

FILM LITERACY X SCIENTIFIC LITERACY INTRODUCING SCIENCE-BASED VIDEO ESSAYS TO EXPLORE FILM DESIGN IN ENGLISH LANGUAGE EDUCATION

Film literacy befähigt Lernende, sich eigenständig und kritisch mit Filmen in englischer Sprache auseinanderzusetzen. Forschungsergebnisse zeigen jedoch, dass Schüler*innen Schwierigkeiten haben, Filme als bewusst gestaltete Medienprodukte zu erkennen, die Fakten verzerren können. Um dieser Herausforderung im Englischunterricht zu begegnen, stellen wir einen Unterrichtsvorschlag vor, der *film literacy* mit *scientific literacy* verknüpft. Wir möchten damit Lernende befähigen, zu untersuchen, wie komplexe Themen in Filmen aus einer evidenzbasierten Perspektive dargestellt werden. Wir veranschaulichen diesen Ansatz anhand der Animationsfilme *Inside Out* (dt. Alles steht Kopf) und *Inside Out 2* (dt. Alles steht Kopf 2), welche die Komplexität von Emotionen in Kindheit und Jugend thematisieren. Im Unterrichtsvorschlag analysieren und produzieren die Lernenden wissenschaftlich fundierte Videoessays und werden so zu aktiven Teilnehmenden wissenschaftlicher Diskurse.

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Films in English language education: A short review

Research over the past decade has shown that films and online videos have become an integral part of adolescents' media consumption in Europe (most recently Külling-Knecht et al., 2024; mpfs, 2025). What is more, streaming services such as Netflix and Amazon Prime, as well as on-line video platforms like YouTube provide a major part of their content in English. Already in grade 6, 44 % of learners in Germany watch films in English; this number increases to 68 % in grades 8 and 10 (Leonhardt, 2024, p. 280). Consequently, English language education must equip learners with *film literacy*, i.e., the ability to autonomously and critically engage with English-language films. 'Critically' thereby refers to the ability to analyse films as cultural artefacts and their deliberate narrative and aesthetic design (Leonhardt, 2024; cf. also Viebrock, 2016b).

Publications on *film literacy* in English language education have so far focused

on developing competence models from a conceptual perspective and on creating practical teaching approaches (Blell et al., 2016; Henseler et al., 2011; Viebrock, 2016a). Only more recently, empirical research on *film literacy* has gained attention, yielding valuable insights into both teachers' perceptions and use of films as well as students' abilities to engage with films. Most notably, Paran and Duncan (2018) show that teachers are aware of the potentials of films for teaching literature in language education; however, teachers seem to focus more on the narrative level of films and less on their specific design elements such as camera work and editing. Bakken (2016) notes that many teachers tend to use films as truthful representations of history, people, and culture. These findings can further be substantiated by looking at the *film literacy* of secondary school learners, as researched by Leonhardt (2024) in a large-scale mixed-methods study (n=671). While learners are often able to follow the storyline, they demonstrate lower levels of competence in analysing

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film-aesthetic design. What is more, they often mistake the film narrative for truth, thus not capturing films as consciously produced cultural artefacts.

In this article, we thus aim to connect the objective of *film literacy* with *scientific literacy*, which allows learners to critically scrutinize films from an evidence- and research-based perspective. We will then present a practical teaching approach in which learners contextualise films by viewing and producing a video essay. We elaborate this approach by drawing on two animated films by Pixar, *Inside Out* and *Inside Out 2*, which address emotional development and identity formation from childhood to adolescence, informed by insights from psychological and neuroscientific research.

Film literacy x scientific literacy

Film literacy is defined as the autonomous and critical engagement with films on both a receptive and productive level. Several models of *film literacy*, which largely remain conceptual, define competence areas serving this objective (for an overview of the most influential models, cf. Leonhardt & Römhild, 2026). In the following, we will refer to the model of *film literacy* proposed by Leonhardt (2024) as the first empirically substantiated model. Based on an exploratory factor analysis of test data and an evaluative qualitative content analysis of interview data, Leonhardt (2024) differentiates between several key areas of *film literacy*: First, to understand a film’s story, characters, and setting, learners need *narrative-aesthetic competences*. Second, to understand the specific design elements of a film – including camera angles and movement, music, and lighting –, learners need *film-aesthetic competences*. Learners must also be able to engage with films as cultural artefacts and understand (how) they are produced; Leonhardt (2024) subsumes this as *critical competences*. These competence areas are constantly interacting. Thus, analyses should especially focus on the interplay between narrative and film-aesthetic design. Third, the model

contains *language competences* for understanding language used in films and for discussing films. When analysing film design, students need to acquire correct technical terminology.

When films focus on scientific topics, the notion of *film literacy* can be combined with *scientific literacy*. *Scientific literacy* overlaps with *film literacy* particularly in the domain of critical competences and can support learners in deconstructing films and videos regarding the evidential basis of their representations. While *film literacy* is a concept that stems from English language education, *scientific literacy* is used mainly in the context of Science, Technology, Engineering, and Mathematics (STEM), as well as in science communication. According to Alter (2025, p. 67), who brings together STEM subjects with film-based language teaching, *scientific literacy* refers to “the ability to understand scientific concepts, to critically engage with their media representations, to communicate clearly about science, to act reflectively, and to make informed decisions” (OECD, 2023, p. 40).

When defining *scientific literacy* from the perspective of science communication, however, a few additions are necessary. In the 1980s, *scientific literacy* was mainly conceptualised within a deficit model, assuming that the public lacked an adequate understanding of scientific research. Although this perspective has since been challenged, science communication is still sometimes framed as a process of “knowledge transfer”, particularly in films and videos (Boy et al., 2020), thereby obscuring learners’ active role in meaning-making. More recent publications also point to a paradigm shift towards approaches of



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public engagement with science, which conceptualise non-scientists as partners encouraged to participate in scientific debates (Gantenberg & Jurack, 2024; Schäfer et al., 2020). Hence, promoting *scientific literacy* requires more than analytical deconstruction; learners must be actively engaged in the discourse, participating in discussions, reflections, and productions that allow them to interrogate both the scientific content and the ways it is communicated.

What is more, 'science' in English often refers only to the natural sciences, not the humanities and social sciences. Yet, science communication research emphasises that the humanities and social sciences are essential academic disciplines grounded in systematic inquiry (Gödecke, 2022). Therefore, *scientific literacy* should include all scientific disciplines, as the example used in this article will show. Consequently, this article includes two fields of scientific inquiry: film studies, which allow to deconstruct the design of films and videos, and neuroscience, which allows to critically engage with the key topics of the *Inside Out* films.

Video essays to promote film literacy and scientific literacy

English language education can be seen as a particularly suitable context for engaging with scientific content, as knowledge is frequently communicated and debated through media in English. Whereas Gödecke (in this volume) illustrates the analytic-deconstructive dimension of *scientific literacy* through her analysis of science communication strategies in a mini-series, this article highlights its critical-participative dimension by focusing on the learners' production of video essays.

Video essays are audio-visual texts of limited length that analyse films, cinematic practices, or filmmakers (McWhirter, 2015, p. 370). Typically, video essays are published on interactive and participatory platforms such as YouTube. They are thus characterised by discursivity and audience engagement that is also central

to both *film literacy* and *scientific literacy*. As part of digital fan and popular culture, video essays present a meaningful way of involving learners actively in scientific discourses.

Sendra (2020, p. 69) argues that producing a video essay is an inherently critical activity, which

claims a kind of film education that embraces practice as key to the theoretical enquiry, not so much to prepare aspiring filmmakers for the industry, but to produce reflexive and recursive scholarly work through artistic practice-based research. Criticality results then from a close engagement with and manipulation of the film medium [...].

By incorporating intertextual excerpts from other films or online videos, video essays position their creators within an ongoing critical and evidence-based discourse. Video essays hereby follow a clear argumentative framework, comprising an introduction, a summary of the film under analysis, a critical discussion based on selected scenes and supported by academic theories, and a conclusion or punchline. Thus, video essays enable a dual focus in classroom analysis, addressing both the evidential basis and aesthetic design of a film, and the video essay's own argumentative structure, language use, and aesthetic features (e.g., voice-over, background music).

While video essays have gained popularity in film studies, there is little evidence of their use in English language education so far. The following teaching proposal integrates video essays into film-based English language education, employing the format both as an analytical tool for film reception and as a productive task.

Inside Out – a teaching proposal fostering film literacy and scientific literacy

The target group for the teaching proposal consists of learners at CEFR level B2 and above (grade 11 and older). The proposal is based on two animated

films, *Inside Out* and *Inside Out 2*. *Inside Out* (2015) humorously explores the emotional world of its protagonist Riley during her childhood by personifying her core emotions Joy, Sadness, Anger, Fear, and Disgust. These emotions 'run' Riley's brain, depicted as a headquarter, and guide her thoughts, decisions, and responses. *Inside Out 2* (2024) continues the narrative into Riley's adolescence, introducing new emotions such as Anxiety and Embarrassment. While the films tell a fictional story, their design is rooted in neuroscience, psychology, and emotional theory (Keltner & Ekman, 2015). The films fictionalise how emotions play a central role in shaping perception, memory, and identity. For example, Sadness gradually influences Riley's thinking and memories by colouring her recollections in blue, illustrating how emotional states can shape memories. While the *Inside Out*-films have been praised for their emotional model, a focus on key emotions was necessary to fictionalise emotional theory. The depiction of memories in form of tangible, colour-coded orbs is necessarily simplified (Prost, 2016). To add suspense to the story, emotions are often displayed as more disruptive than research suggests. For example, Sadness is mainly presented as lethargic, whereas research shows sadness to be physiologically activating (Keltner & Ekman, 2015).

The objective of the teaching proposal is for learners to analyse the films from a research perspective (cf. info box 'target task'). The given target task can be accompanied by further pre- and while-viewing activities: To promote engagement with video essays, students can research video essays about their favourite films, analyse them in terms of structure and discourse markers, and compile these in a glossary to serve as a language scaffold for the target task. Additionally, learners can engage with *Inside Out* and sketch the main emotions featured in the film as characters, and speculate about what the film may be about. While-watching, learners can take notes on the story of Riley and her family, the depiction of the emotions in the film in comparison to their presumptions, and the depiction of Riley's brain as a headquarter.

Target task:

Design a video essay discussing the scientific accuracy of the animated film *Inside Out 2*.

Follow these steps:

1) After having watched *Inside Out*, watch this video essay by Nerdwriter1: <https://tinyurl.com/arpmy72>.

- a) Outline the main arguments.
- b) Analyse its key features as a video essay as well as these features' communicative purposes. Use the given analysis grid. You can amend the grid if necessary.

2) Watch *Inside Out 2*. Discuss: What are the key topics of the film that lend themselves to closer scientific analysis in a video essay?

3) Do research on psychological theory to substantiate your video essay. Create a glossary of the most important technical terms that you encounter.

You can start your research here:

- a) This news article in TIME: <https://tinyurl.com/58r58fwx>
- b) This comment in the British Journal of Psychiatry: <https://tinyurl.com/yrysbd25>
- c) This video with Dacher Keltner, scientific consultant to the film: <https://tinyurl.com/yasvtdj3>
- d) This video on Sigmund Freud's theory of psychoanalysis, which was neglected in the depiction of emotions in *Inside Out* according to the video essay you have watched: <https://tinyurl.com/yuxmpc2k>

4) Write a script for your video essay, making visible your main topic of discussion, your argument, and the scenes you want to discuss. Use the technical terms you have noted down earlier.

If you want to learn more about video essay writing, visit this website: <https://tinyurl.com/w5f9u635>

5) Film and edit your video essay.

6) Share your video essays. Based on the analysis grid, give feedback on both strengths and areas for improvement of each video essay.

Based on the given video essay in (1), the learners can discover the science behind the first film and how it has been fictionalised. An analysis grid for science communication texts can be used as a scaffold (cf. teaching taster in this issue). Most prominently, the video visualises abstract concepts – such as emotional theories – and substantiates its claims through intertextual references to scenes from *Inside Out*. The argument unfolds in a clear structure narrated by the editor, and the auditory design is supported by suspenseful background music that sustains attention.

In the following steps (2) to (5), the learners research, plan, film, and produce a video essay on *Inside Out 2*. They typically focus on the emotions during early puberty and how they are represented in the film. Differentiation can be implemented at the level of the product by allowing learners to choose between formats, such as writing a script only or producing an audio essay with voice-over and still images instead of a full video essay. Differentiation can also be offered in terms of content, for example by focusing on a single emotion in early puberty, or, for higher difficulty, by contrasting different psychological models. In addition, collaborative group work with clearly assigned roles, such as researcher, scriptwriter, narrator, or editor, provides further opportunities to accommodate different proficiency levels.

Programs such as *Clipchamp*, *Splice*, *Kinemaster*, or the relatively easy-to-learn editing program *iMovie* for MacOS/iOS

are suitable for editing (cf. also Leonhardt & Viebrock, 2021). As video essays usually make use of original scenes as well as background music, learners should be made aware of potential copyright issues especially if the essays are to be shared online. To reflect on the video essays that have been created in step (6), again the analysis grid for science communication texts can be used: Which strategies detailed in the grid have been used successfully, which ones could be added for an improved video essay?

Final considerations

Depictions of scientific topics in films and videos offer a promising entry point for fostering both *film literacy* and *scientific literacy* in English language education. In this article, a teaching proposal that deconstructs depictions of science in films has consequently been developed. The proposal draws on the films *Inside Out* and *Inside Out 2*. Learners first engage with a video essay on *Inside Out* to analyse the film, then create their own video essay analysing *Inside Out 2* – thus becoming active participants and creators of scientific discourse instead of passive recipients of scientific knowledge.

For implementation in English language classrooms, the proposal furthermore is designed to be adaptable, e.g., by providing more scaffolding on film analysis (for practical suggestions cf. Leonhardt & Viebrock, 2021). We thus encourage teachers to experiment with video essays as a means of integrating *film literacy* and *scientific literacy* in English language education.

While our teaching proposal has not been implemented in class and scientifically evaluated yet, it is based on recent studies into film-based language education. The teaching proposal, connecting *film literacy* with *scientific literacy*, hereby opens up a productive field for future research into film-based English language education, particularly regarding learners' critical engagement with scientific content, and how these competence areas can be promoted in the language classroom.

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