T.C.

BAHCESEHIR UNIVERSITY

GRADUATE SCHOOL OF EDUCATIONAL SCIENCES

THE DEPARTMENT OF EDUCATIONAL TECHNOLOGY

EXPLORING THE IMPACT OF SOCIAL CUES IN MULTIMEDIA LEARNING DESIGN ON EAP CLASSES: AN INVESTIGATION OF THE PERSONALIZATION AND VOICE PRINCIPLES

MASTER'S THESIS

SELMA TAMDOĞAN ÇALIŞKAN

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This thesis was read by us; the quality and content as a Master's thesis have been seen and accepted as sufficient.

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ABSTRACT

EXPLORING THE IMPACT OF SOCIAL CUES IN MULTIMEDIA LEARNING DESIGN ON EAP CLASSES: AN INVESTIGATION OF THE PERSONALIZATION AND VOICE PRINCIPLES

Tamdoğan Çalışkan, Selma

Educational Technology Master's Program

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This study investigates whether the use of high social cues (the personalization and voice principles) affects the achievement of EAP learners on how to write a response paper. These principles suggest that people learn better when a multimedia presentation includes high social cues (a conversational speaking style, polite wording, and an appealing voice) (Mayer, 2020). The study comprised 221 EAP students in Turkey at a private university. It was conducted with two groups who received multimedia presentations with narration that included either high social cues or low social cues (formal speaking style, direct commands, and a monotonous voice). A pretest and posttest were implemented to evaluate the effect of each style, and the results were compared. The results demonstrated no significant difference between the two styles regarding learning. However, both groups had significantly higher scores after multimedia presentations.

Keywords: Multimedia Learning, Personalization Principle, Voice Principle, Social Cues, EAP

ÖZ

ÇOKLU ÖĞRENME KURAMININ KİŞİSELLEŞTİRME VE SES İLKELERİNİN AKADEMİK AMAÇLI İNGİLİZCE DERSLERİNDEKİ ETKİLERİ

Tamdoğan Çalışkan, Selma

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Bu çalışmanın amacı, çoklu ortamla öğrenme kuramının kişiselleştirme ve ses ilkeleri kullanımının akademik amaçlı İngilizce dersi öğrencilerinin performanslarına bir etkisi olup olmadığını araştırmaktır. Bu ilkelere göre, çoklu ortam sunularında sosyal ipuçları (günlük konuşma tarzı, kibar ifadeler ve kulağa hoş gelen bir konuşma biçimi) kullanıldığında öğrenciler daha iyi öğrenmektedirler (Mayer, 2020). Çalışma, Türkiye'de özel bir üniversitede öğrenim gören toplamda 221 öğrenciden oluşan iki gruba yüksek miktarda sosyal ipucu ve az miktarda sosyal ipucu (resmî, emir kipi kullanılan ve monoton bir konuşma biçimi) içeren iki farklı çoklu ortam sunusu verilerek yürütüldü. Öğrencilerin değerlendirme raporu yazma becerilerine bu iki farklı konuşma tarzının etkisini ölçmek için önce bir ön test, ardından bir son test yapıldı. Bulgular, her iki grubun da değerlendirme raporu yazma konusunda bilgi edindiğini, ancak iki grup birbirleriyle karşılaştırıldığında yüksek miktarda sosyal ipucu içeren konuşma tarzının beklendiği gibi anlamlı bir fark yaratmadığını göstermiştir.

Anahtar Kelimeler: Çoklu Ortam, Kişiselleştirme İlkesi, Ses İlkesi, Sosyal İpucu, Akademik Amaçlı İngilizce

To my beloved father

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Selma TAMDOĞAN ÇALIŞKAN

Istanbul

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LIST OF ABBREVIATIONS

AR	Augmented Reality
CEFR	Common European Framework of Reference
CTML	Cognitive Theory of Multimedia Learning
EAP	English for Academic Purposes
EFL	English as a Foreign Language
EGAP	English for General Academic Purposes
EMI	English as a/the Medium of Instruction
ESAP	English for Specific Academic Purposes
HSC	High social cues
L2	Additional language spoken alongside one's first language
LSC	Low social cues

Chapter 1

Introduction

Technology has changed people's lives and significantly impacted many aspects of society, including education. Traditional teaching methods were the norm in the past, but new learning opportunities have emerged with the advent of technology. Today, technology plays a crucial role in education, providing students with a range of tools and resources that can enhance their learning experiences. The use of technology in education can be traced back to the early 20th century, with the introduction of educational films and radio broadcasts. Over time, other technologies such as televisions, computers, and the internet have become integral to the education system. However, the real revolution in technology-based education came in the 21st century, with the widespread adoption of mobile devices, online learning platforms, and interactive digital media.

Today, technology has transformed how people learn and, as a result, has created new educational opportunities. One of the earliest and most significant trends in technology-based education is the integration of multimedia into instructional settings. To understand this trend, it is essential to grasp the meaning of the word "media", which is the plural form of "medium," and it refers to a form of communication. According to Smaldino et al. (2008), everything that transmits information from a source to a receiver is called media. The prefix "multi-" adds the notion that various forms of media are incorporated. In essence, multimedia learning refers to learning from text and visuals (Mayer, 2020). Multimedia is a powerful pedagogical medium to promote better communication and learning by delivering instructional messages effectively. Six basic categories of media can be listed as (1) text, (2) audio, (3) visuals, (4) video, (5) objects, and (6) people (Smaldino et al., 2008). Since the emergence of technology integration, multimedia's effectiveness has been tested repeatedly, and the general consensus is that multimedia is more efficient than films, teachers, books, or other traditional methods (Alessi & Trollip, 2001).

To understand what makes multimedia effective, it is necessary to explain the role of multi-channel interaction. The theory of multi-channel interaction describes the

efforts to improve instructions by using multiple channels in a multimedia delivery or presentation (Bagui, 1998). According to this theory, information must be processed through more than one channel in a multimedia tutorial to promote learning (Ellis, 2004). Therefore, using multiple forms of media can foster learning more when compared to media with a single information processing channel, such as sight or sound (Mayer, 2008; Noetel et al., 2021; Rolfe & Gray, 2011). Instructional designers and educators can now provide more graphics, diagrams, and screen displays in the learning environment thanks to advancements in educational technology and studies that support the theory of multi-channel interaction.

However, while creating multimedia communications, it is vital to analyze how human cognition functions to allow learning to occur based on the cognitive process of each learner. Although it is accepted that information presented through multiple channels seems to enhance the process of learning (Mayer, 2005a; Schnotz, 2005), studies demonstrated that intense and complex information conveyed through verbal and visual means can be mentally challenging (Sweller, 1994). This mental challenge was investigated and theorized under *the cognitive load theory* and described as the amount of information that working memory can process at a time (Paas et al., 2004). Cognitive load theorists suggest that instructional materials must be designed and presented in a way that acknowledges the fundamental limitations of the human information processing system (Paas et al., 2010; Sepp et al., 2019). To reduce the amount of cognitive load during the multimedia learning process and increase the effectiveness of multimedia tutorials, several principles were put forward by Mayer (2001, 2020). These principles include multimedia, coherence, signaling, redundancy, spatial contiguity, temporal contiguity, segmenting, pre-training, modality, personalization, voice, image, embodiment, immersion, and generative activity principles.

These principles are all related to specific informational arrangements in various modalities and their impact on knowledge acquisition. However, more attention has recently been drawn to the importance of social considerations in multimedia design for education. Thus, the image, embodiment, personalization, and voice principles

have been under scrutiny. According to social agency theory (Mayer et al., 2014a), multimedia learning can be regarded as a conversation between the instructor and the learner, and using positive social cues (a conversational speaking style, polite wording, and an appealing human voice) can help the learner form a social stance and motivate the learner to participate in more active cognitive processing. Ultimately, the learner can benefit more from the multimedia lesson as he or she can construct the information more meaningfully.

The image principle suggests that having an on-screen pedagogic agent does not necessarily lead to better learning due to the possibility of creating extraneous processing (Mayer, 2020). Although having a representation of the instructor is assumed to be an effective social cue, some experiments conducted to test the effectiveness of the visible pedagogic agent revealed that a static (low-embodied) image might not stimulate a feeling of social presence; in contrast, it might distract the learner (Mayer & DaPra, 2012; Moreno et al., 2001). In other experiments, students who received a multimedia presentation with an on-screen pedagogic agent performed only slightly better (Mayer et al., 2003a; Moreno et al., 2001). The results did not provide overall support for the inclusion of the speaker's image in a multimedia lesson. However, it was found that learning can be enhanced if the on-screen agent displays human-like gestures, mimics, and eye-gaze, which led to the formulation of the embodiment principle (Mayer, 2020). The rationale behind the embodiment principle is that a high-embodiment on-screen instructor can be perceived as a positive social cue, resulting in social partnership. Some studies supported this principle, and learners received higher scores from multimedia presentations that included high-embodiment pedagogical agents than low-embodiment pedagogical agents (Li et al., 2019; Wang et al., 2018).

To maximize the learning outcomes, the personalization principle suggests that multimedia messages are converted to conversational style, and polite language is used while delivering the instruction. The voice principle is also listed under the social aspects of multimedia learning design, and it suggests that more profound learning occurs when an appealing human voice is preferred over a machine-synthesized or

unappealing human voice in a multimedia tutorial (Mayer, 2001). These principles focus on increasing learner interest in computer-based multimedia presentations and are correlated with each other because they increase social presence, familiarity, and authenticity.

This study focuses on the role of social cues in multimedia learning in EAP settings, and the impact of personalization and voice principles were investigated in detail. However, the image and embodiment principles were excluded since "empirical research is still needed to determine how these principles affect the transfer of learning" (Issa et al., 2011, p. 818). The personalization and voice principles are regarded as more potent agents in priming social partnership; therefore, they will be exclusively examined.

1.1 Statement of the Problem

Many studies have examined the effectiveness of personalization and voice principles. Some studies proved that the use of a conversational speaking style could increase interest and motivation toward the subject area (Brom et al., 2014; Ginns et al., 2013; Kurt, 2011; Park, 2015; Reichelt et al., 2014; Rey & Steib, 2013; Schrader et al., 2018; Zander et al., 2015). The use of polite wording was also well-received by the learners (Mayer et al., 2006; Schneider et al., 2015). It was also proven that the learning performances were higher when personalized messages were incorporated (Ginns et al., 2013; Mayer et al., 2004; Moreno & Mayer, 2004; Reichelt et al., 2014; Riehemann & Jucks, 2018; Schrader et al., 2018; Töpper et al., 2014; Yang et al., 2022; Zander et al., 2015). Furthermore, some studies revealed higher retention rates in personalized tutorials (Ginns et al., 2013; Lin et al., 2020; Moreno & Mayer, 2000, 2004; Reichelt et al., 2014; Rey & Steib, 2013; Schneider et al., 2015).

For the effectiveness of the voice principle, some studies were conducted, and it was found that a human voice with a foreign accent and a monotonous tone may hinder the learning process in a multimedia lesson (Mayer et al., 2003b). It was also reported that students performed better when the instructional messages were delivered via a human voice with a standard accent (Atkinson et al., 2005; Domagk, 2010; Mayer & DaPra, 2012; Mayer et al., 2003b).

Despite these positive outcomes, the effectiveness of the personalization principle is questionable because some studies indicate counter results (Onat, 2018; Sofi et al., 2018; Töpper et al., 2014) or no significant influence on learning performance (Brom et al., 2014; Kurt, 2011; Park, 2015). In addition, the voice principle is not always practical when the audience involves L2 learners (Davis et al., 2019; Liew et al., 2020). Language learning environments are considered boundary conditions for personalization and voice principles since second language learners may not fully grasp the linguistic elements and subtleties that come naturally to native speakers. For instance, the prosodic qualities of a language, which refer to various aspects of speech that go beyond individual words and involve the overall rhythm, intonation, stress patterns, and melody of the language, may be more difficult for non-native speakers to understand because the listening process differs from that of a native speaker (Davis et al., 2019). The key difference is that native speakers typically adopt a top-down approach when processing language, prioritizing the comprehension of overall meaning. In contrast, non-native speakers often employ a bottom-up approach, which involves paying more attention to individual words and their specific meanings (Osada, 2001). This distinction occurs because native speakers have a more extensive linguistic background and intuitive knowledge of the language, which allows them to rely on higher-level context and prior knowledge to understand meaning. However, non-native speakers may have a limited vocabulary or less familiarity with the language's nuances. As a result, they tend to allocate more cognitive resources toward interpreting particular words. These differences in how foreign language learners perceive language may make it difficult for them to notice social cues and prevent the principles of voice and personalization from being effective in multimedia environments. Therefore, additional research on these principles is required in language learning contexts.

There are many studies on principles based on social cues; however, literature shows that there is not adequate research on the effectiveness of these principles in English for Academic Purposes (EAP) settings. EAP courses are usually delivered in universities and colleges, and they aim to support L2 learners in improving the essential language and study skills necessary for academic contexts. Due to the formal

nature of these courses, academic norms and formal communication methods (speaking and writing skills) are prioritized during delivery. EAP students are required to engage in academic genres that are cognitively demanding and are exposed to the formal aspects of the language so that they can succeed in their studies (Simpson-Vlach & Ellis, 2010). In a study conducted by Negretti and Kuteeva (2011), it was revealed that EAP learners benefit more from these courses when their metalinguistic understanding of academic discourse increases. Metalinguistic features refer to the capability of comprehending and analyzing certain linguistic features of academic discourse, which includes the use of academic vocabulary, academic style, and tone. When learners have a better understanding of such features, they can communicate more effectively in written or oral forms and produce more accurate and appropriate language. This implies the necessity of exposing EAP learners to formal linguistic features to improve their learning. The controversy here lies in determining the speaking style in multimedia tutorials in EAP settings. On the one hand, formal language is known to increase the metalinguistic understanding of academic discourse; on the other hand, incorporating high social cues (a conversational speaking style, polite wording, and an appealing human voice) into multimedia tutorials is believed to increase active cognitive processing. Onat (2018) has already drawn attention to the paradox by conducting a study investigating the effects of multimedia presentations that included personalized and non-personalized messages in an EAP setting and found that non-personalized narration improved the learning outcome, which contradicted Mayer's (2005b) findings. The study emphasized the role of the EFL setting, indicating that L2 learners have significant cognitive difficulties while trying to follow a lecture in a foreign language. It was stated that the participants might have allocated their linguistic resources to understand the instructional messages and ignored the social cues. In addition, the study highlighted that Turkish students might have perceived the formal style as more convenient due to its prevalence in Turkish educational settings. The role of the EAP settings was also given as a factor for the learners' preference for a formal speaking style due to the degree of formality that exists naturally in these courses.

In this case, Onat's (2018) study is enlightening because it shows the contrast between the importance of using personalized messages in multimedia instruction and the importance of using formal language in EAP settings. However, much uncertainty still exists about the role of social cues in multimedia learning design, especially in EAP settings where formal instruction is prioritized. Therefore, this study attempts to contribute to the existing literature by investigating the impacts of using social cues in multimedia learning tutorials on the achievement of EAP learners and to encourage researchers to conduct further studies on the role of the personalization and voice principles in language learning environments.

1.2 Purpose of the Study

This study aims to determine whether using high social cues (a conversational speaking style, polite wording, and an appealing human voice), as grounded by Mayer's (2001) personalization and voice principles, impacts EAP learners' achievement in writing a response paper. The study was conducted at a private university in Turkey with 221 students with diverse backgrounds who were taking an introductory EAP course (ENG 101). A quasi-experimental design was used, and an achievement test was delivered as pre and posttests. The multimedia tutorial used in the experiments focused on response paper writing conventions. The participants were divided into two groups: the experimental group received a multimedia presentation that included high social cues (a conversational speaking style, polite wording, and an appealing human voice), and the control group received the same multimedia presentation with low social cues (a formal speaking style and a neutral, monotonous human voice). The pre and posttest results were compared to evaluate the achievement of learning outcomes.

1.3 Research Questions

This study addressed the following research questions:

1. Is there a significant difference between the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) and the pretest and

posttest scores of the control group (multimedia presentation with low social cues) on how to write a response paper?

2. Compared to the control group (multimedia presentation with low social cues), is there a significant difference in the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) on how to write a response paper?

1.4 Significance of the Study

The argument favoring multimedia learning is founded on the notion that instructional messages should be designed considering how the human mind functions. For years, the primary method for delivering instructional messages has been words, namely texts included in lectures and books. However, with the advent of technology and the growing body of research on technological tools, it is now accepted that teaching and learning can be enhanced using two formats – words and pictures. Better learning takes place when both channels (verbal and visual) are activated (Mayer, 2020). Today, students can make meaningful connections between visual and linguistic representations thanks to multimedia tools.

The use of multimedia tools can enhance EAP learning in several ways. One of the benefits of using multimedia in EAP classes is that it increases exposure to multimodal language input, caters to authentic interaction, and provides opportunities for adaptive, self-paced learning (Wang & Vásquez, 2012). Multimedia-enhanced instruction can also help students engage within or beyond the classroom, fostering autonomy and 21st-century skills (Dede, 2010; Hockly & Dudeney, 2018; Kessler, 2018).

The use of multimedia can enhance EAP instruction because it can address some of the challenges. A significant challenge learners experience after shifting to a completely formal register is their difficulty with the distinctive linguistic features of EAP (Galloway & Ruegg, 2020). In Turkey, previous studies demonstrated that students often begin their studies in their departments where the medium of instruction is English (EMI) with limited English proficiency (Ekoç, 2018; Kırkgöz, 2009).

Therefore, many require assistance with General English skills and attend preparatory schools (Macaro et al., 2018). Even after successfully completing their preparatory studies, most students struggle with language awareness. However, EAP courses usually cover rather challenging texts. Students without specialized expertise might have trouble understanding academic literature because these texts use a wide range of specialized, sophisticated, and rare vocabulary and phrases. According to a study conducted in a Turkish EAP setting by Kamaşak et al. (2021), writing and speaking are the most challenging areas for EAP students. It was reported in the study that the participants had difficulties organizing essays and using appropriate academic writing styles. The same study also suggests that the EAP curricula should be designed to address students' needs.

Considering the challenges of EAP settings and the benefits of using multimedia instruction mentioned above, this study aimed to promote better learning for EAP students in a Turkish setting by incorporating a multimedia tutorial on writing. Using a multimedia presentation was expected to promote autonomous and self-paced learning, thereby enhancing the learning process. By delivering the input outside the class through video lessons, instructors could allocate more time for in-class writing practice, and students could receive one-on-one feedback. In addition, the design of the study allowed to evaluate the effectiveness of personalization and voice principles and determine whether the use of high social cues (a conversational speaking style, polite wording, and an appealing human voice) impacted the achievement of learners in an EAP setting, where a formal register is encouraged.

Much of the research to date has been conducted in various fields; however, there has been little discussion about the EAP settings. Therefore, this study aims to fill a gap by investigating whether students learn better when high social cues are incorporated into multimedia presentations in an EAP context. Furthermore, the literature shows that the personalization principle was separately investigated in EAP settings. However, personalization and voice principles go hand in hand as they both serve as meaningful agents in promoting social partnership. Therefore, this study will contribute significantly to the existing literature by providing a more comprehensive

view of using social cues in multimedia design in EAP settings. Further research is encouraged to understand whether the application of personalization and voice principles will bring any value to the learning process of EAP students.

1.5 Definitions

Augmented Reality (AR): Augmented Reality is a technology that projects digital data onto the physical environment in real time. It utilizes digital visual components, music, or other sensory inputs, delivers them via technology, and improves the real physical environment.

Common European Framework of Reference (CEFR): The Common European Framework of Reference for Languages (CEFR) is an international benchmark for describing language proficiency, designed to endorse educational transparency and allow movement between countries for work or study within the European Union.

Cognitive Theory of Multimedia Learning (CTML): This theory explains how people learn better from words and pictures together than from words alone. It proposes that learners actively build mental representations to make sense of their experiences and that instructional media should be presented in a way that encourages learners to engage in appropriate cognitive processing (Mayer, 2001).

English for Academic Purposes (EAP): The term describes the language and associated practices that individuals require to study or work in higher education that is taught in the English language.

English as a Foreign Language (EFL): The term refers to learning and using English as an additional language in a non-English speaking country.

English for General Academic Purposes (EGAP): This type of English for Academic Purposes (EAP) deals with the language and practices shared with all EAP students.

English as a/the Medium of Instruction (EMI): The term can be described as the use of the English language to teach academic subjects in countries where the first language of the majority of the population is not English.

English for Specific Academic Purposes (ESAP): This is a type of English for Academic Purposes language instruction that focuses on the language requirements of learners from specific disciplines, such as engineering, aviation, or medicine.

High Social Cues (HSC): High social cues refer to the use of personalization, voice, image, and embodiment principles in the context of multimedia learning design principles. These principles are based on the idea that people learn more deeply when multimedia presentations are designed to include social cues that make the content more engaging and relatable to the learner (Mayer, 2005b).

Second Language (L2): Second language or a language spoken in addition to one's first language.

Low Social Cues (LSC): Low social cues refer to multimedia presentations that lack conversational style and instead use formal language in the context of multimedia learning design principles. This type of delivery includes a computerized and/or monotonous tone of voice with fewer affective cues (Mayer, 2005b).

Multimedia: Multimedia refers to a system of relaying information or entertainment that includes many different forms of communication, such as text, audio, images, animations, or video.

Personalization Principle: This principle suggests that better learning is achieved when a multimedia lesson is delivered in a conversational rather than a formal style (Mayer, 2001).

Voice Principle: This principle proposes that deeper learning occurs when multimedia instruction includes an appealing human voice than a machine-synthesized voice or an unappealing human voice (Mayer, 2001).

Chapter 2

Literature Review

2.1 Theoretical Framework

This section includes the definitions of the key terms and the theoretical framework behind Mayer's (2020) multimedia learning theory and multimedia design principles, more specifically, the personalization and voice principles. In addition, the theoretical framework behind English language learning and English for Academic Purposes (EAP) was explained to provide more insight into the background of the study.

2.2 Cognitive Theory of Multimedia Learning (CTML)

Multimedia instruction is becoming increasingly common, fostering an enriched learning experience through the seamless integration of words and images. The multimedia learning theory assumes that learning can be improved when text and a relevant image are presented to learners simultaneously in an instructional unit (Mayer, 2009). Texts can be seen or heard depending on whether they are delivered orally or in writing. Illustrations, pictures, diagrams, charts, and maps are examples of static types of imagery, while animations and videos are dynamic. Although their levels of interaction vary, both static and dynamic kinds of imagery may be effective teaching aids for students. Additionally, the simultaneous display of words and images can improve the learning process by enabling students to construct meaningful mental representations of both verbal and visual information in a referential link (Mayer & Moreno, 2002). This indicates that students who encounter knowledge in both written and visual forms are more likely to comprehend and retain it. Consequently, combining the two media kinds can be a very successful teaching strategy.

Multimedia learning researchers stress that how the information is presented in computer-based learning environments is as crucial as the information itself (Töpper et al., 2014). Therefore, the primary goal of instructors and instructional designers should be to create learning materials that are suitable for actual learning processes (Ercan, 2014). In an attempt to maximize the learning outcomes, Mayer (2020)

conducted research in many domains and developed 15 multimedia design principles to accomplish the successful and long-lasting display of information. These principles were based on three assumptions: (a) the assumption of dual channels, (b) the assumption of active processing, and (c) the assumption of limited capacity (Table 1).

Table 1

The Assumptions for Multimedia Learning Theory (Mayer, 2001)

Assumption	Definition	Related Literature
Dual Channels	People use two different channels to process auditory and visual information.	Paivio, 1986 Baddeley, 1992
Active Processing	Building mental representations of their experiences requires conscious cognitive processing on the part of the individual.	Wittrock, 1989 Mayer, 2009
Limited Capacity	Short-term memory can only process a limited amount of data at a time.	Chandler & Sweller, 1991

2.2.1 Dual-channel assumption. According to this hypothesis, human cognition comprises two distinct channels for knowledge processing: visual and verbal. The visual system interprets the human mind's inputs through the brain, while words are verbalized through the ears and are part of the verbal channel. The verbal and nonverbal processing pathways are interrelated while being functionally separate. This dual-channel assumption aligns with Baddeley's (1992) working memory model and Paivio's (1986) dual-coding theory.

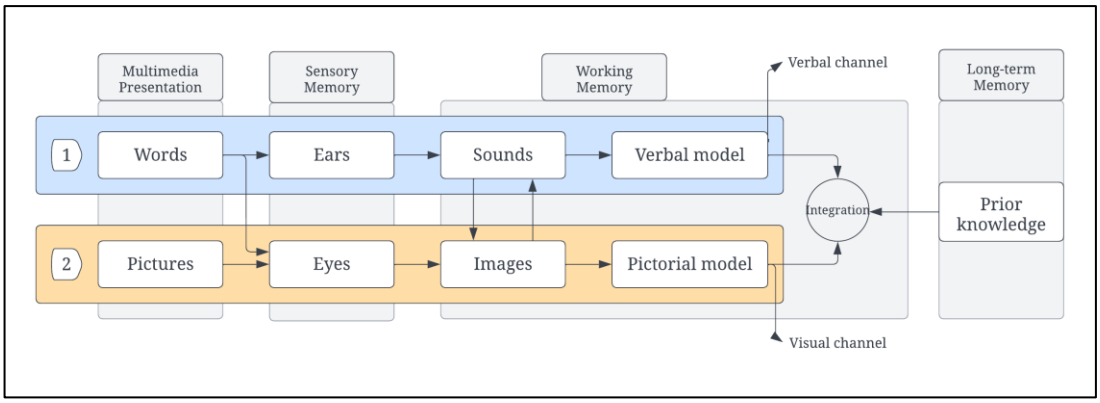

Figure 1. Dual channel model (Mayer, 2009)

The first area highlighted in blue in Figure 1 shows the process of the verbal channel, and the second area highlighted in orange shows the process of the visual channel. The information which enters the brain through these channels is processed and transferred to working memory (Mayer, 2009).

2.2.2 Active processing assumption. Active learning occurs if learners actively process knowledge by operating two channels for meaningful learning. To do this, incoming information must be attended to, organized, and integrated (Mayer, 1997, 2005a). This hypothesis assumes that simultaneously providing verbal and visual figures is essential so that working memory can actively process them.

In this contextual framework, it is necessary to explore *generative learning* to explain memory retention and transfer more effectively. Fiorella and Mayer (2014) define the term and explain the relationship between what is presented and how the brain processes it by stating that generative learning occurs when learners actively attempt to understand the instructional material. To achieve this goal, learners must actively participate in generative processing by focusing on the pertinent elements of the material (*selection*), organizing the information into a cognitive construct in working memory (*organization*), and merging these cognitive structures with prior knowledge retrieved from long-term memory (*integration*) (Figure 2). The rationale behind proposing the SOI (Selecting-Organizing-Integrating) model as a guide for instructional material development is that the current emphasis on 21st-century skills might be interpreted as a demand for generative learning that aids individuals in

acquiring “transferable knowledge and skills” (Pellegrino & Hilton, 2012, p. 69, as cited in Fiorella & Mayer, 2014). Figure 2 below summarizes the SOI model.

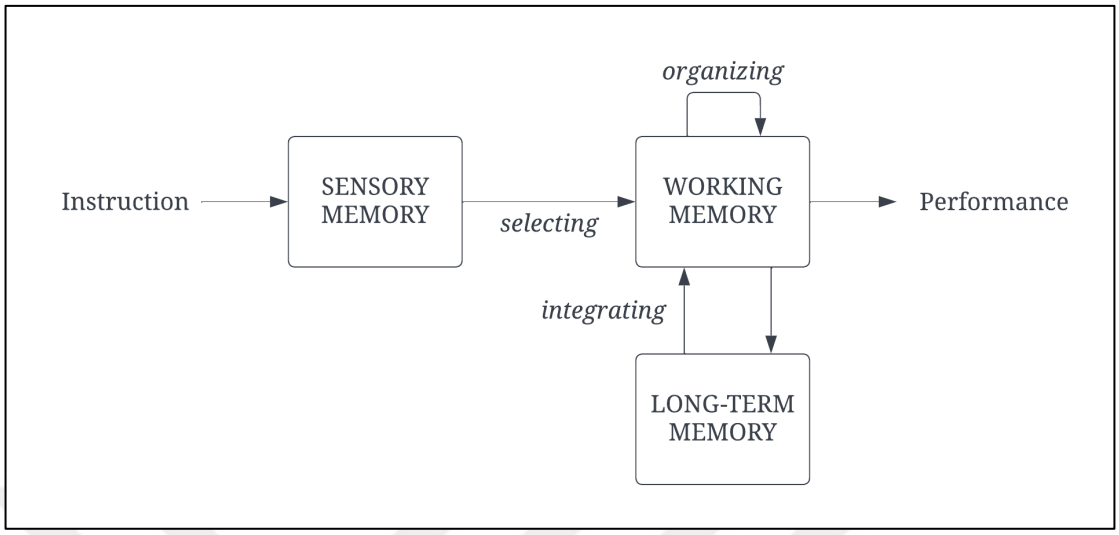

Figure 2. The SOI model in generative learning (Fiorella & Mayer, 2014)

2.2.3 Limited capacity assumption. This assumption concludes that each channel in the human cognitive system has a restricted capacity (Miller, 1956). Cognitive overload occurs when too much information is presented at once, leading to decreased cognitive performance (de Jong, 2009); therefore, irrelevant components should be eliminated when displaying information to reduce potential cognitive strain.

Table 2

Three Memory States in Generative Learning (Fiorella & Mayer, 2014)

Memory store	Description	Capacity	Duration
Sensory memory	Holds visual images and sounds of what was presented	High	Very short
Working memory	Allows pictures and words to be held and manipulated	Limited	Short
Long-term memory	Acts as a permanent storehouse of knowledge	High	Long

Table 2 illustrates the three memory stores and how they work. It can be understood that for the incoming information to be permanent, it needs to be transferred to long-term memory. Due to the limited capacity of working memory, only a few pieces of information can be actively processed at one time, and a learner's

working memory is likely to get overloaded if a large amount of information is presented to them quickly (Fiorella & Mayer, 2014).

In conclusion, CTML is based on these three presumptions: dual-channel assumption, active processing assumption, and limited capacity assumption. When all these assumptions are considered, it can be said that active learning occurs when several cognitive processes take place in the brain. Mayer (2010) proposes that meaningful learning from words and images can be accomplished when learners engage in five cognitive processes: selecting words, selecting images, organizing words, organizing images, and integrating. During the learning process, students actively choose words and attend to important spoken words, preparing them for subsequent processing in working memory. Similarly, they select images and carefully focus on significant written words and visuals, enabling effective working memory processing. To facilitate cognitive organization, students mentally rearrange the selected words into a coherent verbal model within working memory. Simultaneously, they utilize working memory to organize the chosen images into a cohesive pictorial model. Moreover, students form connections between verbal and visual models, establishing meaningful associations in their minds. Additionally, they integrate these models with relevant prior knowledge, which is retrieved from long-term memory and activated to enhance learning outcomes. In summary, by engaging in these five cognitive processes, learners can achieve meaningful learning from words and images, enabling the effective assimilation and integration of information (Mayer, 2010).

2.3 Multimedia Learning Design Principles

Mayer (2020) proposed 15 principles for designing effective multimedia presentations based on the abovementioned theoretical framework. These principles are classified under three main categories: (1) reducing extraneous processing, (2) managing essential processing, and (3) fostering generative processing in multimedia learning (Table 3).

Table 3

The Categorization of Multimedia Learning Design Principles (Mayer, 2020)

Reducing Extraneous Processing	Managing Essential Processing	Fostering Generative Processing
Coherence Principle	Segmenting Principle	Multimedia Principle
Signaling Principle	Pre-training Principle	Personalization Principle
Redundancy Principle	Modality Principle	Voice Principle
Spatial Contiguity Principle		Image Principle
Temporal Contiguity Principle		Embodiment Principle
		Immersion Principle
		Generative Activity Principle

The following section includes brief explanations for each principle.

2.3.1 Principles for reducing extraneous processing in multimedia learning.

2.3.1.1 Coherence principle. This principle emphasizes that extraneous material can overload working memory, leading the learner to divert his or her attention from crucial information. As a result, such extraneous elements may interfere with the organization of information and cause the learner to engage with the material with an inappropriate theme. In other words, when working memory is preoccupied with irrelevant information, it becomes harder to retain and process necessary information effectively. Mayer (2020) suggests that learning is improved "(1) when interesting but irrelevant words and pictures are excluded from a multimedia presentation; (2) when unneeded words and symbols are eliminated from a multimedia presentation; and (3) when interesting but irrelevant music is excluded from a multimedia presentation" (p. 143).

2.3.1.2 Signaling principle. According to this principle, people can learn better when cues are added to highlight important information. Signaling verbal and visual elements can reduce unnecessary processing as the learner's attention is directed to the lesson's essential components and ensures meaningful connections among them. This technique can be beneficial when the extraneous material is removed (Mayer, 2020).

Some features of the verbal signaling principle include using outlines, headings, and pointer words such as "first… second…", organizing the information with graphic

organizers, displaying keywords in color or bold font, or saying the words more loudly or slowly. For visual signaling, key features of a material can be highlighted with distinctive colors, both visual and verbal cues can be coordinated in a way they complement each other, specific elements can be pointed using pointing gestures and arrows, and a particular component can be animated (flashing, graying out, zooming in/out) (Mayer, 2020).

2.3.1.3 Redundancy principle. In multimedia presentations, the narration is usually accompanied by printed text. According to Mayer (2020), learning can be improved when graphics and narration are combined, but the printed text is excluded, especially in fast-paced lessons. The reasons why redundancy leads to extraneous processing are (1) if learners are forced to scan between pictures and onscreen text, their visual channel can become overloaded, and (2) additional mental effort is spent when trying to compare the printed and spoken text. Hence, any multimedia material can be improved by eliminating the already included element (Kalyuga et al., 1998). This principle aligns with the limited capacity assumption, suggesting that more cognitive resources should be available for learners to connect words and pictures.

2.3.1.4 Spatial contiguity principle. This principle suggests that people learn more effectively when corresponding text and images are placed close together on a page or screen instead of far apart. When corresponding words and images are spread over the page or screen, learners are forced to employ cognitive resources to visually scan the page or screen, reducing their ability to store both items in working memory at once. In cases when the information is hard to understand, the material is not familiar to the learner, and the graphic is too complex without words, placing the corresponding text and images near each other will produce more successful results (Mayer, 2020).

2.3.1.5 Temporal contiguity principle. In some multimedia presentations, the design requires the users to hear the information first and then watch an animated video or vice versa. This principle suggests that not presenting the corresponding portions of narration and animation simultaneously can create cognitive overload and exceed the cognitive capacity of the learner. Therefore, when designing a multimedia material, corresponding words and pictures should be presented simultaneously rather than

sequentially to preserve mental representations of both items in working memory simultaneously (Mayer, 2020).

2.3.2 Principles for managing essential processing in multimedia learning.

2.3.2.1 Segmenting principle. For learners to fully understand the causal relationship between one step and the other, a multimedia lesson should be presented in user-paced sections rather than an uninterrupted module. When information is divided into blocks, the learner can follow the lesson more efficiently and process the information more meaningfully (Mayer, 2001). It is also important to note that learners should be allowed to control the pacing of the lesson so that they can manage cognitive processing (Mayer, 2020). This principle is aligned with the active processing assumption (Baddeley, 1992) and cognitive load theory (Sweller, 1999). Research shows that the segmenting principle is most effective when the material is hard to understand and the multimedia presentation is delivered at a fast pace (Mayer, 2020).

2.3.2.2 Pre-training principle. This principle suggests that effective learning occurs when learners are familiar with the names and characteristics of the concepts presented in a multimedia lesson. By using the relevant prior knowledge, learners can more efficiently process the information, and cognitive overload is reduced as some of the workloads of essential processing are transferred to the pre-training episode (Mayer, 2020). Although further research is necessary to understand better when this principle does and does not apply, there is a large body of evidence that supports the pre-training principle (Mayer & Pilegard, 2014b).

2.3.3.3 Modality principle. In some situations, words and pictures are presented simultaneously, and when the pace of the multimedia lesson is fast, the visual channel is overburdened by essential processing. To avoid such circumstances, this principle suggests that words should be presented as narration rather than onscreen text, as "people learn more deeply from pictures and spoken words than from pictures and printed words" (Mayer, 2020, p. 281). The research on this principle demonstrates that printed words are more applicable when technical words and symbols are included in the multimedia presentation, when the language delivered in the lesson is not the learner's mother tongue, or when the lesson allows the learner to control the pace. The

modality principle takes its basis from the dual-channel assumption, which suggests that there are two channels for information processing: visual/pictorial channel and auditory/verbal channel (Baddeley, 1992).

2.3.3 Principles for fostering generative processing in multimedia learning.

2.3.3.1 Multimedia principle. This principle suggests that learners have the chance to create verbal and visual mental models and make connections between them when both words and pictures are offered simultaneously. When given only words, learners can create a verbal mental model, but they may not be able to create a visual mental model or integrate their verbal and visual mental models. Therefore, the use of multimedia presentations can encourage generative processing and result in better learning. An instructional design of a multimedia presentation requires not only the presentation of the material but also guiding the learner's cognitive processing (Mayer, 2020).

2.3.3.2 Personalization principle. According to this principle, learners concentrate more effort on understanding what the author in the multimedia presentation is saying when the words are in conversational rather than formal style. In this way, the learners' feelings of social presence and motivational commitment to active cognitive processing are increased. This principle can be applied by personalizing the script of the multimedia lesson and addressing the learner directly using pronouns such as *you* and *your*, and "polite wording (e.g., Do *you* want to click the ENTER button?) rather than direct wording" (Mayer, 2020, p. 305). It is suggested that this principle best applies to situations where the learners are beginners, and the duration of the multimedia lesson is relatively short.

2.3.3.3 Voice principle. According to Mayer (2020), when multimedia presentations include an appealing human voice rather than a machine-synthesized voice, the cognitive processing of the learner is activated as the learner tries harder to comprehend what is being said. At this point, it is important to note that this principle may be more effective when negative social cues do not exist within the multimedia presentation.

2.3.3.4 Image principle. This principle suggests that more effective learning does not necessarily occur when a static image of the instructor is included in the multimedia presentation. Reeves and Nass (1996) suggest that the development of a conversational partnership can be fostered by the use of verbal and visual social cues, and it is assumed that placing the image of the instructor on the screen might help the learner build a social connection with the multimedia material. However, studies conducted by Moreno et al. (2001), Mayer et al. (2003a), Mayer and DaPra (2012), and Wang et al. (2018) demonstrate that there is no strong and consistent support for the inclusion of the instructor's image. Here, it is worth mentioning that the onscreen agents used in these studies were static images, and there were no human-like gestures. The reason why inserting a static image of the instructor does not necessarily lead to better learning is explained as its potential violation of the coherence principle by leading to extraneous processing (Mayer, 2020).

2.3.3.5 Embodiment principle. The term *embodiment* describes how instructors on-screen might use their bodies to improve the process of instructional communication (Mayer et al., 2014a). This principle states that a high embodiment of the instructor in a multimedia presentation (showing human-like gestures, body movements, facial expressions, and eye-gaze during the presentation) can lead to deeper learning compared to a low embodiment of the instructor (static image) (Mayer, 2020).

2.3.3.6 Immersion principle. The current technology in immersive virtual reality, which absorbs the user in a three-dimensional (3D) world and allows moving around and interacting with other subjects and objects, is also appealing for instructional design as it is assumed that immersive virtual reality can promote a feeling of presence in the learner (Blascovich & Bailenson, 2011). However, research shows that the details included in the design of virtual reality may create extraneous processing and distract the learner (Mayer, 2020). Therefore, this principle is based on the idea that people may not always learn better in 3D immersive reality than in a 2D desktop presentation.

2.3.3.7 Generative activity principle. This principle is in line with the active processing assumption, which holds that when individuals actively engage in cognitive processing by attending to, organizing, and integrating coming information, deeper learning occurs (Mayer, 1997, 2005a). Therefore, when learners are guided in doing generative learning activities such as "summarizing, mapping, drawing, imagining, self-testing, self-explaining, teaching, or enacting" (Mayer, 2020, p.370), they learn better. The effectiveness of this principle can be increased when necessary scaffolding is provided to the learner.

Overall, CTML is based on three areas of cognitive processing: reducing extraneous processing, managing essential processing, and fostering generative processing. All these principles play an important role in promoting effective learning in multimedia environments; however, this study focuses on investigating the effects of the principles based on social cues in multimedia learning on the achievement of EAP learners.

2.4 Principles Based on Social Cues in Multimedia Learning

According to Mayer (2020), in order for learners to actively engage in generative processing, they need to be motivated to understand the material. To achieve this aim, many studies have been conducted, and the value of social components in multimedia design for education has gained attention. Research demonstrated that the speaker's image, voice, and delivery style of the message have significantly positive impacts on knowledge acquisition (Inglese et al., 2007; Mayer, 2005a). It is suggested that by implementing *the personalization, voice, image,* and *embodiment principles,* it is possible to ensure that the learner establishes a social connection with the online tutor and makes an additional effort to learn deeply. In this study, the effects of *the personalization principle* and *voice principle* were investigated comprehensively. The reason why the image and embodiment principles were excluded from this study is based on Mayer's (2020) hypothesis that students do not necessarily learn better when a static image of the online instructor (or the pedagogical agent) is embedded into the multimedia environments. Although the embodiment principle suggests that a dynamic image of the virtual instructor that displays humanlike gestures and mimics

can serve as a positive social cue, this study did not include the appearance of the narrator in order not to distract the learners and create additional cognitive load. In addition, Mayer (2020) states that a "high-embodied instructor is most effective when gesturing includes specific pointing" (p. 351). As the multimedia instruction in this study did not require the use of specific pointing, the appearance of the narrator could have been redundant. In the following section, the personalization and voice principles are examined in detail.

2.4.1 The personalization principle. The personalization principle is based on the idea that learning with multimedia materials can be fostered when these materials are presented in a conversational style rather than a formal style. According to Mayer (2020), it is possible to think of multimedia learning as a dialogue between the instructor and the student. In this case, multimedia learning can be considered a social activity, and social cues may have an impact on how hard students strive to make sense of the material being given. Therefore, by using *you* and/or *we* rather than an impersonal perspective and addressing the learner directly, the narration can be personalized, and a more conversational style can be achieved (Kühl & Zander, 2017).

Figure 3 below illustrates the non-personalized and personalized versions of the script for the lightning lesson implemented by Mayer (2020). The excerpt includes personalized additions indicated in brackets and highlighted in blue and deletions indicated in italics and highlighted in red.

(Let me tell you what happens when lightning forms. Suppose you are standing outside, feeling the warm rays of the sun heating up the earth's surface around you.) Cool moist air moves over a warmer surface and becomes heated. The warmed, moist air near the earth's surface rises rapidly. As the air in this updraft cools, water vapor condenses into water droplets and forms a cloud. (Congratulations! You have just witnessed the birth of your own cloud.)

(As you watch, you tilt your head skyward. Your) *The* cloud's top extends above the freezing level, so the upper portion of (your) *the* cloud is composed of tiny ice crystals. (Brr! I'm feeling cold just thinking about it!) Eventually, the water droplets and ice crystals become too large to be suspended by updrafts. As raindrops and ice crystals fall through (you) *the* cloud, they drag some of the air in (your) *the* cloud downward, producing downdrafts. When downdrafts strike the ground, they spread

out in all directions producing the gusts of cool wind (you) *people* feel just before the start of the rain.

Figure 3. The excerpt of the non-personalized and personalized versions (Mayer, 2020, p.307)

2.4.1.1 Social cues. The personalization principle takes its basis from the assumption that using social cues can create a sense of social presence, which means that learners can have the feeling of being in a social relationship with the instructor and/or the pedagogical agent (Reeves & Nass, 1996). It is also closely linked with the *self-reference effect*, which suggests that better recall is obtained when information is related to the self than when the same information is encoded structurally or semantically (Klein & Loftus, 1988; Rogers et al., 1977). Therefore, it is suggested that using social cues in a multimedia instructional message can enable the learner to be socially responsive. As a result of this social response, the learner's active cognitive processing is activated, which leads to the learning outcome that promotes problem-solving transfer (Mayer, 2020).

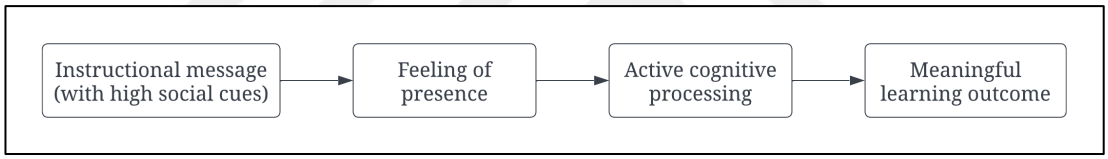

Figure 4. Personalization hypothesis (Moreno & Mayer, 2004)

2.4.1.2 Polite wording. According to Reeves and Nass (1996), learners react to pedagogical agents as though they were social actors. In that case, whether or not the agents function as social actors should determine how effective they are (Wang et al., 2008). As part of the social cues, the use of polite wording is also included in the personalization principle, as being polite is one of the fundamental principles of communication in the classroom (Gupta et al., 2005). According to the literature, increased levels of politeness in teacher requests and close ties that exist between teachers and students seem to lessen psychological reactance (Zhang & Sapp, 2013). In a study conducted by Wang et al. (2008), it was found that polite wording used during tutorial feedback had positive impacts on motivation and learning outcomes. Although being polite can be viewed as a cultural cue that communicates learned

cultural norms (Schneider et al., 2015), the study conducted by Mayer et al. (2006) demonstrated that the use of guarded questions and suggestions, and statements that conveyed a common goal were rated highly in politeness by the participants, while direct commands were regarded less polite. The reason why polite wording should be used in multimedia learning environments is to leave the impression that the instructor is cooperating with the learner, and therefore, it is a means of putting the personalization principle into practice (Mayer, 2020).

2.4.1.3 Studies on the personalization principle. Many studies have been conducted to evaluate the effectiveness of the personalization principle, and there are mixed results in several areas.

In terms of increased social presence, Moreno and Mayer (2004) found that the students rated the multimedia game that included personalized messages as more helpful and friendly. They also reported that students in the personalized group had a higher sense of physical presence. Similarly, a meta-analysis conducted by Ginns et al. (2013) showed that the perceptions of the friendliness of instructional materials prepared in a conversational style were positive, which showed that an instructional text that includes personalized messages creates more social response to learning materials.

Many studies have proved that the use of personalized messages in a multimedia learning environment promotes interest and motivation toward the instructional material and the lesson. Despite its contrasting results in other areas, Kurt's (2011) study showed that the learners in the personalized group favored the personalized material as it motivated them to learn, and learners perceived the material as a conversational partner. In addition, Park (2015) stated that the inclusion of personalized narration improved the motivation of the learners in terms of confidence and relevance, regardless of its being delivered in onscreen text or by a pedagogical agent. Another study by Reichelt et al. (2014) indicated that the motivation levels of students who received personalized instructional texts in 25-30 minute-long gestalt laws learning material were higher. Within this context, it seems that the interest in learning increases when the instructor uses the first-person perspective (Ginns et al.,

2013; Rey & Steib, 2013; Schrader et al., 2018), and in some cases, learners spend more time on the instructional material voluntarily when personalized messages are preferred (Brom et al., 2014). Furthermore, personalized instructional materials can be viewed as more appealing and inviting by learners (Zander et al., 2015).

The personalization principle also suggests that how the instructor delivers a message is as important as the content. Brown and Levinson's (1987) politeness theory suggests that during tutorial dialogues between a tutor and a student, the acts of requesting and suggesting may have an impact on the student's positive face (the desire to be accepted by others) or negative face (the desire to be independent from others), or both. In conjunction, using polite wording may ensure affective processing, which leads to motivation for cognitive processing (Wang et al., 2005). In the experiment conducted by Mayer et al. (2006) to examine the role of polite language, learners were exposed to personalized instructional content that included guarded suggestions involving ‘‘could’’ or ‘‘may’’ and ‘‘we’’ or ‘‘let’s’’ constructions were assumed to be perceived as comparatively respectful and consistent with being supportive of the learner. The results showed that learners could assess the politeness of suggestions and requests and that students with less computer expertise are more sensitive to the politeness of the tutor's suggestions and demands. Similarly, Schneider et al. (2015) conducted a study on the role of politeness in instructions during learning with a multimedia webpage. Based on the results, it was found that students in the polite treatment group scored significantly higher in learning assistance, interest, and probability of success.

Concerning the role of personalization on better learning performance and higher retention, studies present supporting and contrasting results. Some studies found that learners demonstrate higher learning performances and cognitive processing is activated when personalized messages are included (Ginns et al., 2013; Mayer et al., 2004; Moreno & Mayer, 2004; Reichelt et al., 2014; Riehemann & Jucks, 2018; Schrader et al., 2018; Töpper et al., 2014; Yang et al., 2022; Zander et al., 2015). In addition, Lin et al. (2020) observed that there was an increase in mental effort when the content was delivered by a pedagogical agent using a conversational style.

Several studies reported that there was a higher retention rate in the learning process of students when personalized messages were incorporated (Ginns et al., 2013; Lin et al., 2020; Moreno & Mayer, 2000, 2004; Reichelt et al., 2014; Rey & Steib, 2013; Schneider et al., 2015).

On the other hand, contrary to Mayer's (2005b) research, some studies reported that the use of a formal style provided better learning outcomes. For instance, in a study conducted by Sofi et al. (2018), it was found that the participants did not perceive the personalized version as beneficial as they thought the content was excessively dense and complex. In another study conducted by Onat (2018), the participants in an EAP course learned better from the multimedia presentation that included formal narration. Moreover, Töpper et al.'s (2014) experiment demonstrated that the non-video content of the computer-based learning environment provided a higher level of knowledge acquisition in contrast to the video content with a conversational style of speaking.

In addition, some studies concluded that there was no significant difference between the achievement scores of personalized and non-personalized groups, which suggests that the personalization principle did not yield any significant effect on learning performance. Kurt (2011) and Brom et al. (2014) conducted studies using multimedia materials that included both personalized and non-personalized versions, and the results showed that there was no significant difference between each group in terms of achievement scores. Park (2015) also found a similar result, stating that the personalization principle did not influence students' learning performance as the recall and the comprehension tests showed no significant differences.

In order to test the effectiveness of the personalization principle, this study employed the use of narration with a conversational speaking style and polite wording such as "please, let's" in the multimedia presentation with high social cues. However, the multimedia presentation with low social cues included the use of narration with a formal speaking style and direct commands such as "Now, read the article".

2.4.2 The voice principle. The voice principle is based on the idea that multimedia materials that include an appealing human voice rather than a machine-

synthesized voice promote deeper learning (Mayer, 2020). When the instructor speaks with a friendly human voice that expresses positive emotion, learners tend to view the instructor (or the pedagogical agent) as a conversational partner, which leads to active cognitive processing (Mayer, 2020, 2021). This is closely linked with the *voice hypothesis,* which states that the voice of the instructor (or the pedagogical agent) delivers affective cues within the verbal content, and the effective use of voice can activate affective processing along with cognitive processing (Nass & Brave, 2005). Likewise, the *positivity hypothesis* can be linked with this principle as it postulates that people can identify when an instructor displays positive or negative emotions (Horovitz & Mayer, 2021; Lawson et al., 2021a, 2021b). Research shows that people learn better when they interact with an affective and enthusiastic pedagogic agent than with a neutral pedagogical agent (Ba et al., 2021), and the use of human voice in multimedia environments positively impacts learners' perceptions of virtual instructors (Chiou et al., 2020).

According to the literature, the use of humanlike features and affective cues in narration may increase social perception and improve learning. One experiment conducted by Mayer et al. (2003b) showed that multimedia presentations, including a human voice that includes perceived unfavorable features, such as a foreign accent with a bored or monotonous tone, may impede the social response of the learner. Another study conducted by Domagk (2010) found that when presented with a multimedia lecture that featured a perceived likable voice rather than a perceived unlikable voice, students scored better on a transfer test. Liew et al. (2020) found that when the narrator has a more enthusiastic tone, students rated the speaker highly and achieved higher scores on the transfer tests. Here, it is important to note that online spoken messages might be more influential when the speaker's voice is perceived as familiar in terms of gender, race, ethnicity, or emotional state (Nass & Brave, 2005). However, it was found that the voice principle might not be effective when the audience comprises non-native language speakers (Davis et al., 2019; Liew et al., 2020).

In addition, many studies investigate the use of speech engines and how they impact learners. A study conducted by Craig and Schroeder (2019) compared the efficiency of an older text-to-speech engine, a modern text-to-speech engine, and a recorded human voice within an educational animation and found that human voice was more influential in terms of engagement and achievement. In the meantime, when two modes of text-to-speech engines were compared, it was found that the modern engine with more humanlike features improved learning more than the older, synthesized version. Clearly, with the advance of technology, it seems that high-quality and humanlike machine voices may provide similar or more enhanced learning outcomes (Craig & Schroeder, 2019; Dincer, 2022; Pi et al., 2022).

Overall, the preliminary evidence shows that using an appealing human voice in multimedia presentations promotes a positive social connection between the instructor and the learner, leading to better information processing. To test the effectiveness of this principle, the present study implemented the use of a friendly tone of a female voice with a varying pitch in the multimedia presentation with high social cues, while the multimedia presentation with low social cues included a formal, monotonous tone of the same female voice. Table 4 below summarizes the techniques employed for the implementation of this study.

Table 4

The Features of High and Low Social Cues Applied in This Study

Multimedia Design Principle	High Social Cues	Low Social Cues
Personalization Principle	• Narration with a conversational speaking style (*you, we, let's*) • Polite wording (*giving advice*)	• Narration with a formal speaking style (*it, the, passive voice)* • Direct commands (*neutral speech*)
Voice Principle	An engaging and friendly tone of voice with varying pitch	A formal, monotonous tone of voice

2.5 English Language Learning

The world's most frequently spoken language is not English; however, it is debatably the most influential (Nunan, 2015). Therefore, many people around the world, whether young or adult, attempt to learn English as a second or foreign language for educational, professional, social, as well as many other purposes. The current English language teaching methods focus on addressing the demands of today's world and preparing learners to access the information that they need to be successful in all areas of their lives.

Finding the reasons why students need to utilize English as a language is the first step in creating effective language learning environments. Then, the competencies, functions, grammar, vocabulary, and skills required for confidence and proficiency should be identified. These all can be combined in integrated language lessons (Parrish, 2019). English language teaching essentially focuses on improving four *macro-skills* —listening, speaking, reading, and writing. *Micro-skills* such as grammar, vocabulary, pronunciation, and spelling are also treated either simultaneously or separately depending on the needs of the learner.

2.5.1 Multimedia use in EFL environments. Multimedia design, in comparison to using a single medium, provides many advantages to EFL learners. Within a multimedia learning environment, L2 learners can benefit from better-structured information (Larkin & Simon, 1987), improve their memory through the use of more than one representation of information (Penney, 1989), get involved in active processing (Ainsworth, 1999), and learn more information which is presented in simultaneous acts (Sweller, 2005). However, compared to the larger body of research on multimedia design for classes in students' native language, there are few studies on instructional design for lessons in students' second or foreign language (Mayer, 2009; Sweller et al., 2011).

The literature on multimedia learning design shows that the applicability of modality and redundancy principles has gained interest in EFL environments. Lee and Mayer (2018) investigated the best ways to deliver learning materials when the words are in the learner's second language and evaluated the roles of these principles. The

study showed that the modality principle lost its pertinence in second-language learning settings, indicating that better learning occurred when students received a multimedia tutorial with video and printed text compared to the one with video and narration. It was also revealed that the redundancy principle did not apply when learners were non-native speakers of English, as they learned better when the English instruction was delivered with video, narration, and printed text rather than video and narration only. In terms of mental effort, the instruction with video, narration, and printed text caused less difficulty for non-native learners. Samur (2012) also investigated the role of the redundancy principle in a multimedia presentation for foreign language vocabulary learning on undergraduate students' retention. The results indicated that students were able to acquire new and unfamiliar vocabulary in a foreign language through the addition of on-screen text to a multimedia presentation with animation and narration. In a similar study conducted by Karabıyık et al. (2022), the effects of multimedia, modality, and redundancy principles were examined through the use of a multimedia lesson that included a) English audio, b) English audio with video, c) English captions with video, and d) English audio with video and captions. Similar to Lee and Mayer's (2018) study, the results showed that the multimedia principle maintained its relevance to foreign language learning settings, while the modality and redundancy principles became impertinent. It seems that learners benefit greatly from the use of multiple modalities; however, learning from pictures and written text is as effective as learning from pictures and spoken text. Additionally, the inclusion of written text in multimedia lessons with spoken text and pictures creates a similar amount of essential overload compared to the multimedia lessons that exclude it. Liu et al. (2018) also conducted a study to test the effectiveness of modality and redundancy principles and came to the same conclusion that these principles do not apply to ESL/EFL environments.

Some other studies on the use of multimedia in EFL environments focus on the use of glosses (translation or explanation of a word or phrase) and annotations. These studies mainly examine the role of multimedia in listening and reading comprehension, and vocabulary acquisition. To begin with, Türk and Erçetin (2014) studied the role of interactive and simultaneous display of glosses in a multimedia reading lesson and

found that delivering verbal and visual information at the same time is more effective as students use text resources more frequently. The design of such elements in a multimedia environment is equally important to ensure student achievement. Abuseileek (2011) conducted a study to evaluate the effectiveness of presenting glosses in various parts of the multimedia reading lesson using hypermedia links. The results showed that when glosses are placed close to the glossed word, students learn better, which can be associated with the spatial contiguity principle. This principle suggests that corresponding elements in a multimedia tutorial should be placed near rather than far to ensure that students allocate their cognitive resources appropriately. The integration of multimedia seems to increase the proficiency of EFL learners and assist them in improving their reading and vocabulary learning skills. In their study, Lo et al. (2013) used an online annotation tool and allowed students to analyze a reading text by taking notes on a multimedia reading passage to assess whether there was an increase in their reading performance. As the participants who used the online annotation tool performed significantly better in recall tests, it was concluded that annotation technology increases the flexibility of EFL learners in ways printed materials cannot ensure. This finding is in line with the generative activity principle, which suggests that learners can actively engage in cognitive processing when they are given tasks that require selection, organization, and integration of materials. On the other hand, while using the annotation tools, it is important to pay attention to the student profile. According to a study by Ariew and Ercetin (2004), the proficiency level of the learners determines the success of annotation tools. In this study, EFL students received a reading text containing different forms of online annotation, and the findings revealed that these tools were distracting for low-level learners and they interfered with reading comprehension. Therefore, it is suggested that pre-training should be provided for such students in order to maximize their learning. This finding seems to align with the pre-training principle, which suggests that learners benefit from a lesson better when they are equipped with the necessary skills and knowledge that will ease the learning process.

The research on multimedia use in EFL settings also sought answers for whether using subtitles and captions contributed to the learning process of English language

learners. A study conducted by Chen et al. (2022) examined the role of captions in a multimedia lesson that included augmented reality (AR), and it concluded that the efficiency of captions depends on the proficiency level of students. In this study, low-level English learners had difficulty applying their knowledge when they received the material with English captions, and a high cognitive load was observed. However, proficient learners did not experience any hindrance regarding their learning with different types of captions. Similarly, Lin et al. (2016) investigated the impacts of providing subtitles and taking e-notes on the cognitive load and performance of EFL undergraduates and concluded that the performance of EFL learners was influenced by prior knowledge and English proficiency. However, when these covariates are eliminated, subtitles can enhance learning and reduce cognitive load in English language classes. This finding is a shred of contradictory evidence for the split-attention effect, which suggests that when the multimedia lesson includes several separated sources, learners are forced to divide their attention between them in order to comprehend the information (Ayres & Sweller, 2014). However, the findings of the study conducted by Mayer et al. (2014a) support the split-attention effect and the redundancy principle, suggesting that adding subtitles to a narrated video lecture in English does not increase students' performance. Additionally, a more recent study by Chan et al. (2022) found that reading L1 subtitles improved comprehension while L2 subtitles required more mental effort. As can be seen, there are mixed views on the use of subtitles and captions in multimedia lessons delivered to non-native English learners. To better understand the role of subtitles and captions, researchers are encouraged to conduct further studies on eye-tracking.

2.5.2 English for academic purposes (EAP). Since the demand for English as a language has increased worldwide and more individuals have discovered a need to utilize English to fulfill certain aims and purposes, research in academic/disciplinary areas has increased considerably over the past twenty years. Specifically, universities that offer English as a/the Medium of Instruction (EMI) for the internationalization process require non-native students to be able to communicate effectively in English, and due to the increase of English in scholarly publications, the field of English for Academic Purposes (EAP) has blossomed. EAP can be described as "teaching English

with the aim of assisting learners' study or research in that language" (Hyland, 2006, p. 1). The goal of EAP courses is to assist students in developing the necessary language proficiency and study techniques to succeed in academic contexts. These courses concentrate more precisely on formal communication techniques, academic norms, and formal writing styles. EAP courses deal with topics that are cognitively challenging. The reading covers genres such as journal articles, literature reviews, textbooks, essays, reports, critiques, abstracts, and summaries, while the academic writing style encompasses the language of political, social, and socio-cultural contexts. These courses focus on topic-led vocabulary, units prepared for specific needs, or language chunks in terms of grammar (De Chazal, 2014). EAP branches into two divisions: English for General Academic Purposes (EGAP) and English for Specific Academic Purposes (ESAP). While EGAP relies on linguistic features and academic skills that are common to all disciplines, ESAP focuses on teaching the skills and language functions that are associated with the requirements of a specific discipline or department. This study took place in an EGAP setting where students from multidisciplinary backgrounds were studying in English.

2.5.2.1 Academic register in EAP courses. The majority of students in EAP courses are expected to attend lectures, seminars, and tests while at the same time being required to take notes, present, and complete assignments. In academic discourse, many disciplines have distinctive linguistic characteristics that set them apart from everyday speech. One aspect of language that is characteristic in such an environment is the high degree of formality in academic texts. According to Hyland (2006), the formal language used in this context is attained through the ways ideas are expressed with comparatively fewer words, the impersonal voice, and specialist vocabulary. Table 5 below illustrates the key features of academic writing.

Table 5

Key Features of Academic Writing

Feature	Definition	Example of Academic Style	Example of Conversational Style
High lexical density	A high proportion of content words in relation to grammar words such as prepositions, articles, and pronouns.	Investment *in* a rail facility implies *a* long-term commitment.	*If you* invest *in a* rail facility, *this* implies *that you are going to be* committed *for a* long term.
High nominal style	Actions and events are presented as nouns rather than verbs to package complex phenomena as a single element of a clause.	The train's 5.00 p.m. *departure*...	The train *leaves* at 5.00 p.m.
Impersonal constructions	The use of 'I' and expressions of feeling are avoided. First-person pronouns are often replaced by passives, dummy 'it' subjects, and 'abstract rhetors', where the agency is attributed to things rather than people.	*The solution* was heated. *It* was possible to interview the subjects by phone. *The data* suggests…	*I* heated the solution. *I* interviewed the subjects by phone. *I* found…

Note. Adapted from *English for Academic Purposes: An Advanced Resource Book* (pp. 13-14), by K. Hyland, 2006, Routledge. Copyright 2006 by Ken Hyland.

According to studies, many students across a range of learning contexts find the shift from secondary to tertiary academic literacy training to be particularly difficult (Holschuh, 2019). More specifically, this transition entails shifting from producing compositions, creative pieces, or writing in general English to creating academic works with a purpose (Bizzell, 1992). In a study, Guz (2016) investigated the perceptions of EAP students toward the variety of Academic English and academic register. It was suggested that academic vocabulary and rhetorical posture are the most important but also the most difficult elements of EAP. As academic texts employ a wide variety of specialized, complex, and uncommon terms and phrases, students who do not have specialized knowledge might experience difficulties in comprehending the texts. However, Negretti and Kuteeva's (2011) study concludes that the capacity of non-native students to analyze and create academic writing is positively influenced by

the metalinguistic understanding of academic discourse, which highlights the fact that students should be exposed to the features of formal language as much as possible to increase their understanding of complex concepts.

2.5.2.2 The use of technology in EAP. The reality of the EAP context frequently presents several difficulties that may prevent student-centered learning and learner outcomes from being successfully achieved. According to Alkhalidi (2020), learning anxiety, lack of engagement, and poor self-confidence are some of the most frequent difficulties that less proficient students may have, especially when they are mixed together with highly skilled students in a multilevel classroom. However, EAP learning may be aided by educational technology in a variety of ways: by increasing exposure to multimodal English language input, facilitating possibilities for real-world engagement, and exposing learners to adaptable, self-paced learning (Wang & Vásquez, 2012). With the rise of Web 2.0 technologies, EAP learning is now relevant to twenty-first-century learning, in which ideas of literacy, writing, and engagement are all heavily mediated by technology. Technology-mediated instruction has the potential to develop interactive online learning environments that extend the learning process outside of the classroom while promoting independence and improving transferrable 21st-century communication skills (Dede, 2010; Hockly & Dudeney, 2018; Kessler, 2018). EAP educators may manage, organize, and develop their teaching processes with the use of technology. Technology-mediated language learning (TMLL) options today provide EAP teachers and administrators with a diverse array of highly interactive tools to create flexible, accessible, and customized online language learning options that can support fully online or face-to-face classroom instruction (Kessler, 2018; Wang & Vásquez, 2012). Emergent technologies promote community building, engagement, and cooperation; thus, it is critical to comprehend how these opportunities support the acquisition of academic and linguistic abilities and how they can be incorporated into effective teaching. It is suggested that EAP educators must thus comprehend the possibilities of digital technologies as well as how to customize and incorporate them into their activities (Kessler, 2018).

In an effort to evaluate the effectiveness of the use of technology in EAP settings, several studies have been conducted. One study conducted by Romanova (2017) focused on implementing flipped learning in an EAP setting, and it demonstrated that a flipped classroom could offer the ideal setting for non-native students to develop linguistic competence, enhance real-time production and comprehension skills, and develop a wide range of cognitive skills and functional abilities that are essential for a professional level of language proficiency. Lin et al. (2013) conducted a study to investigate the effects of digital storytelling tools and the perceptions of EAP students and found that the use of this technology inspired the learners and aided in the growth of their soft skills, linguistic abilities, and sense of independence. Dashtestani's (2015) study on computer literacy, self-efficacy, and attitudes of Iranian EAP students of various different disciplines (i.e., law, political sciences, biology, and psychology) revealed that participants had positive attitudes toward Web-based tests of academic vocabulary, and they experienced high levels of self-efficacy. It is clear that research conducted so far supports "the value of integrating language skills and technology to combine authentic language, learner autonomy with information processing and communication" (Plastina, 2003, p. 17). The use of technology in EAP classes has certain benefits for better learning outcomes. This view is also supported by Tallent-Runnels et al.'s (2006) study, which suggests that online instruction can provide similar benefits to those in traditional classrooms if the course is well-designed and well-implemented.

Chapter 3

Methodology

This chapter provides information about the methods used to measure the impact of applying the personalization and voice principles on EAP students' learning while designing multimedia presentations. The details of the research design, setting, participants, data collection tools and procedure, validity and reliability of the data, and the study's limitations can be found in this section.

This study sought answers to the following research questions:

1. Is there a significant difference between the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) and the pretest and posttest scores of the control group (multimedia presentation with low social cues) on how to write a response paper?

2. Compared to the control group (multimedia presentation with low social cues), is there a significant difference in the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) on how to write a response paper?

3.1 Research Design

This study includes a quasi-experimental design using quantitative data to answer whether adopting high (a conversational speaking style, polite wording, and an appealing human voice) or low social cues (a formal speaking style and a monotonous human voice) affects the achievement of EAP students. The quantitative research provided measurable data from the participants taking the EAP course at the time. In an effort to be able to answer the research questions and obtain more reliable and valid results, a quasi-experimental method was applied in 13 ENG 101 classes with five EAP instructors. The participants in these classes were taking the same EAP course at the time of the study and receiving the same instruction on how to write a response paper. During the study, the participants were divided into two groups: the experimental group (10 classes) received a multimedia tutorial on how to write a

response paper with a narration that included high social cues, and the control group (three classes) received the same multimedia tutorial but narrated with low social cues. To assess the impact of social cues, a comparison was made between the pretest and posttest scores within each group, as well as between the two groups.

The quasi-experimental method used in this study refers to a strategy in which the assignment of participants to an experimental or a control group cannot be done randomly for practical or ethical reasons. In such settings, administrators are likely to determine the allocation of participants, or self-selection methods are used (American Psychological Association [APA], n.d.). As this study focused on the role of high and low social cues in an EAP setting, the researcher focused on a specific group of participants (the participants who were taking the ENG 101 course at the time of the study). The sample was divided into control and experimental groups to compare the use of high and low social cues and examine their effects on participants' achievement. The implementation conducted in the control group was expected to simulate the authentic conditions of a typical EAP classroom setting, where learners are commonly exposed to a more formal style of speaking. In EAP settings, learners are exposed to a language register that is more formal and structured compared to everyday spoken language. This may involve using proper grammar, specific academic vocabulary, and appropriate discourse markers that reflect a level of formality required for academic or professional contexts. By exposing the control group to this formal speaking style, the researcher aimed to capture the typical linguistic environment encountered by learners in EAP programs or academic settings.

The instructional material used for the multimedia presentation was prepared within the scope of the existing curriculum of the ENG 101 course that the participants were enrolled in. The PowerPoint material was narrated twice: one in a conversational speaking style with an engaging tone and another in a formal speaking style with a rather monotonous tone. Both narrations were recorded in English by the researcher, who is a native speaker of Turkish with a native-like American English accent. The video lesson was implemented in a total of 13 ENG 101 classes. Among these classes, 10 received the video lesson accompanied by a narration that incorporated high social

cues, while the remaining 3 classes received the video lesson with a narration that incorporated low social cues. The implementation occurred over a span of two weeks, with each class receiving the multimedia lesson once during that period. For the implementation of the study, a pretest, which consisted of nine multiple-choice questions aiming to assess the participants' previous knowledge, was administered. After the video lesson treatment, the subjects received the same questions as the posttest, and the answers were collected through the quiz function of Moodle. Table 6 below illustrates the stages of the implementation of the study.

Table 6

Stages of the Implementation of the Study

Groups	Pretest	Treatment	Posttest
Experimental Group (N=161)	Achievement test on how to write a response paper	Video with high social cues x once (14 mins)	Achievement test on how to write a response paper
Control Group (N=60)	Achievement test on how to write a response paper	Video with low social cues x once (12 mins)	Achievement test on how to write a response paper

3.2 Setting and Participants

The study took place in an undergraduate English program at a private university in Turkey during the 2022-2023 Fall Semester. The total number of participants taking the ENG 101 course was approximately 1000, with various demographic information.

To increase the participants' English language proficiency, the school provided a one-year preparatory program for those who could not pass the proficiency exam, which was based on CEFR (Common European Framework of Reference) standards, and who needed assistance to improve their general language skills, as most of the departments at the institution delivered English-medium instruction. After successfully completing the program, all students in their first years had to take the ENG 101 course to improve their academic English skills further. As this study took place in the ENG 101 course, the participants were assumed to have the necessary linguistic abilities to be able to understand the course content. Most of the population

comprised participants who were in their first years; however, some participants were repeating the course.

The ENG 101 course was aimed at helping learners acquire and improve academic and language skills for interdisciplinary undergraduate studies by focusing on contemporary global issues and sustainable development. The course addressed the underlying causes of global problems and the United Nations Sustainable Development Goals (UN SDGs), which aspire to achieve a sustainable future. Students were expected to develop their academic and language skills by studying the economic, social, and environmental pillars of sustainable development and their practical implications in Turkey and worldwide. The exit level of the course was aligned with the Common European Framework level B2+. One of the aims of the course was to establish a link between reading and writing skills, and in order to achieve this aim, students were required to read an academic article on sustainability (Appendix C) and write a response paper (Appendix D). A response paper is a type of academic writing that enables the presentation of individual viewpoints and responses to a particular literary work, such as a book, article, or essay. It enables the writer to actively engage with the concepts discussed in the text and to offer their own analysis and interpretation. The writer of a response paper is typically required to engage in a critical analysis of the text's content as well as provide unique perspectives and observations. Discussing emotional reactions, drawing parallels to one's own life, or assessing how the article affected the writer's understanding of a certain subject can be a part of a response paper. The response paper gives readers the chance to voice their agreement or disagreement with the author's points of view and justifications while also evaluating how well the material achieves its stated goals.

To successfully complete the course, the students needed to write two response papers following the response paper writing conventions as part of the assessment system. There were four class hours per week for each section. As the class hours were usually spent on practicing the above-mentioned skills and conducting discussions, it was necessary to allocate more time for the writing input. For the purposes of delivering information, a writing booklet prepared by the Curriculum and Assessment

Unit was used, and for the coverage of articles, academic texts that focus on sustainability were collated and adapted.

The study sample consisted of 221 participants (60=Control group, 161=Experimental group) who were taking the ENG 101 course at the time of the experiment. The convenience sampling method, which is regarded as "less costly, quicker, and simpler than other forms of sampling" (Stratton, 2021, p. 374), was followed to select the participants. Although demographic information was not collected from the participants, it was assumed that the ages of the participants varied from 18 to 24, and there were 130 male and 91 female participants. The number of participants in the experimental group was higher due to the availability of participants at the time of the experiments. While implementing the multimedia presentation with low social cues, fewer participants attended the lessons, which is why the number of participants in the control group was lower. Table 7 below illustrates the demographic information of the participants.

Table 7

Participant Information

	Control (n=60)	Experimental (n=161)	Total (N=221)
Age	Vary from 18 to 24	Vary from 18 to 24	Vary from 18 to 24
Male	36	94	130
Female	24	67	91

As can be seen from Table 7, the number of male participants in this study was (n=130), and the number of female participants in this study was (n=91). According to Ahmad and Shah (2019), maintaining equivalence within the sample contributes to the preservation of unbiased outcomes, preventing any predisposition towards a particular gender. Therefore, an equitable representation of both genders should be maintained to eliminate any risk of biased results. Figure 5 below depicts the distribution of both male and female participants that took part in this study.

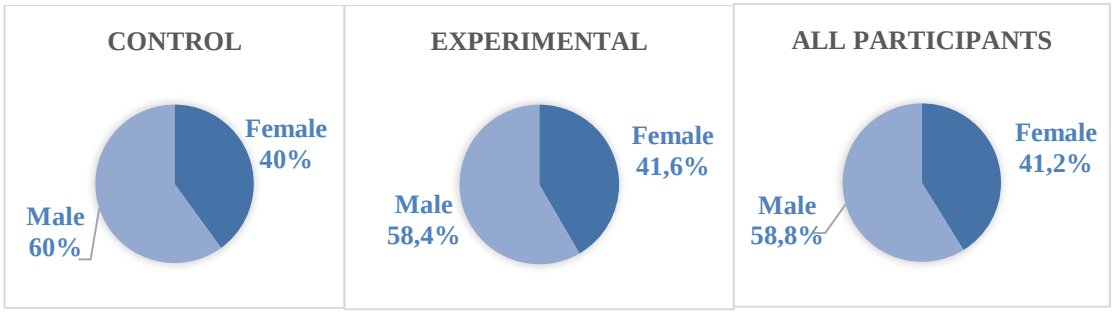

Figure 5. The distribution of male and female participants in this study

Upon examining Figure 5, it becomes evident that both genders display nearly equivalent participation in this study, and gender was not a relevant variable to be considered.

Prior to the implementation of the study, ethical approval had been obtained from the Ethical Committee of the institution. During the experiment, the participants were informed about the purpose of the study, the procedure that was going to be followed, their rights to withdraw at any time without a consequence, and the confidentiality of their personal information through a consent form (Appendix B).

3.3 Data Collection

For data collection, an achievement test was prepared and used as a pretest and posttest. The test was implemented through a Moodle quiz, and the data was collected as an Excel document and analyzed in SPSS 26.0. The experimental group received a multimedia presentation that included narration with a conversational speaking style, polite wording, and an appealing voice, while the control group received the same multimedia presentation with a formal speaking style and a monotonous tone. Both groups received the same achievement test as pre and posttests.

3.3.1 Data collection instruments.

3.3.1.1 Achievement test. To measure the learning performance of Participants on how to write a response paper, an achievement test was prepared by the researcher and used as pre and posttests (Appendix A). The test included nine multiple-choice questions which aimed to measure participants' knowledge of response paper writing conventions. While selecting each item, the content of the multimedia presentation

implemented in this study was taken into account, and the correct answers to each question were explicitly addressed within the multimedia presentation. The aim of using this achievement test as the pretest was to measure participants' background knowledge of how to write a response paper. All of the participants had already received introductory class input on the subject, and through the use of a pretest, more reliable and valid data could be obtained. The same test was used as the posttest to be able to measure the learning performance of the participants after being exposed to two different multimedia presentations in experimental and control groups.

After writing the items, three subject-matter experts reviewed the item design, and the questions were modified as needed as a result of their input. Table 8, presented below, provides a visual representation of the order and type of questions, their corresponding cognitive levels, and the assigned scores for each question. The cognitive levels of each question based on Bloom's Taxonomy were identified collectively with two subject matter experts.

Table 8 (cont.d)

The Achievement Test Utilized in This Study

Order	Type	Question	Objective	Score
1	Multiple-choice	What is the primary function of a response paper?	Comprehending	1
2	Multiple-choice	Which of the following is not a part of the introductory paragraph?	Analyzing	1
3	Multiple-choice	Which of the following is a part of the reaction paragraph?	Analyzing	1
4	Multiple-choice	Which of the following should be included in a concluding paragraph?	Analyzing	1
5	Multiple-choice	The thesis statement _____.	Comprehending	1
6	Multiple-choice	The topic sentence _____.	Comprehending	1
7	Multiple-choice	Consider the difference between the thesis statement and the topic sentence. Which of the following statements only applies to the topic sentence?	Analyzing	1

Table 8 (cont.d)

Order	Type	Question	Objective	Score
8	Multiple-choice	In the _____ paragraph, you can refer to ENG 101 articles and use direct quotations.	Remembering	1
9	Multiple-choice	Which of the following cannot be included in a concluding paragraph?	Remembering	1

To ensure the reliability of the questions, a pilot study was administered to three classes with 66 participants through the test-retest method. According to Kalaycı (2010), although there are different types of analysis to measure reliability, the most widely used is Cronbach's Alpha coefficient, and if the coefficient is $0{,}60\alpha \leq 0{,}80$, the scale is reliable. If the scale is $0{,}80\alpha \leq 1{,}00$, the scale is highly reliable. After conducting the reliability analysis, both the Crα coefficient and the KR-20 analysis yielded a consistent result of 0,691 for the scale used in this study, which indicates that the questions designed for the study exhibit an acceptable level of internal consistency. After the reliability analysis, the achievement test was administered through Moodle's Quiz module, and the results of each class were collected as Excel documents.

3.3.2 Data collection procedures. The study was conducted in the Fall Semester of the 2022-2023 academic year when the majority of ENG 101 students were taking the course for the first time. While designing the multimedia learning material, the writing booklet was used, and a step-by-step guide was provided with examples to ensure comprehension. In an effort to increase the effectiveness of the instructional material, Mayer's (2009) pre-training, signaling, multimedia, and segmenting principles were used. According to the pre-training principle, providing the learner with information that will make it simpler for them to process the lesson is vital to reduce the essential load (Mayer & Moreno, 2003a). As the participants in this study had already received some training on the key terms of writing a response paper, it was assumed that the multimedia presentation would be easier to follow. Furthermore, Mayer (2009) suggests that by including signals that bring the learner's attention to the crucial information, instructors may get their students to pay attention and, as a result, participate in cognitive processing that meets the learning objective, which is called

the signaling principle. In the multimedia presentation used for this study, key information was highlighted and/or pointed out using graphic elements to reduce the extraneous cognitive load (Figure 6).

Figure 6. Slide based on the signaling principle

The multimedia principle, which refers to the fact that using words and pictures rather than words alone is more effective in terms of fostering learning, was also applied in this multimedia presentation (Figure 7).

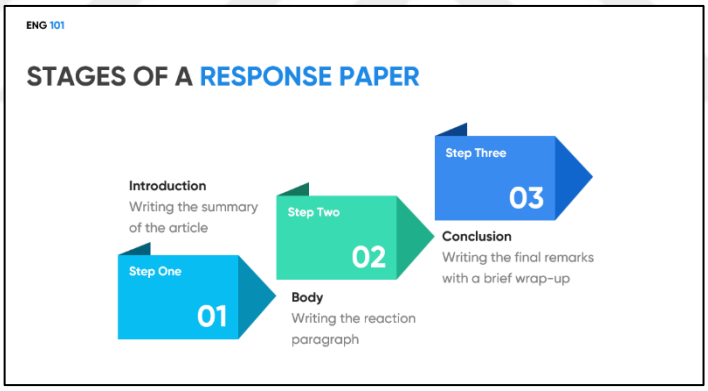

Figure 7. Slide based on the multimedia principle

Moreover, segmenting principle states that when a multimedia message is delivered in user-paced parts as opposed to one continuous piece, people learn more effectively. In this study, the multimedia presentation was divided into different sections and the video recordings were delivered via YouTube, which allowed the participants to pause, rewind and fast-forward the content (Appendix E). The YouTube videos included chapters and the participants were able to navigate through the sub-topics easily.

Overall, the multimedia presentation comprised twenty-five slides organized into seven sections (Table 9).

Table 9

Multimedia Presentation Content Used in This Study

Order	Stage	Slide Numbers
1	Introduction	1-3
2	Stages of a response paper	4-12
3	Writing the thesis statement	13-14
4	Writing the topic sentence	15-17
5	Writing the reaction paragraph	18-21
6	Writing the concluding paragraph	22-23
7	Summary and conclusion	24-25

The instructional material was narrated by the off-screen researcher twice, one with a formal and monotonous tone (low social cues) and the other with a conversational and engaging tone using polite wording (high social cues). In the video lesson with low social cues, the narrator explained each section in a neutral and objective way, using passive voice and the present tense. The narrator did not address the audience and used a monotonous tone. On the other hand, in order to follow the personalization principle, which suggests that students are more likely to regard the author as a conversation partner and work harder to understand what the author is saying when they feel as though the author is speaking directly to them (Mayer, 2009), the video lesson with high social cues included active voice, and the explanations were given in a friendly and supportive way in the form of giving advice to participants. The narrator addressed the participants directly. To be able to adopt the voice principle, a lively tone with prosodic qualities was used to engage the audience. Both multimedia presentations included the same content with a few modifications on slides to ensure that the wording used on slides corresponded to the narration. The multimedia presentation with low social cues lasted around 12 minutes, while the one with high social cues lasted around 14 minutes.

The researcher who narrated both presentations holds a BA in Teaching English as a Foreign Language and has excellent communication skills in Turkish and English with a native-like American English accent.

Table 10 below presents a summary of the features incorporated in the multimedia tutorial design utilized in this study.

Table 10

The Design of The Multimedia Presentations Implemented in This Study

Design Considerations	Multimedia Presentation with High Social Cues	Multimedia Presentation with Low Social Cues
Multimedia learning design principles	Pre-training, signaling, multimedia, segmenting principles	Pre-training, signaling, multimedia, segmenting principles
Objective	To recognize and explain the conventions of writing a response paper	To recognize and explain the conventions of writing a response paper
Material	The recording of a PowerPoint presentation delivered via YouTube	The recording of a PowerPoint presentation delivered via YouTube
Content	How to write a response paper	How to write a response paper
Speaking style	Conversational and engaging tone Active voice Friendly and supporting tone Addressing the participants directly using "you"	Formal and monotonous tone Passive voice Neutral and objective tone Not addressing the participants directly
Duration of the video lesson	Approximately 14 minutes	Approximately 12 minutes
Narrator	Turkish female speaker	Turkish female speaker

Taking the personalization principle into account, two different versions of a text (one with high social cues and the other one with low social cues) were prepared. Figure 8 provides an overview of the transcript of the multimedia presentation with high social cues, and Figure 9 is a sample from the multimedia presentation with low

social cues. The sentences in blue represented the conversational style, while the sentences in red represented the formal narration.

Then, we explain why we agree by using our background knowledge about the topic. And then, we establish a link between our opinion and the idea from the article by referring to an example.

And this is the final look. First, we included the idea either by paraphrasing or providing direct quotations, then we interpreted what it meant, and then we provided our own opinion by justifying our answer. We use linking words to make a smooth transition and reporting words to deliver the meaning more effectively.

As I've already mentioned before, this example is just a portion of the reaction paragraph. You need to include a variety of attempts like this and connect them meaningfully.

Figure 8. The transcript of the multimedia presentation with high social cues (excerpt)

Now, it is essential to explain the reasons by using background knowledge about the topic. And then, a link between the opinion and the idea from the article needs to be established by referring to an example.

This is the final look. First, the idea was paraphrased or given as a direct quotation, then the interpretation was given, and then the student provided his or her own opinion by justifying the answer. There are uses of linking words to make a smooth transition and reporting words to deliver the meaning more effectively.

As mentioned before, this example is just a portion of the reaction paragraph. It is necessary to include a variety of attempts like this and connect them meaningfully.

Figure 9. The transcript of the multimedia presentation with low social cues (excerpt)

Following the design of the multimedia presentation, nine multiple-choice questions were prepared to assess existing knowledge as a pretest and check comprehension as a posttest. The item design was reviewed by three subject-matter experts, and according to their feedback, necessary changes were made to the questions. The questions were modified to avoid excessive verbiage and ambiguity in the stem and/or the options. In addition, some options were altered to ensure the

measurement of a single construct. Lastly, the options were repositioned in the order of their length (from the longest option to the shortest one) to make reading easier for participants (Figure 10).

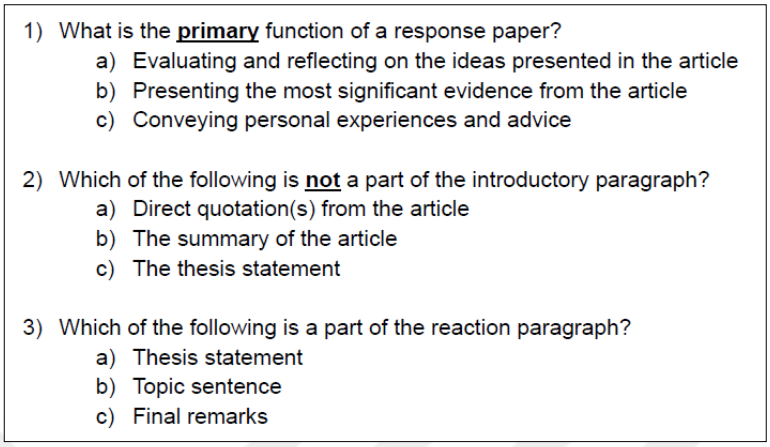

Figure 10. Item writing

The material design process continued by utilizing two versions of the text. One version incorporated high social cues, while the other version incorporated low social cues. For this purpose, PowerPoint's built-in recorder was utilized. The multimedia presentation with high social cues underwent a meticulous editing process, where the audio was slightly accelerated, and the unnecessary parts, such as fillers and long pauses, were removed using Adobe Premium Pro. This was done to provide a more engaging experience for participants. Conversely, the audio of the multimedia presentation with low social cues remained unaltered to maintain the natural speech-like narration and to ensure a fair and unbiased comparison between the two versions. In order to enrich the slides, visuals and design elements were used (Figure 11). These included carefully curated images, appropriate color schemes, and visually appealing fonts. Subsequently, both multimedia presentations were uploaded to YouTube, allowing for easy access for the audience to view them.

Figure 11. Content-related visuals

Figure 12 below illustrates the various phases involved in the material design process.

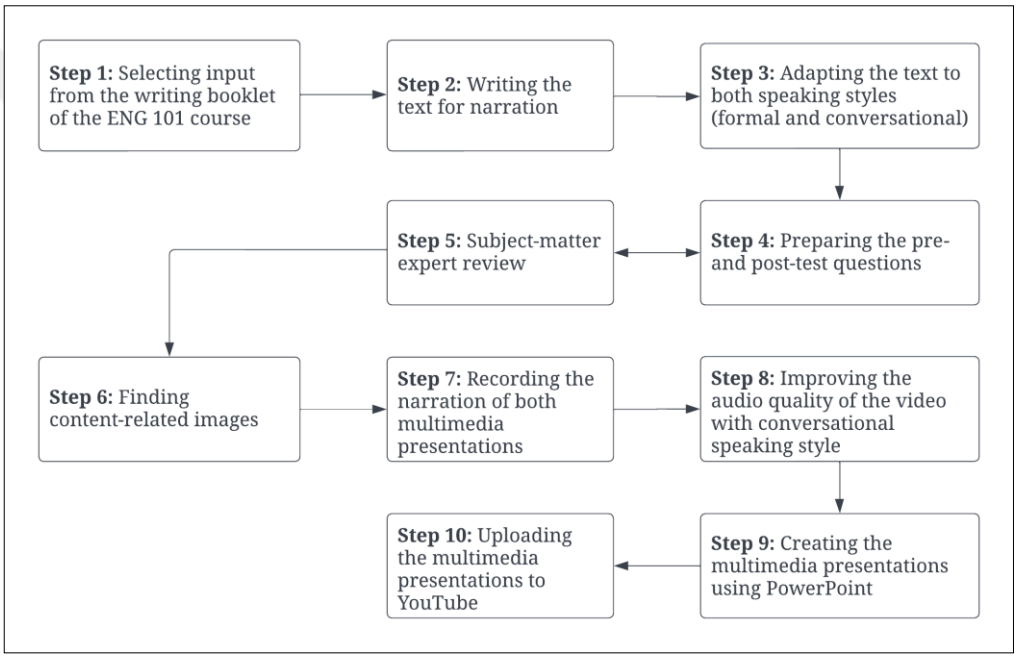

Figure 12. Material design process

According to Ponce et al. (2020), computer-administered exams provide benefits for learners in terms of reducing the response time and improving the learning process. Therefore, in this study, the achievement test was conducted on Moodle. The pre and posttest questions were transferred to Moodle using the Quiz module, and each item was carefully reviewed and inserted as multiple-choice questions. The task was divided into three pages, the first of which started with the instructions and the pretest questions. The second page included the instructions and the YouTube link to the

multimedia presentation. On this page, an additional link to the article used in the material for providing samples was also included for participants to refer to it if they wanted to reread it. The third and final page consisted of instructions and posttest questions. Figures 13 and 14 demonstrate the Moodle task layout for each application.

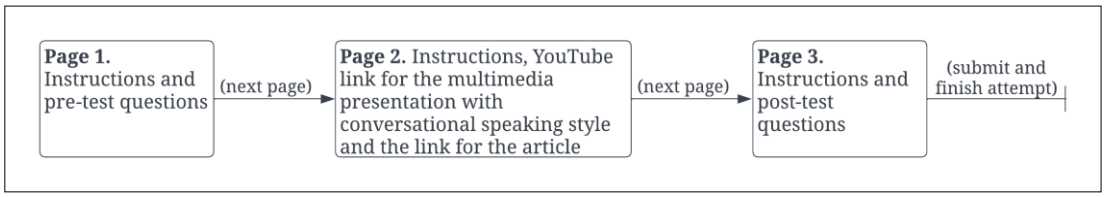

Figure 13. Moodle task layout for the multimedia presentation with high social cues

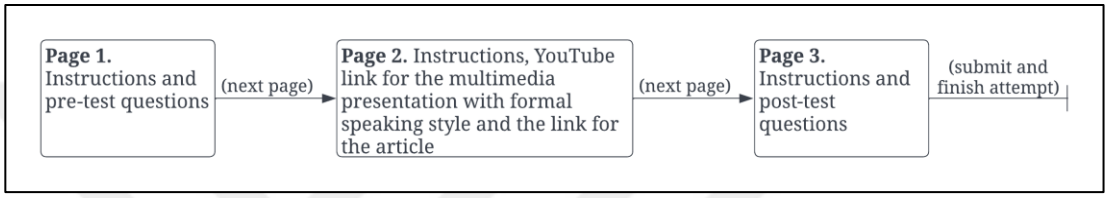

Figure 14. Moodle task layout for the multimedia presentation with low social cues

Before implementing the study, the achievement test was piloted in three ENG 101 classes with 66 participants, and the reliability analysis showed that the test was reliable.

The study was implemented in thirteen classes with five instructors for two weeks. The multimedia tutorials used in this study were implemented once in each class and the delivery was through Moodle Quiz function on LMS. The module included all of the necessary instructions that were carefully planned during the material design process. The administration protocol was clearly communicated to the instructors through a training session, and they were asked to report any difficulties or challenges they encountered during the implementation process. After the treatment, the instructors reported that the administration of the tasks was smooth and that participants did not report any confusion. The participants of both the control group and the experimental group received the same questions after being presented with multimedia tutorials that included either high or low social cues once. In some classes, the study was conducted in instructor-paced lessons; however, some instructors preferred to allow participants to complete the task outside the classroom at their own

pace. The data was retrieved from Moodle and analyzed using SPSS 26.0. Figure 15 provides a summary of the data collection process.

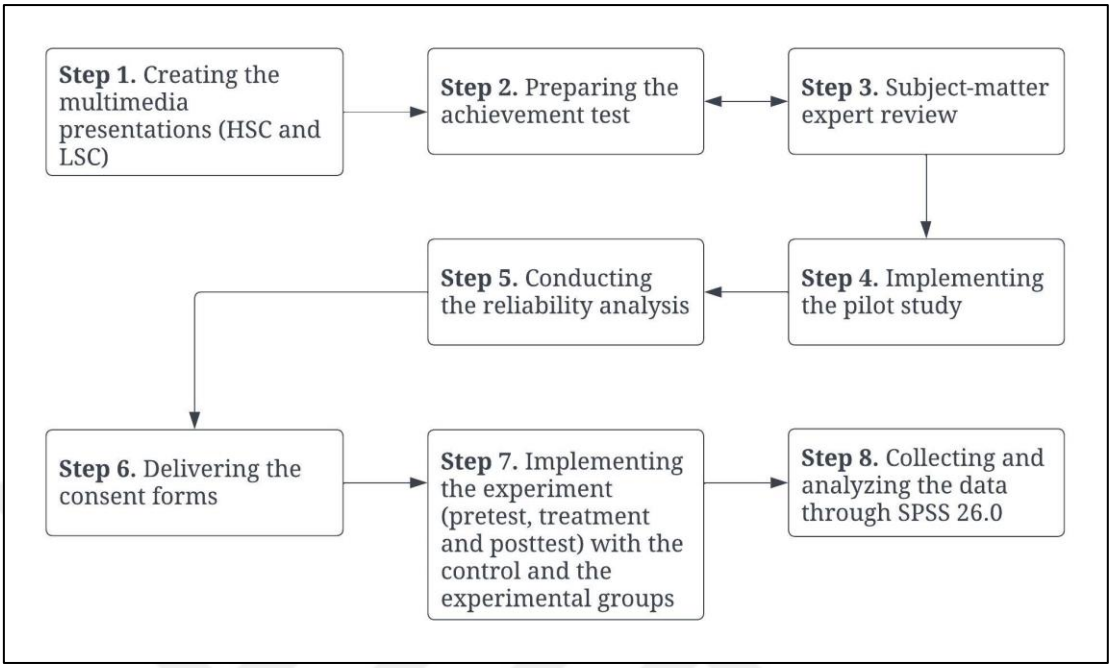

Figure 15. Data collection process

3.3.3 Data analysis procedures. The quantitative data collected from the participants of this study were analyzed in SPSS 26.0 by employing different tests. As it was observed that the data distribution was normal, the data gathered from the pretest and posttest of each group were analyzed through paired samples t-test, and to compare the results of each group, independent samples t-test was used. The mean scores of the achievement test were taken, and the standard deviation for each calculation was taken into account to tell how much the group members differed from the mean value for the group. To measure the effect size, Cohen's d was calculated.

Before evaluating the results, some assumptions were tested before comparing the achievements of the experimental and control groups. The distribution of the scores of the experimental and control groups from the knowledge test for writing a response paper was analyzed based on the skewness and kurtosis coefficients. According to Tabachnick and Fidell (2007), the skewness and kurtosis coefficients should be in the range of ±1.5 in order to meet the assumption of normal distribution. In this study, it

was observed that the measured skewness and kurtosis coefficients were within the specified range, and the normal distribution assumption was met (Table 11).

Table 11

Skewness and Kurtosis Coefficients

Test	Group	Skewness		Kurtosis	
		z	SH	z	SH
Pretest	Experimental (HSC)	-0,83	0,19	0,45	0,38
	Control (LSC)	-0,53	0,31	0,25	0,61
Posttest	Experimental (HSC)	-1,39	0,19	1,35	0,38
	Control (LSC)	-0,79	0,31	-0,38	0,61

3.3.4 Reliability and validity. Anderson and Morgan (2008) state that the consistency of test findings is shown by a reliability metric. In order to measure the reliability of a test, several factors are taken into account, including the test itself, the quality of test items, the methods used for the administration of the test, the characteristics of the sample group, and the quality of the scoring of test items. It is also suggested that the degree to which the various pretest items correlate with one another should be confirmed by the implementing agency's reliability evidence. The capacity to generalize the results to similar circumstances is made possible by reliability, which is a crucial component. For the reasons mentioned above, a reliability analysis was conducted for the achievement test used in this study.

The convenience sampling approach was used to select the participants in this quasi-experimental research design. In other words, the researcher focused on Participants who were readily available during the experiment. The pretest and posttest implementation processes were given top priority in order to collect more reliable and accurate data. A pilot study using the test-retest approach was conducted in three classes totaling 66 participants to confirm the reliability of the achievement test. Piloting the study gave the researcher a foundation on which to build her ability to

predict potential outcomes and potential issues. To measure reliability, the test items were tested through reliability analysis on SPSS 26.0 (Cronbach's Alpha= 0,691, KR-20=0,0691). Kalaycı (2010) reports that a scale proves reliable if the coefficient is $0{,}60\alpha \leq 0{,}80$ and highly reliable if the coefficient is $0{,}80\alpha \leq 1{,}00$. It was observed that the achievement test used for this study was reliable, and the test findings were consistent.

Following the assessment of reliability, the next crucial step in ensuring the trustworthiness of research outcomes was the evaluation of validity. According to Messick (1989), making appropriate interpretations and uses of test results or score information falls under the wide construct of validity. The accuracy of measuring instruments is referred to as validity, and it seeks to match whether the tools actually measure what the approach is supposed to measure (Golafshani, 2003). As validity is a judgmental issue rather than a statistical one, a reference group of subject-matter experts, such as curriculum specialists, should work together to ensure that the elements represent a curriculum or construct sufficiently (Anderson & Morgan, 2008). For the achievement test used in this study, three subject matter experts, two of whom had worked in the Curriculum & Assessment Unit of the institution, were consulted in terms of the effectiveness of the items, and some alterations were made to ensure validity. The changes were implemented in accordance with the recommendations outlined by Anderson and Morgan (2008) to enhance the validity of the multiple-choice items used in the achievement test. These guidelines emphasize the importance of avoiding specific practices in multiple-choice items, such as (1) ensuring that the correct answer does not significantly exceed the length or level of detail compared to the other options, (2) organizing the options in a logical and clear manner, avoiding confusing patterns or orders, (3) minimizing the substantial overlap between the options and the key answer, so that selecting the "best" answer relies on knowledge of the subject matter rather than primarily on language skills.

3.4 Limitations

This study was carefully planned, piloted, revised, and carried out; however, it is not irreproachable in all aspects. One limitation of this study is the small sample

size. Large sample size has benefits for interpreting significant results since it enables a more accurate estimation of the treatment impact and typically makes it easier to judge the sample's representativeness and generalize the findings (Beck, 2013). However, this study comprised 221 Participants studying in a particular setting; therefore, more studies need to be conducted to make necessary generalizations.

Another limitation of this study is that the question set consisted of multiple-choice items only. In addition to multiple-choice questions, achievement tests can also include other types of questions, such as open-ended questions and matching-type questions. This can allow for assessing the aims and objectives at analysis, synthesis, and evaluation levels that are challenging to determine using multiple-choice questions (Ozudogru & Aksu, 2019).

Moreover, to further investigate the effectiveness of the personalization and voice principles, it would be better to conduct interviews with the participants and gain insight into the factors that contributed to the findings. In future studies, surveys and interviews should also be incorporated to better understand the attitudes and perceptions of learners toward these multimedia learning design principles.

Chapter 4

Findings

In this section, the findings from multiple data sources are showcased. The primary objective of this study was to examine whether learning performance is influenced by high or low social cues in EAP multimedia presentations. To achieve this goal, pre and posttest scores were collected from both groups and analyzed quantitatively. The findings from these data sources are detailed below.

In order to determine whether there was a difference between their initial and final scores of the implementation of multimedia presentations with two types of social cues and compare their performances, the participants in both groups performed a pretest and posttest. The participants were presented with a multimedia lesson on how to write a response paper with either high (a conversational style, polite wording, and an appealing voice) or low social cues (a formal style and a monotonous tone of voice). The lesson material was prepared based on the existing instructional materials of the ENG 101 course, and the content of both multimedia presentations was identical, with a few modifications of texts on some slides to match the corresponding narration.

In order to compare the pretest and posttest scores of the experimental and control groups, independent samples t-test was conducted. Additionally, paired sample t-test was used to compare the pretest and posttest scores within each group. For effect size measurement, Cohen's d was calculated. In this calculation, d = 0.2 can be considered a 'small' effect size, 0.5 represents a 'medium' effect size, and 0.8 is a 'large' effect size (Cohen, 1988). This means that if the difference between two groups' means is less than 0.2 standard deviations, the difference may be ignored even if it is statistically significant. The data used in this study were analyzed using the statistics software SPSS 26.0.

4.1. Findings of the First Research Question

To be able to answer the research question, "Is there a significant difference between the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) and the pretest and posttest scores of the control

group (multimedia presentation with low social cues) on how to write a response paper?", the pre and posttest scores of each group were separately compared. First, the pre and posttest scores of the experimental group were compared, and then, the pre and posttest scores of the control group were compared.

In order to understand whether there was a significant impact of the use of low social cues (a formal speaking style and a monotonous voice) in the multimedia tutorial utilized in the study, a paired samples t-test was conducted to compare the pre and posttest scores of the control group. Table 12 below shows the findings of this analysis.

Table 12

Comparison of Pre and Posttest Data of Control Group

Group	Test	N	Mean	SD	*t*(59)	p	Cohen's *d*
Control (LSC)	Posttest	60	7,45	1,57	3,11	<0,01	0,40
	Pretest	60	6,87	1,63			

Table 12 demonstrates that there is a significant difference (t(59)= 3,11; p<0,01) between the pre and posttest scores of the control group. The mean score of the posttest data of the control group (Mean=7,45; SD=1,57) is significantly higher than the mean score of the pretest data of the same group (Mean=6,87; SD=1,63). This data set illustrates that the implementation of low social cues in multimedia learning design increased the knowledge levels of participants in the control group.

Table 13 illustrates the comparison of the pre and posttest data of the experimental group. Paired samples t-test was conducted to determine whether the use of high social cues (a conversational speaking style, polite wording, and an appealing voice) in the multimedia tutorial had a significant impact on the achievement of the participants in the experimental group.

Table 13

Comparison of Pre and Posttest Data of Experimental Group

Group	Test	N	Mean	SD	*t*(160)	p	Cohen's *d*
Experimental (HSC)	Posttest	161	7,59	1,65	4,88	<0,01	0,38
	Pretest	161	7,03	1,74			

It can be understood from the data in Table 13 that there is a significant difference between the pre and posttest scores of participants who received the experimental material (t(160)= 4,88; p<0,01). The mean score of the posttest data of the experimental group (Mean=7,59; SD=1,65) is significantly higher than the mean score of the pretest data of the same group (Mean=7,03; SD=1,74). The finding showed that the implementation of high social cues in multimedia learning design also increased the knowledge levels of participants in the experimental group.

Based on these findings, it can be concluded that both the experimental and control groups benefited from the treatment, indicating that the multimedia tutorial effectively facilitated learning.

4.2 Findings of the Second Research Question

In an effort to identify the answers to the study question, "Compared to the control group (multimedia presentation with low social cues), is there a significant difference in the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) on how to write a response paper?", the pretest and posttest scores of each group were compared. First, the pretest scores of the experimental group and the control group were compared, and then, the posttest scores of the experimental group and the control group were compared.

The pretest consisted of nine multiple-choice questions that assessed the participants' prior knowledge regarding the content. The aim of implementing this test was to assess what the participants already knew about how to write a response paper and to observe whether the multimedia lesson had an effect on their learning. Both the

experimental and the control groups received the same pretest questions. Then, the experimental group watched the video lesson that included an informal, conversational narration that included polite wording and an appealing tone of voice, while the control group received the same content with a more formal and monotonous narration. To be able to assess the impact on their learning, both groups received the same pretest questions as the posttest. The answers were collected through an online quiz on Moodle.

Table 14 below illustrates the comparison of the pretest scores of the experimental and the control group. Independent samples t-test was conducted to determine whether the groups were initially equivalent in terms of the outcome being measured.

Table 14

Comparison of Pretest Data of Experimental and Control Groups

Test	Group	N	Mean	SD	*t*(219)	p	Cohen's *d*
Pretest	Experimental (HSC)	161	7,03	1,74	0,63	0,53	0,10
	Control (LSC)	60	6,87	1,63			

It can be seen from the data in Table 14 that the means of pretest scores of participants in each group are not significantly different (t(219)= 0,63; p>0,05). It is apparent from this data that both the experimental group and the control group had similar levels of knowledge regarding the conventions of writing a response paper.

In an effort to understand the impact of using high social cues (a conversational speaking style, polite wording, and an appealing voice) on the achievement of the participants, the posttest scores of the experimental and control group were compared through independent samples t-test. Table 15 shows the findings of this analysis.

Table 15

Comparison of Posttest Data of Experimental and Control Groups

Test	Group	N	Mean	SD	*t*(219)	p	Cohen's *d*
Posttest	Experimental (HSC)	161	7,59	1,64	0,57	0,57	0,09
	Control (LSC)	60	7,45	1,57			

When the mean scores of the posttests of each group are compared, it can be seen in Table 15 that there is no significant difference between them (t(219)= 0,57; p>0,05). This data indicates that the use of high social cues in the multimedia tutorial in this study did not yield a statistically significant impact on the learning outcome of the participants.

Overall, the findings of the analyses in this study suggest that both the experimental group and the control group benefited from the multimedia tutorial, as evidenced by the pretest and posttest scores. However, upon comparing the posttest findings of the two groups, no statistically significant difference was observed. Table 16 below summarizes the key findings of this study.

Table 16 (cont.d)

Findings of the Study

Research Questions	Findings
1. Is there a significant difference between the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) and the pretest and posttest scores of the control group (multimedia presentation with low social cues) on how to write a response paper?	**Significant difference in the control group (t(59)= 3,11; p<0,01)** Participants learned from the multimedia tutorial with low social cues. **Significant difference in the experimental group (t(160)= 4,88; p<0,01)** Participants learned from the multimedia tutorial with high social cues.

Table 16 (cont.d)

Research Questions	Findings
2. Compared to the control group (multimedia presentation with low social cues), is there a significant difference in the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) on how to write a response paper?	**No significant difference in the pretest scores of both groups (t(219)= 0,63; p>0,05)** The experimental group and the control group both had a similar degree of understanding of how to write a response paper before the treatment. **No significant difference in the posttest scores of both groups (t(219)= 0,57; p>0,05)** Incorporating high social cues in the multimedia lesson did not have a statistically significant effect on the participants' learning outcomes.

These findings suggest that using high social cues (a conversational speaking style, polite wording, and an appealing voice) in a multimedia tutorial may not have a significant impact on participants' achievement compared to a tutorial with low social cues (a formal speaking style and a monotonous tone of voice) in EAP settings. Further research may be necessary to better understand the factors that affect the effectiveness of multimedia tutorials and the role that social cues play in student achievement.

Chapter 5

Discussion and Conclusions

This chapter discusses the findings of this study and offers recommendations to be used in future research on the use of social cues in multimedia learning design for learner achievement in EAP settings. The current study intended to examine whether the use of a conversational speaking style and polite wording suggested by the personalization principle and an appealing tone of voice suggested by the voice principle had any effects on EAP students' learning performance. The sample was 221 participants studying in various departments and taking an EAP course at a private university in Turkey. The study included a quasi-experimental study design and was conducted with an experimental and a control group. Initially, the experimental and control groups received a pretest to measure their existing knowledge of writing a response paper. Consecutively, the experimental group was presented with a multimedia presentation that included high social cues (a conversational speaking style, polite wording, and an appealing tone of voice). In contrast, the control group was presented with the same multimedia presentation that included low social cues (a formal speaking style with direct commands and a monotonous tone of voice). Both groups received the same posttest questions after completing the first two stages to investigate whether there was a difference in their learning process and whether using social cues affected their achievement.

5.1 Discussion of Findings for the First Research Question

The first research question, "Is there a significant difference between the pretest and posttest scores of the experimental group (multimedia presentation with high social cues), and the pretest and posttest scores of the control group (multimedia presentation with low social cues) on how to write a response paper?" sought to find answers for whether the use of high and low social cues had any impact on the achievement of the participants who were taking an EAP course. The findings indicate that both multimedia presentations with high and low social cues significantly affected the achievement outcomes being measured in the experimental and control groups.

Although the use of social cues varied, it is clear that the use of a multimedia presentation positively influenced the participants' learning process.

According to Mayer (2020), using both words and images to present information maximizes cognitive processing power. When the information is delivered solely verbally, the potential benefit of learners' ability to assimilate information visually is disregarded. Mayer (2020) further explains this notion with the multimedia principle, the effectiveness of which has been the focus of numerous studies (Mayer, 1989; Mayer & Anderson, 1992; Mayer et al., 1996; Mayer & Gallini, 1990; Moreno & Mayer, 1999; Ponce & Mayer, 2014; Sung & Mayer, 2012). These experiments compared the use of words alone and pictures alone, and it was concluded that the performances of the dual representations group were better than the single representation group. It was concluded that the participants who were presented with words and pictures got higher scores on tests than those who received words alone. The findings of this study are also consistent with previous studies. In this study, the participants in the experimental group and the control group received the multimedia presentations with text and related visuals; therefore, it is possible that their understanding of the content was increased.

Additionally, the multimedia presentation used in this study was designed considering the pre-training, signaling, and segmenting principles. The pre-training principle suggests that students comprehend the multimedia lesson better if they are provided with the names and characteristics of the major elements in the lesson prior to the delivery (Mayer, 2020). A study done by Mayer et al. (2002) demonstrated that students that received pre-training outperformed the students in the no pre-training group in three different experiments. Since the participants in the study had received input on how to write a response paper prior to the experiment, they were familiar with the names and the characteristics of the major components, which might have led to an increase in the scores. The use of signaling principle in this study, which is explained by Mayer (2020) as the necessity of providing cues and signals to emphasize the organization of the material to promote better learning, might also have played a role in the increased learning levels of participants. The studies on the signaling

principle show that there are positive outcomes of using distinctive colors, coordinated visual and verbal cues, pointing gestures, arrows, flashing and graying out techniques while delivering instruction through a multimedia presentation. Signaling can guide the learner to determine what to pay attention to and create a mental organization of the information (De Koning et al., 2009; Mayer, 2020). As the key information in the multimedia tutorial used in this study was highlighted and pointed out using arrows, it is possible that the participants were able to focus more on the content, leading to an improved performance. Finally, the segmenting principle, which suggests that students learn better when they are allowed to view the multimedia presentation in segments at their own pace, was also considered in the design of this study and research shows that the use of this principle has many benefits for learning (Mayer, 2020). Based on the findings reported in the meta-analysis conducted by Rey et al. (2019), segmenting techniques not only improve performance on transfer tests but also reduce self-reported cognitive load, which refers to the mental effort or resources required to process and understand information. The use of segmenting appears to alleviate cognitive load, making the learning process more efficient and effective. In this study, the administration of the achievement test and the multimedia presentation was conducted in three pages to allow for an improved organization of the delivery (Figures 13 and 14). Also, the multimedia presentations were recorded as YouTube videos and the videos were divided into chapters, which allowed the participants to navigate through the sub-topics easily. The participants were able to play, rewind, or fast-forward the video or move to different chapters at their own pace. Consequently, the use of the segmenting principle might have impacted the participants' performance positively.

According to Brown and Bennett (2002) as well as Moors and De Houwer (2006), student facility or automaticity, which refers to the ability to operate knowledge elements effortlessly, can be improved through practice. Achieving automaticity typically requires significant preparation and repetition. However, once attained, automaticity enables students to utilize their cognitive resources for more complex tasks. In other words, by becoming automatic in certain skills or knowledge, students set aside mental capacity that can be used for more challenging tasks. In this

study, participants had already received input on how to write a response paper; therefore, it is possible that the implementation of multimedia presentations (with high and low social cues) served as practice opportunities for participants, improving automaticity and leading to higher performance.

5.2 Discussion of Findings for the Second Research Question

The second research question "Compared to the control group (multimedia presentation with low social cues), is there a significant difference in the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) on how to write a response paper?" aimed to understand whether there was a significant difference in the pretest and posttest scores of the experimental group (multimedia presentation with high social cues) compared to the control group (multimedia presentation with low social cues) on how to write a response paper. The purpose of this question was to determine if participants in both groups had different levels of background knowledge regarding the conventions of writing a response paper. The question also sought to evaluate the potential impact of using high social cues in a multimedia tutorial on learning outcomes.

Comparing the pretest scores of both groups was essential to ensure the reliability of the measurement tools used in the study and to understand the effect of the described variables. According to Veerbeek et al. (2017), the use of a pretest in educational settings can give a baseline performance and a static measure of performance that can be used to analyze the findings of the posttest. In order to achieve this goal, both groups received the same achievement test, which included nine multiple-choice questions. The findings indicate no significant difference between the pretest scores of participants in each group; therefore, it can be concluded that the groups were similar in terms of their knowledge or skills at the beginning of the study. This can be considered a desirable finding, as it means that any differences between the groups that are found after the treatment can be attributed to the treatment itself rather than to pre-existing disparities between the groups. Additionally, it shows that equivalent groups were successfully created at the beginning of the study using the randomization process that was used to allocate individuals to the groups.

In an effort to identify which group performed better in the achievement test, the posttest scores of the experimental and the control group were compared. The findings suggest that there is no significant difference between the posttest scores of each group, which means that there is no evidence that the treatment had a substantial effect on the measured achievement outcomes. The data reveals that both groups were positively influenced by the multimedia presentations, as their mean scores were higher compared to the pretests. However, the high social cues implemented in the experimental group did not lead to a statistically significant improvement in achievement compared to the control group that received the same multimedia tutorial with low social cues. There might be several factors concerning this finding, and the following sections will discuss these factors in detail.

5.2.1 Discussion of the role of the personalization principle. These findings differ from Mayer's (2020) personalization principle of multimedia learning theory and some of the previous studies in the literature. With the implementation of the personalization principle, some studies reported more social presence (Ginns et al., 2013; Moreno & Mayer, 2004), higher learning performances, and more active cognitive processing (Ginns et al., 2013; Mayer et al., 2004; Moreno & Mayer, 2004; Reichelt et al., 2014; Riehemann & Jucks, 2018; Schrader et al., 2018; Töpper et al., 2014; Yang et al., 2022; Zander et al., 2015). Also, the retention rate was also higher in personalized groups (Ginns et al., 2013; Lin et al., 2020; Moreno & Mayer, 2000, 2004; Reichelt et al., 2014; Rey & Steib, 2013; Schneider et al., 2015). Additionally, personalized messages in multimedia environments are believed to foster learners' interest and motivation (Brom et al., 2014; Ginns et al., 2013; Kurt, 2011; Park, 2015; Reichelt et al., 2014; Rey & Steib, 2013; Schrader et al., 2018; Zander et al., 2015).

On the contrary, some other studies reported that students benefitted more from the formal style (Onat, 2018; Sofi et al., 2018; Töpper et al., 2014). In the meantime, similar to the findings of this study, some studies concluded that there was no significant difference between the achievement scores of each group (Brom et al., 2014; Kurt, 2011; Park, 2015).

One reason why there was no significant difference between the experimental and the control group in this study might be linked to the fact that the participants were not native speakers of English. It is possible that the non-native participants were not able to distinguish the subtle differences in the conversational style. McLaren et al. (2006) highlighted this problem and stated that conversational first and second-person language is essential, but so is the emergence of a genuine social bond with the learner. L2 learners may not always be able to distinguish the differences in social cues due to their lack of language awareness, which might lead to a lack of social bonds between the tutor and the learners. In that case, they do not necessarily become more motivated to make sense of what is being conveyed.

Additionally, one other risk factor that might have contributed to the findings of this study is the possibility that conversational sentences that were used in the multimedia presentation with high social cues were perceived as extraneous materials, which should be avoided to improve learning according to Mayer's (2020) coherence principle. The coherence principle emphasizes that extraneous elements compete for working memory resources and may draw attention away from crucial information. Although this study does not report any findings against the use of the personalization principle, the reason why the implementation of the personalization principle did not have any significant influence on the achievement of the learners might be related to the assumption stated by Mayer (2020) that social cues do not add new information to the lesson; therefore, should not improve learning. One study found that some participants in the personalized group reported that personalized messages were distracting for them (Brom et al., 2014). It can be understood that using conversational elements may not always yield the desired learning outcomes.

Moreover, Mayer (2020) expresses the need for additional research to evaluate the effectiveness of the personalization principle in cases when learners have less experience or more experience working with online tutors. In this study, the data for whether the participants were experienced working with online tutors were not collected; therefore, this factor might also have played a role in the findings.

The cultural setting can also be a reason why the personalization principle did not significantly impact the findings of this study. It is evident from the literature that there are a variety of outcomes depending on the cultural and contextual conditions. One study in Japan reported that Japanese college students indicated their preference for the formal style by expressing that they preferred more direct language use since they felt that the conversational approach increased the cognitive burden (Ayub et al., 2018). In the Chinese setting, it was found that Chinese students' recall was improved by the conversational approach, but not their ability to transfer knowledge because it required more concentration and pressure (Lin et al., 2020). Another study investigating the role of cultural background in the personalization principle was conducted with Czech learners, and the findings showed that there was no overall difference in learning outcomes between the two language styles of instructional texts, although direct rather than polite statements were specifically preferred (Brom et al., 2014). Similarly, a study conducted in a Turkish setting also concluded that the posttest achievement findings of the groups showed no discernible variation (Kurt, 2011). Onat's (2018) study investigating the effects of the personalization principle in a Turkish EAP setting also revealed that students preferred formal narration over conversational tone. Clearly, the learners' cultural background might be an important agent in achieving the suggested benefits of the personalization principle. The conversational messages delivered in the multimedia presentation must be suitable for the context and the audience. One element considered suitable in one setting "might be rated as negative or disrespectful in other cultures and therefore provoke completely different outcomes" (Schneider et al., 2016, p. 72). As this study comprised participants from various cultural backgrounds and the fact that most Turkish students "perceive the teacher as a very knowledgeable person who will teach them what they need to learn in a formal setting" (Acar, 2019, p. 138), the implied benefits of the personalization principle might have been reduced.

5.2.2 Discussion of the role of the voice principle. As the findings of this study indicate that the use of high social cues did not have an overall effect on the achievement of EAP learners, it is essential to explore the reasons for the inconsistency with Mayer's (2020) findings of the voice principle. The voice principle suggests that

people learn better when a multimedia presentation is displayed with an appealing human voice. Most studies regarding the implementation of this principle focus on the comparison between the use of a human voice and a machine-synthesized voice, and the findings mainly support the assumption that the human voice is more effective in terms of learning (Atkinson et al., 2005; Chiou et al., 2020; Craig & Schroeder, 2019; Mayer & DaPra, 2012; Mayer et al., 2003b), with some exceptions which concluded that modern computer speech could perform similarly or even better than a human voice in some learning outcomes and is as effective as a human voice in some social measures (Craig & Schroeder, 2017; Dincer, 2022; Pi et al., 2022). However, some other studies focus on comparing the use of an appealing human voice and an unappealing human voice (a tone in which the speaker sounds somewhat bored and disinterested). The study by Mayer et al. (2003b) demonstrated that an unattractive human voice might lessen the learner's social response to the message. Additionally, when students perceive the tone as likable, they may perform better in tests (Domagk, 2010), and if the narrator uses an enthusiastic tone of voice, better learning occurs (Liew et al., 2020). Taking the findings mentioned above into consideration during the research design, this study included an appealing human voice with a friendly tone and a varying pitch in the multimedia presentation with high social cues; however, there was no significant effect between the groups in terms of achievement.

The reason why the voice principle did not substantially impact participants' achievement could be linked to the possibility that a less prosodic human voice is considered more desirable for non-native speakers (Davis et al., 2019). Prosodic qualities (internal features of rhythmic pattern that convey a lot of lexical, semantic, syntactic, and discourse information), as described by Akker and Cutler (2003) and Cutler et al. (1997), can be exceedingly difficult for non-native speakers to understand, while they are simple to grasp for native speakers (Vanlancker Sidtis, 2003). Even though the narrator in the multimedia presentation with high social cues was not a native speaker of English, she used prosodic qualities in the speech. These elements might have impeded the comprehension of the content or were discarded by participants, which might be the reasons why the conversational style did not yield any considerable impact.

The narrator's accent might also play a role in the effectiveness of the voice principle. Previous studies indicate that when the words in a multimedia presentation are spoken by a native-accented human voice speaking their native language rather than a foreign-accented human voice or a machine voice, it helps people who are presumed to be native speakers learn more effectively (Atkinson et al., 2005; Mayer et al., 2003b). One study conducted in a Chinese setting by Ngoc (2014) examined whether the accent of the narrator in a multimedia presentation impacted the achievement and attitudes toward the narrator and found that participants had significantly more positive attitudes toward the narrator with an American English accent compared to the narrator who spoke English with a Chinese accent. Although there was no significant difference between the accent groups in terms of learning, and the foreign accent did not cause extraneous cognitive load, the findings showed that students favored the native speaker in the multimedia environment. In this current study, the narrator was a native Turkish speaker. Although her accent was close to the native American accent, it is possible that the foreign elements in her accent might have affected the participants' attitudes.

5.3 Conclusions

In conclusion, this research aimed to determine whether the use of high social cues (conversational speaking style, polite wording, and an appealing human voice) in a multimedia presentation affected students' performances on how to write a response paper in an EAP setting. According to research on the personalization principle, using informal language rather than formal language in a multimedia presentation produces better learning outcomes because it gives learners a sense of social presence and encourages them to use deep cognitive processing to understand what the narrator is saying (Mayer, 2005b; Mayer et al., 2004; Moreno & Mayer, 2000). The voice principle suggests that learning becomes more effective when words are delivered in a pleasing human voice during multimedia presentations (Domagk, 2010; Mayer, 2020; Mayer et al., 2003b). In this study, the findings from the pretest and posttest showed that the use of high social cues (conversational speaking, polite wording, and an appealing human voice) did not significantly affect the learners' achievement,

although both groups had increased performances. These findings are consistent with previous studies (Brom et al., 2014; Kurt, 2011; Park, 2015). The primary reason why the personalization and voice principles did not bring any substantial change in the learning process of the students could be linked to the foreign language learning environment this study was conducted in. According to the literature, foreign language learning environments are considered boundary conditions for the personalization principle (McLaren et al., 2006) and the voice principle (Davis et al., 2019). In this context, the use of English as L2 might have been an obstacle for students as it might be difficult for language learners to grasp the language elements and social cues that are deemed inherent for native speakers. The students in this study might not have recognized direct speech, polite language use, and the narration's prosodic elements. Another major factor contributing to this study's findings could be that the research took place in a Turkish educational setting where the use of formal language is usually perceived as the appropriate form of instructional delivery. In this case, it is possible that the students who received the multimedia presentation with high social cues did not view the personalized messages as encouraging and motivating. Moreover, the conversational messages and the foreign accent used in the narration were probably distracting for students. When all the factors are considered, it can be said that the effects of the personalization and voice principles in EAP settings are not certain even though these principles were well received by students in terms of interest and motivation in previous studies (Brom et al., 2014; Ginns et al., 2013; Kurt, 2011; Park, 2015; Reichelt et al., 2014; Rey & Steib, 2013; Schrader et al., 2018; Zander et al., 2015). It is evident that the literature is inadequate in terms of the use of personalization and voice principles in foreign language learning environments, and this gap can be filled through systematic analyses in diverse contexts with different learner profiles.

5.4 Recommendations

5.4.1 Recommendations for practitioners. This study helped to establish the limits of the personalization and voice principles' (Mayer, 2020) generalizability by incorporating a conversational speaking style, polite wording, and an appealing voice.

According to the personalization principle, deeper learning occurs when a conversational style is preferred over a formal one. In addition, the voice principle suggests that learners benefit more from an appealing human voice (a speech from a native narrator with a balanced amount of prosodic elements) than a machine-synthesized voice or an unappealing human voice (a speech from a non-native speaker and/or a monotonous tone of voice) (Atkinson et al., 2005; Davis et al., 2019; Mayer, 2020; Mayer & DaPra, 2012; Mayer et al., 2003b; Ngoc, 2014). Although the personalization and voice principles were implemented for the participants in this study, the achievement test did not indicate any significant improvement in overall learning. The experimental and the control groups learned better with the multimedia presentations, yet, there is no significant difference when the two groups are compared.

The findings of this study can guide instructional designers in choosing the appropriate register for multimedia instruction in EAP settings. When deciding whether to use a conversational or formal speaking style, instructional designers should consider the learners' profile and the cultural context. If the majority of the learners perceive the instructor as an authority figure, a formal register with a neutral tone of voice may be more appropriate. However, it should be noted that neither the conversational nor formal style resulted in better overall learning for EAP learners, based on the findings of this study.

Using a conversational speaking style, polite wording, and an appealing voice did not differentially affect the participants' learning. However, comparing the pretest and posttest scores of each group revealed that participants in both groups scored significantly better in the posttest, which supports the longstanding advice to instructional designers and educators that they should utilize a variety of design elements and include design considerations in multimedia tutorials to enhance users' learning. Furthermore, as previous studies suggest, learners might be more motivated to learn from the multimedia materials that incorporate personalized messages (Brom et al., 2014; Ginns et al., 2013; Kurt, 2011; Park, 2015; Reichelt et al., 2014; Rey & Steib, 2013; Schrader et al., 2018; Zander et al., 2015). Therefore, it is suggested that

instructional designers and practitioners may consider adding personalized elements to multimedia tutorials to increase interest in students.

5.4.2 Recommendations for researchers. This study investigated the effects of the use of high and low social cues in multimedia learning in an EAP context with multicultural participants at a private university in Turkey. The findings of this study indicated that the use of conversational speaking, polite wording, and an appealing voice in a multimedia lesson did not significantly impact the students' performances. In future studies, it is suggested that the personalization and voice principles be investigated in various language learning settings so that the boundary conditions can be tested and a universal framework can be created to theorize the principles.

A key recommendation for future researchers could be to comply with the coherence principle, which suggests that the extraneous components should be eliminated to activate cognitive processing. In this study, the multimedia presentation was designed based on the coherence principle to maximize the impact and avoid irrelevant components. However, personalized messages can also be regarded as extraneous elements and could distract the students (Brom et al., 2014). Therefore, future studies can measure the potential cognitive overload of personalized messages in language learning environments. It is also suggested that researchers should ensure that the multimedia presentation does not include additional irrelevant and unneeded components. Secondly, this study took place in a Turkish setting where learners tend to perceive their instructor as an authoritative figure and, therefore, might prefer a formal register. In order to test the effectiveness of the personalization principle, it might be helpful if future studies are conducted in different cultures and settings. While conducting the studies, cultural aspects of the language should also be considered, and the register should be carefully examined in order to ensure that students recognize the polite wording used in the multimedia presentation. As one of the boundary conditions for the language learning settings is the fact that learners may not be aware of all of the linguistic elements in a foreign language (McLaren et al., 2006), more research is necessary for the impact of using social cues on beginner, intermediate and advanced level language learners.

Furthermore, as also indicated by Mayer (2020), there is a need for additional research on whether being experienced working with online tutors plays a role in the success of the personalization principle. In this study, the data for whether the students were experienced was not collected. Therefore, in future studies, this variable can also be considered. Lastly, there is a growing body of evidence that personalized messages increase the motivation and interest levels of students (Brom et al., 2014; Ginns et al., 2013; Kurt, 2011; Park, 2015; Reichelt et al., 2014; Rey & Steib, 2013; Schrader et al., 2018; Zander et al., 2015). To further reinforce this argument, future studies might incorporate motivational and attitudinal scales to investigate the effects of personalized messages in EAP settings.

In terms of the implementation of the voice principle, the role of prosodic qualities in narrations within language learning contexts should be further investigated. Although Davis et al. (2019) concluded that human voice with weak prosodic qualities scored higher in their measured subscales when compared to human voice with strong prosodic qualities, it is necessary to examine whether retention rates and other learning outcomes are influenced by these elements, especially in language learning environments.

Moreover, current studies demonstrate that students prefer a native accent over a foreign accent (Ngoc, 2014). In this study, despite being native-like, the narrator was not a native English speaker; therefore, it is possible that the narration did not influence the students' performance as indicated in the literature. This is why future researchers may consider conducting their studies by focusing on the comparison between a native speaker and a foreign-accented speaker.

Another recommendation is that experiments can be extended over time and repeated multiple times to evaluate the retention rate and better understand whether students learn from multimedia presentations with high social cues. The treatment in this study was done only once; therefore, the findings might not provide conclusive evidence. In addition, the question set to be used for the pre and posttests can include a variety of question types (i.e., open-ended questions) rather than multiple-choice questions so that better analysis can be done to evaluate whether effective learning was

achieved or not. Lastly, to measure the role of several variables mentioned above, interviews can be conducted with participants to gain better insight into the findings.

All in all, it can be said that the effects of the personalization and voice principles are based on several variables, and further studies need to be conducted to make certain generalizations. However, it is worth noting that instructional designers and instructors can design materials to foster learning by considering these principles' benefits and boundary conditions. The findings of this study and the recommendations were presented to pave the way for educationalists to collaborate and improve student learning.

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