doi.org/10.3233/WOR-182754
21. Seo, K. (2020). Meta-analysis on visual persuasion – Does adding images to texts influence persuasion? Athens Journal of Mass Media and Communications, 6(3), 177-190. http://dx.doi.org/10.30958/ajmmc.63-3
22. Wijayanti, S. H., Widyastuti, T. D., Ristyantoro, R., & Pramono, H. (2025). An investigation of the quality of presentation slide design and oral communication in higher education. Journal of Research in Instructional, 5(1), 185-198. https://doi.org/10.30862/jri.v5i1.608
23. Willyarto, M. N., Werhoru, D., Januarta, S., & Rivaldo. (2020). Visual aid presentation as a learning method: A case study in learning English of management students in Binus University. Journal of Physics: Conference Series, 1, 1-6. http://dx.doi.org/10.1088/1742-6596/1566/1/012023