



INTERDISCIPLINARY APPROACH IN PRIMARY EDUCATION: ANIMATED FILMS AS A TOOL FOR CROSS-CULTURAL AWARENESS

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Abstract/Izvleček

The paper presents results from a study exploring the effectiveness of animated films in primary education for enhancing cross-cultural awareness. The study examined how animated films can broaden young learners' perspectives on diverse cultural practices, values, and traditions, and identified factors that affect information processing in complex, cross-cultural contexts. Using triangulation, data were gathered and analysed from twenty primary students (ages 8-11). The study employed Tobii Pro Glasses 3 for eye-tracking, supplemented by a questionnaire to support the eye-tracking findings. Analysis revealed that integrating culture-specific concepts from animated films can effectively enhance cross-cultural awareness in interdisciplinary education.

Interdisciplinarni pristop v osnovnem izobraževanju: animirano Filmi kot orodje za medkulturno ozaveščanje

V prispevku predstavljamo rezultate študije o učinkovitosti animiranih filmov v osnovnošolskem izobraževanju za krepitev medkulturne zavesti. Preučevali smo, kako lahko animirani filmi razširijo perspektive mladih učencev na različne kulturne prakse, vrednote in tradicije, ter identificirali dejavnike, ki vplivajo na obdelavo informacij v zapletenih medkulturnih kontekstih. S triangulacijo smo zbrali in analizirali podatke 20 osnovnošolcev (starih 8–11 let). V študiji smo za sledenje očem uporabljali očala Tobii Pro Glasses 3, dopolnjena z vprašalnikom za podporo ugotovitvam sledenja očem. Analiza je pokazala, da lahko vključevanje kulturnospecifičnih konceptov iz animiranih filmov učinkovito poveča medkulturno zavest v interdisciplinarnem izobraževanju.

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Introduction

The interdisciplinary approach in education aligns closely with the goal of fostering cross-cultural awareness, as both aim to broaden understanding and promote collaboration across diverse fields and cultural contexts. By merging insights from distinct disciplines, individuals can develop a deeper appreciation for cultural diversity, which is essential for addressing complex global challenges and succeeding in a multicultural world.

Considering the evidence presented by Lenoir (2023), Reić and Kovačević (2023), and Rekha (2022), it is imperative for educational systems to actively promote the integration of interdisciplinary learning to better equip students with essential skills for lifelong adaptability, while addressing the structural limitations identified by Didham et al. (2024) and Roth et al. (2023) that currently hinder this integration.

Moreover, researchers worldwide have explored various tools and methodologies in multidisciplinary education, with a particular emphasis on the role of animated films in primary education. This highlights the potential of animated films as a valuable resource for enhancing interdisciplinary learning, thereby facilitating a more engaging and effective educational experience for young learners. In their study on early intentional bilingualism Kayadibli-Oğuz and Çamlıbel-Acar (2024) investigated language exposure through cartoons, Vereş and Magdaş (2020) reviewed the use of the educational animated film in primary education in Romania; Kozjek and Duh (2017) studied cross-curricular integration with the example of implementation of contemporary art in the eighth grade of primary school; Kenna and Waters (2017) discussed teaching geography through an animated lens; Żebrowski (2017) analysed the educational potential of animated films in Poland, and Mithans and Brumen (2011) examined language and intercultural education at the classroom level in primary education.

On the one hand, existing studies highlight the importance of cross-curricular integration; on the other hand, they indicate a need not only to evaluate how multimodal education supports both cross-curricular and cross-cultural understanding but also to identify the factors that affect information processing efficiency among primary education learners.

The role of multimodal education in cross-cultural understanding

Since the early 2000s, multimodality has increasingly gained attention across various disciplines that explore meaning, text, and communication. Multimodality is defined from one of two perspectives: it can refer to the presence of multiple modes within a specific context or to the process of interpreting these coexisting modes from the perspective of a viewer or reader. In multimodal studies, the term “mode” is sometimes also associated with physiological or sensory channels, such as sight (visual mode), hearing (auditory mode), touch (tactile mode), smell (olfactory mode), and taste (gustatory mode) (Tuominen et al., 2018).

Šrot et al. (2023), and Aden and Theodotou (2019) investigated the advantages of multimodal teaching and learning in primary education. Li et al. (2022) and Cárcamo et al. (2016) highlighted the benefits of multimodal approaches to vocabulary teaching, showing that students who received multimodal instruction not only retained more vocabulary but also forgot words at a slower rate.

In addition, in her pilot study on teaching culture and developing cultural diversity awareness and intercultural communicative competence in schools with English as the medium of instruction, Ger (2022, 106) claims that when discussing the teaching of culture in language education, it is essential to define the different aspects of culture. This scholar refers to different practitioners and researchers who reported that some language teachers associate culture with “history, geography, literary works, or works of art” (2022, 111). In other words, this refers to examples of using culture-bound elements in the classroom to promote cross-cultural awareness and support foreign language acquisition.

The delineation of culture-bound elements

There are differing definitions related to culture-bound elements. The first one is known as “Culture-specific references” (further CSRs) - elements within a text, film, or other media that are deeply rooted in the cultural context of a particular society. Researchers largely agree that these references often rely on shared knowledge, history, traditions, and social norms that are specific to that culture. They can include historical events and figures, idioms and proverbs, popular culture, customs, and traditions, and cultural humour.

The second widespread classification of culture-bound elements is referred to as “Culture-Specific Items” (further CSIs). These items encompass tangible and often

concrete objects, concepts, or phenomena that are unique to a particular culture. CSIs may include material aspects such as food and drink, clothing, architecture, currency, traditional tools, and religious or ritual artifacts.

In contrast, Culture-Specific References (CSRs) pertain to historical events, notable figures, idioms, customs, or popular symbols that, while lacking a physical form, carry significant cultural meaning. CSRs focus more on the abstract and contextual elements inherent to a culture. Thus, while CSIs represent tangible objects or concepts that are culturally specific, CSRs emphasize the intangible aspects that define cultural identity. Both CSIs and CSRs are crucial in conveying the unique attributes of a culture; however, they differ in their nature and the ways in which they are perceived or translated across cultural boundaries.

Discussing CSIs, Newmark suggests the following categorisation of Culture-specific words: *ecology*; *public life*; *social life*; *personal life*; *customs and pursuits*; and *private passions* (Newmark, 2010). According to Newmark, the category of *ecology* encompasses CSIs referring to the geological and geographical environment, e. g., ecological and geographical environment such as hills, sea, mountains, cities, and states, etc. The category of *Personal life* includes “food, clothing and housing.” *Customs and pursuits* includes body language, hobbies, sports, and the related national idioms, such as gestures, postures, and facial expressions specific to cultures, bungee-jumping, trekking, jogging, wrestling, football, soccer, etc. *Public life* refers to politics, law, or governmental patterns, e. g., political parties, liberal or socialist governments, specific laws like no chewing gum on streets, etc. *Social life* encompasses “economy, occupations, social welfare, health and education.” *Private passions* refer to religion, music, poetry, and their different social organisations, e. g., Buddhism, Taoism, reggae, folk songs with their titles, Shakespeare’s sonnets, etc. (Newmark, 2010).

Meanwhile Díaz-Cintas and Remael (2020) offer the following division of CSRs: (1) *Geographical references*: to certain phenomena; to physical, general locations; to physical, unique locations; to endemic animals and plant species; (2). *Ethnographic references*: to food and drinks; to objects from daily life; to work; to art, media and culture; to groups; to weight and measures; to brand names and personal names; (3) *Socio-political references*: to administrative or territorial units; to institutions and functions; to socio-cultural life; to military institutions and objects; to personal names and institutional names.

Ultimately, since language and culture are intertwined, and they cannot exist without

each other as languages represent cultural elements and shape culture itself, it is important to explore how new concepts are learned and to measure the cognitive demands on individuals when they encounter unfamiliar cultural elements.

Methodology

This experiment followed a previous study by Huber and Kairys (2021), which investigated issues of CSIs and cultural equivalence in translated animated films. One of the mixed methods employed in that research was a qualitative survey method, which tested the translation preferences of two groups: adolescents (15- to 16-year-old students) and adults (including teachers of various subjects), with a total of 455 respondents. The study found that adults preferred films where culture-bound elements were adapted to their own culture, while adolescents were more open to the source culture and did not clearly favour content adaptations. Based on these findings, the author of the current study created a multimodal corpus of five animated films aiming to assess how primary school learners understand culture-bound elements and to measure their cognitive load in cross-cultural awareness when viewing both subtitled and dubbed excerpts containing CSIs.

Multimodal corpus

The corpus included the following American animated material: animated comedy-drama film *Ratatouille* (2007), an animated superhero comedy film *Megamind* (2010), the animated science fiction comedy film *Mr. Peabody & Sherman* (2014) and an American animated coming-of-age fantasy film *Luca* (2021). The selection of excerpts from these films was based on the following criteria: multidisciplinary elements, representation of culture and examples of diverse and distinctive cultures through culture-specific items (CSIs) and culture-specific references (CSRs).

Aim and Objectives

The *Aim* of the research was to explore the effectiveness of using animated films as a tool in primary education for enhancing cross-cultural awareness among primary school learners.

Specific objectives:

- to assess how animated films can broaden young learners' perspectives on diverse cultural practices, values, and traditions;

- to investigate how primary school children learn cross-cultural concepts and foreign words by analysing their eye movements in response to visual and textual stimuli, and identify the factors that influence the efficiency of their information processing, particularly in complex cross-cultural contexts;
- to determine young learners' learning preferences: learning acquiring cross cultural awareness through single-modal vs multimodal interventions.

Methods

In this study, triangulation was used, which involves employing at least two different research methods to gather and analyse data within the same study. The experiment was conducted utilizing the Tobii Pro Glasses 3 eye-tracking device. A questionnaire was administered to corroborate the eye-tracking findings, and an analysis was conducted to investigate how primary school learners perceive culture-specific elements that were incorporated in animated films.

A supposition was made that this eye-tracking experiment would provide valuable insights into how children learn cross-cultural concepts and/or foreign words by tracking their eye movements as they interacted with visual and textual stimuli. Additionally, it was assumed that this would provide understanding of how efficiently they process information and identify which elements might cause distraction or confusion, particularly in intricate cross-cultural settings.

Study participants and instruments

The participants were twenty primary school students, younger learners from one of the schools in Lithuania, where primary education pedagogy is combined with advanced foreign language instruction.

The instruments included *Prepared excerpts*; an *Eye-Tracking Device* and *Questionnaires*.

Sixteen video excerpts were prepared in total, comprising eight dubbed and eight subtitled clips—two from each selected animated film. The length of the excerpts varied from 18 to 46 seconds. Twenty primary school learners participated in the study, with 16% aged 8-9 years and 84% aged 10-11 years. Fifteen (15) participants were native Lithuanian speakers; seventeen (17) participants were able to communicate in English on a lower intermediate or mid-intermediate level, and five (5) participants were native speakers of either German, Ukrainian, Italian, or Spanish.

An assumption was raised that subtitled episodes would require extra cognitive effort and divert the viewer's visual attention away from the moving image but also

would encourage revisits, especially in cases of culture-bound elements. Meanwhile in the case of dubbed excerpts, the research participants would make shorter or fewer revisits, since the source text would be muted and culture-specific elements localized in the target language.

To ensure that the respondents understood the questions they agreed to answer after the experiment, a historical or visual representation was included as a supplement to the questionnaire.

Eye-tracking software was used to collect data on younger learners' gaze location and duration. Eye-tracking utilized two primary eye-tracking metrics — fixations and visits (revisits) — to evaluate younger viewer's understanding of culture-specific items and culture-specific references in animated films. All information was collected by means of an initial questionnaire comprising fifteen (15) closed and five (5) open questions, designed to be answered by the younger viewers.

Culture-specific items traced in the corpus

Ratatouille (2007) tells the story of Remy, a rat with an extraordinary sense of taste and smell, who partners with Linguini, an inexperienced kitchen worker, to pursue their shared passion for cooking in a renowned Parisian restaurant. The title of the film itself is a reference to a classic French dish, *ratatouille*, a vegetable stew from Provence. The film features numerous iconic Parisian landmarks, including the Eiffel Tower, Notre-Dame Cathedral, and the Seine River. These visuals establish a keen sense of place, highlighting the romanticized view of Paris as a center of art, culture, and cuisine. Many of the characters have distinctly French names, such as Remy, Linguini, Colette, and Gusteau. The film occasionally uses French phrases and accents, particularly with the character of Chef Skinner, who embodies many stereotypes of a fiery, temperamental French chef. The character of Gusteau is inspired by real-life French chefs like Auguste Escoffier, who is often considered the father of modern French cuisine. Anton Ego's character is a reference to the stereotypical French food critic—sharp, discerning, and feared in the culinary world. His name, “Ego,” plays on the idea of a critic's ego influencing their judgments, a common trope in both real and fictional depictions of critics. The film highlights various classic French cooking techniques and ingredients, such as making sauces, preparing vegetables, and the importance of fresh, high-quality ingredients. The meticulous attention to detail in the kitchen scenes reflects the reverence for culinary traditions in France.

The scene where Anton Ego tastes the ratatouille and is transported back to his childhood is a hinted allusion to the *madeleine* of Proust, from Marcel Proust's novel *In Search of Lost Time*. It refers to the way certain tastes and smells can evoke powerful memories, a deeply French concept.

Megamind (2010) follows the adventures of a super-intelligent alien supervillain named Megamind. The film is action-packed, infused with humour, and carries major themes such as battling evil, transforming villains into positive figures, and looking out for one another. The character Metro Man is a direct reference to Superman. His powers, origin story (sent to Earth as a baby from another planet), and even his disguise as a mild-mannered civilian all parody classic Superman lore. The film features iconic rock songs such as by AC/DC, Guns N' Roses, and Ozzy Osbourne. Megamind's frequent use of the word "Presentation!" when unveiling his plans is a playful nod to the theatricality and melodrama often associated with villain monologues in pop culture. The selection of culture-specific items (CSIs) for analysis was guided by the film's interesting names, nicknames, place names, and a range of common expressions, including slang.

In the animated film *Mr. Peabody & Sherman* (2014), culture-bound elements include historical figures, events, idiomatic expressions, or cultural practices that are integral to the storyline but may require localization or explanation when presented to an international audience. The plot often revolves around correcting historical events that have been disrupted, a common trope in time travel fiction. Mr. Peabody's character is consistent with his portrayal in the original series as a hyper-intelligent, polymath dog who excels in various fields. The name "Sherman" is a subtle reference to General William Tecumseh Sherman, a Civil War general, linking the character to American history. Mr. Peabody and Sherman visit Leonardo da Vinci's studio, where they encounter the artist working on the Mona Lisa. The scene humorously portrays da Vinci as struggling to get Lisa to smile, referencing the famous painting's enigmatic expression. The duo interacts with George Washington during the American Revolutionary War, a playful hint at the importance of this historical figure in American history. The movie references Einstein and his theory of relativity, humorously using it to explain time travel and other scientific concepts. Peabody and Sherman participate in the events of the Trojan War, including the famous story of the Trojan Horse. The film references these well-known myths while adding its own comic twist. The Greek hero Agamemnon is portrayed in a comical light, playing on the tropes of ancient warriors as depicted in epic literature and modern adaptations.

The time machine in the film, the “WABAC,” is a play on the word “Wayback,” referencing both the idea of going back in time and the original spelling used in the 1960s TV show.

Luca (2021) is set on the Italian Riviera in 1959. The film follows Luca Paguro (Tremblay), a young sea monster boy who can transform into a human while on land. Alongside his new best friends, Alberto Scorfano (Grazer) and Giulia Marcovaldo (Berman), he embarks on a life-changing summer adventure in the town of Portorosso, which is inspired by the real-life coastal villages of the Italian Riviera, particularly the Cinque Terre region. The narrow streets, colourful houses, and picturesque landscapes reflect the traditional architecture and scenery of these Italian fishing villages. *Luca* is rich with cultural references that are deeply rooted in Italian culture, as well as broader European and global influences. Characters frequently use Italian phrases and expressions, food, religious imagery, such as statues of saints in homes and public spaces, reflecting the deep-rooted Catholic influence in Italy. The characters’ obsession with “Vespa” scooters is a nod to the iconic status of the Vespa in Italian culture. The cat in the movie is named Machiavelli, after the famous Italian Renaissance political philosopher Niccolò Machiavelli, author of *The Prince*. Giulia Marcovaldo points to a famous book by Italo Calvino, *Marcovaldo*, which features stories about a man living in a big city—an allusion to the juxtaposition of city and rural life. The film makes a subtle allusion to *Pinocchio*, the classic Italian tale by Carlo Collodi. The soundtrack includes classic Italian songs that add an authentic Italian flavour to the film, connecting it to the country’s rich musical heritage.

The films selected for the corpus yielded the following culture-specific items, with the statistics of the types displayed in Figure 1 below:

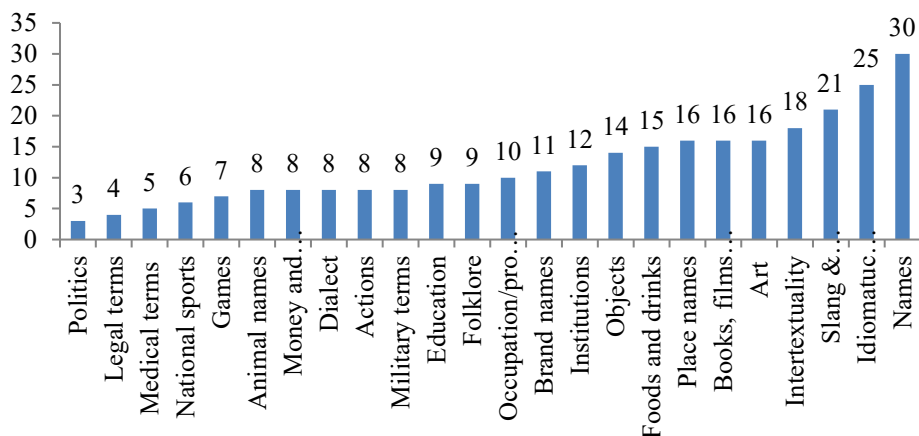


Figure 1

Types of CSIs found in Ratatouille (2007), Megamind (2010), Mr. Peabody & Sherman (2014) and Luca (2021)

Source: created by the author, L. H.

Results and discussion

The results of the study were grouped in accordance with the objectives raised.

- (1) *To assess how animated films can broaden young learners' perspectives on diverse cultural practices, values, and traditions.*

The responses obtained from the research participants indicate that 85% of the primary school students learned one of the following culture-specific items: new concepts, cultural practices, values, and traditions.

Meanwhile 15% of the respondents recognized one of the culture-bound references, such as brand names, foods, games, manners and others that were familiar to the younger viewers. These included "Jean Paul Gaultier's Pour Homme," "Easter bunny," "A yin with no yang" noticed in *Megamind*; "the Eiffel Tower" and "Notre-Dame Cathedral" shown in *Ratatouille*; "Leonardo da Vinci and The Mona Lisa, King Tutankhamun, and Albert Einstein depicted in *Mr. Peabody & Sherman*, and "Trenette al pesto," and the iconic "Vespa" scooter in *Luca*.

The results of the study also revealed how well children connect language learning with cultural understanding. When younger learners focused on cultural icons or language-specific contexts within images or text, the data obtained suggests they

were linking language with its cultural context, an essential aspect of deep learning in both areas. The responses to the questions they were asked to provide after the experiment indicate that the young learners were able to recognize some culture-bound elements that are deeply rooted in Italy and France. This may account for their knowledge of European landmarks. Meanwhile, the biggest difficulties occurred with recognizing the American values and culture-bound elements in *Megamind*. When asked to name one word the respondents remembered, it was "Presentation." In addition, the young learners indicated that they had previously heard the songs/melodies played in the films, though unable to name them. These results imply that the young learners from Lithuania are likely to be more familiar with European languages, art, holidays, and traditions because of travel, media, and the shared cultural context of Europe. In the cases where the audio track from *Megamind* was played, three participants noted that they recognized the music but could not identify its source or recall additional details about the soundtrack. However, their responses suggest that they had likely watched the film previously with parents or family members, who may have discussed certain aspects to help the young learners understand its meaning.

- (2) *To investigate how children learn cross-cultural concepts and foreign words by analysing their eye movements in response to visual and textual stimuli and identify the factors that influence the efficiency of their information processing, particularly in complex cross-cultural contexts.*

The results obtained during the eye-tracking experiment indicated a shorter gaze because of the knowledge of foreign language(s) and/or culture-specific expression(s). In addition, in these cases the answers on the questionnaires revealed that the concept was well known to the research participant from other media or educational content.

In other instances when cultural transfer was achieved in dubbed versions of the selected material, revisits, or repeated fixation on areas of interest likewise occurred. The responses signified that those revisits or repeated fixations contributed to a deeper understanding of the concept and enhanced information retention.

It was noted that subtitles can be beneficial for viewers who are learning the language in which the film is originally spoken. Reading subtitles while listening to the original dialogue helped reinforce language skills and improve vocabulary, even though it required the ability to read quickly and simultaneously follow the visuals, which was harder for younger viewers or those with lower reading skills. Younger viewers aged 8-9 years showed a preference for dubbing with localized translation, as they noted

that they did not have an attention span adequate to follow subtitles. In addition, the answers received from the same age group pointed out that by introducing adapted references that are relevant in a local context, audiences can become more aware of similar concepts or references in other cultures. This led to a broader understanding of and curiosity about the source material and its original context. Thus, localized translation bridged cultural gaps by presenting foreign concepts in a familiar context. Eye-tracking data indicated that all participants noticed Areas of Interest (AOIs). The average fixation duration of participants on AOI that was connected to an unknown CSI was the longest, at 3.5 milliseconds. The number of visits to the first AOI on CSI ranged from 1 to 3, with an average fixation duration of 2.5 milliseconds. In cases of manners and the way of speaking, including episodes when the characters spoke dialect, although the character, such as the food critic Anton Ego or Saucier was visible on the screen for only two seconds, participants focused on it for nearly the entire duration it was displayed. This likely accounts for the low number of visits but a relatively high average fixation duration. Three participants were able to describe the role of the Saucier, but none could correctly name it, indicating partial understanding without full recognition.

In the example from *Luca* with *Trenette al pesto* served on the table, participants' gazes were initially scattered. Some were looking at the dish, others directed attention to the faces. Meanwhile in the episode with the father cooking the dish, the average fixation duration for *trenette al pesto* in a bowl was 2.27 milliseconds, with an average of six visits. In comparison, *trenette al pesto* in the father's hand had an average fixation duration of 1.34 milliseconds, with an average of three visits. This data indicates that participants not only noticed AOIs but also engaged with them sufficiently to remember the appearance of the dish. When young learners encountered unfamiliar or confusing concepts, they tended to have longer fixation times when compared to familiar concepts. Multiple revisits occurred when unfamiliar concepts were shown. The answers received via questionnaires indicate that young learners were trying to make sense of the information. Thus, repeated glances accounted for effortful processing of the content.

The responses obtained from participants in the experiment confirmed that visual and textual stimuli directly influenced their understanding of culture-specific items.

- (3) *To determine young learners' learning preferences: learning acquiring cross cultural awareness through single-modal vs multimodal interventions.*

When speaking about the young learners' preferences, 99% of the respondents expressed a preference for multimodal interventions. 15% of the respondents indicated that some culture-bound concepts were known to them, since they had been introduced to them during lessons in English, history, world awareness, science, art or geography through single-modal interventions (visual aids, audio recordings, or reading and writing activities) and the use of multimodality when gaining cross-cultural understanding, enhanced overall comprehension. Younger learners relied heavily on visual elements (pictures, colours and the manner of speaking) when trying to understand new culture-bound concepts.

The results received from the experiment align with Kenna and Waters' (2017) belief that incorporating animated films into teaching curricula offers numerous benefits, as they promote a deeper, more detailed, and lasting understanding of the subject matter.

These findings also corroborate the outcomes of the study by Bergh and Beelders (2023) where the researchers concluded that the image assists in integration and understanding of the word text for unfamiliar or new concepts when it is done multimodally via colour and movement.

The eye-tracking data and questionnaire responses revealed that, while the visual elements were engaging, some unfamiliar terms and concepts in the dubbed excerpts were not always clear, even after localization. For example, the phrase "nursing school" in the sentence "So I borrowed a prop from a nearby nursing school" was localized as "medicinos mokykla" and translated back as "I borrowed skeletons from medical school."

Other examples include: "Yin-yang," which was retained in the localized version from *Megamind*; "Saucier," which was preserved in translation but sometimes localized as "sous šefas," back-translated as "sous chef;" "Goat cheese" referred to as "Tomme de Chèvre" in *Ratatouille*; "Old geezer", which alludes to Giza but was localized as "O galbūt aš tiesiog senas kvailys," translating back to "Or maybe I'm just an old fool" in *Mr. Peabody & Sherman*; and "Trenette al pesto" from *Luca* was preserved in the dubbed version as "I made your favourite – trenette al pesto."

In the given case *young learners' learning preferences* were expressed in the answers of the questionnaire, e. g., "I would not have understood what was referred to without the visual information," "I saw the doughnut Megamind was holding but would not have been able to understand 'yin with no yang' without the visual information."

Overall, the study results highlight that animated films are a valuable tool for fostering global sensitivity in primary education. They engage students both visually and emotionally, making complex cultural concepts more accessible and relatable. The findings of this experiment validate Kenna and Waters' (2017) conclusion and recommendations that as today's students grow up in a media-rich environment, teachers should deliberately offer them opportunities to critically engage with visual media.

Conclusion

The analysis indicates that incorporating culture-specific concepts from animated films significantly enhances cross-cultural awareness within interdisciplinary education. Specifically, the findings confirm that such integration enriches curricula by connecting language learning with cultural studies, art, media literacy, and social-emotional development. This holistic approach not only fosters a deeper understanding of diverse cultures.

This eye-tracking experiment explored how children learn cross-cultural concepts by monitoring their focus on various elements within animated films. By analysing where and for how long children direct their attention, valuable insights into their comprehension, learning strategies, and the interplay between language and culture were obtained. Additionally, eye-tracking techniques revealed how young learners interpreted social cues, such as facial expressions and gestures.

The experiment confirms that eye-tracking helps identify individual differences in how students process information and where they direct their attention, which can be used to develop personalized learning approaches.

These findings can inform the creation of more effective educational materials and strategies tailored to the needs of young learners, thereby enhancing their ability to understand and appreciate culture-bound concepts and cross-cultural diversity.

Ultimately, taking into consideration the fact that classrooms have become increasingly diverse in terms of culture, language, and learning abilities, understanding how to effectively teach all students is essential, and future research could be directed at content accessibility, inclusion, and diversity in primary education.

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