HUMANITIES & EDUCATION

Humanities & Education
2026, Vol. 1, No. 1
DOI: 10.54195/hued.25790

RADBOUD UNIVERSITY PRESS

OPEN ACCESS

Viewing narrative TV to boost your foreign language learning: An exploratory study on using viewing strategies with the digital tool Language Reactor

Sjoerd Lindenburg[123*], Nivja H. de Jong[12], Fred J.J.M. Janssen[1], Aletta G. Dorst[2]

[1]Graduate School of Teaching, Leiden University

[2]Centre for Linguistics, Leiden University

[3]Alberdingk Thijm College, Hilversum, The Netherlands

ABSTRACT

Millions of people stream narrative TV every day. Recent meta-reviews (Montero Perez, 2022; Wi & Boers, 2025) show that it is increasingly used for learning foreign languages. More recently, studies have explored how digital language learning tools, such as the Language Reactor (LR), can further enhance learning from TV (e.g. Alm, 2021). However, these studies lack a focus on what learners do *with* such tools. This two-week study explored learners' evaluation and usage of LR. Nine high school students of French viewed four episodes of the Netflix series *Marseille* while using LR. Data were collected using a background survey, three diary surveys, and stimulated recall. Findings show that learners believed LR to be useful and less disruptive over time, while engaging mostly with glossed captions to verify unknown words. Our findings suggest that learners could benefit from instruction before they can fully utilize all that digital tools have to offer.

KEYWORDS

Foreign language learning; Informal language learning; Viewing behavior; Viewing strategies; Digital language learning tools; Language Reactor

Introduction

Adolescents and adults spend an average of 1.6 hours per day on viewing (online) video, such as narrative TV (films and series), while teens spend twice as much time on viewing such audiovisual media (DataReportal, 2026). Beyond its entertainment value, narrative TV can also serve as a valuable resource for learning new languages through informal language learning activities, without formal instruction (Dressman & Sadler, 2020). Studies state that audiovisual media can boost engagement in the target language by providing rich and varied language input through an enjoyable medium with appealing and familiar content (Vanderplank, 2020). An increasing number of language learners are therefore voluntarily watching narrative television in a foreign language outside the scope of formal education (Alm, 2021).

✉ *Contact: Sjoerd Lindenburg, s.lindenburg@iclon.leidenuniv.nl, Leiden University, The Netherlands

© 2026 The Author(s). Published by Radboud University Press.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License. CC BY permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms under which this article is published allow the author(s) or a third party, with the author's permission, to deposit the accepted manuscript in a repository.

Examining learners' methods while engaging with foreign language media can provide valuable insights into what learners do while viewing narrative TV, although recent studies (e.g. Garcia, 2023; Lindenburg et al., 2024) have described that learners tend to avoid disrupting their viewing experience even if it might support understanding. Digital language learning tools could fill that gap by keeping disruptions to a minimum. While some studies have already looked at the benefits for language learning when using a digital tool for viewing TV (e.g., Gouleti et al., 2020; Fievez et al., 2021, Popova & Miralpeix, 2024), they lacked a focus on how learners use digital tools, even though researchers have called for such action (see Muñoz & Miralpeix, 2024; Vanderplank, 2016b). The present study therefore aims to further explore how foreign language learners evaluate and use digital language learning tools that support language learning while viewing narrative TV. To that end, the present study integrates approaches from digital humanities and applied linguistics to form a solid framework for educational research into viewing for learning.

Background

Informal Language Learning

Informal language learning involves acquiring a language outside formal classroom settings. One popular informal learning activity is viewing narrative TV, as it makes learning enjoyable (Vanderplank, 2020). Zhang et al. (2020) report that "enjoyment encourages learners to explore the language" (p. 3) and Piniel and Albert (2018) find that it fosters enthusiasm towards learning. These effects are especially true for language-related activities outside the classroom, as they provide more flexibility and personalization (Zhang et al., 2020). Moreover, a recent meta-review by Montero Perez (2022) reports that watching audiovisual media in a foreign language can help improve listening comprehension and expand learners' vocabulary. Such media also allow learners to observe how a target language is used in real-life situations, improving their ability to communicate effectively with others (Kim, 2020), and by a variety of (native) speakers, each with their own registers, accents and dialects, helping learners develop their ability to recognize different sounds and language patterns (Frumuselu et al., 2015).

Viewing Behavior

While the benefits for language learning have been thoroughly researched, research should also consider what learners do while viewing and what their viewing behavior is. Viewing behavior can be categorized into meta-cognitive (i.e. how a task is approached) and cognitive behavior (i.e., the direct analysis of input). In this paper, meta-cognitive behavior is based on Rubin's (2005) model Learner Self-Management, and follows three main phases: planning, monitoring, and evaluating. For example, learners who analyze task demands and plan learning goals according, can increase their learning (Rubin, 2005). Moreover, learners who monitor and evaluate their learning process, can ensure that learning takes place (Chamot, 2005) in an effective way (Oxford & Schramm, 2007). In short, learners who exhibit effective self-management while viewing narrative TV in a foreign language can better support language learning from viewing.

While viewing audiovisual media, learners will automatically process the incoming input, which can be referred to as cognitive behavior (Danan, 2004). If a learner actively monitors this process, they can observe and analyze potential gaps in their knowledge that hinder comprehension and implement solutions to overcome those gaps before moving on (Rubin, 2005). Such a solution can be categorized as a cognitive strategy, which consists of a learner's cognitive method to solve a problem (such as wanting to verify auditory information) by means available to them (such as a translation), choosing between various options that fall under the same means (such as subtitles or a dictionary). All potential combinations together form a cognitive strategy matrix (see Table 1 below). In other words, those with effective viewing behavior actively observe their learning process and apply strategies to ensure language learning occurs, thereby benefitting more from viewing narrative TV (Montero Perez, 2022).

Table 1

The Cognitive Strategy Matrix

	Methods	Guessing	Memorizing	Predicting	Synthesizing	Verifying
Means	**Options**					
Context	Auditory					
	Images					
	Global					
	Local					
Manipulation	Enhancement					
	Video skills					
Translations	Dictionary					
	Subtitles					
Word features	Form					
	Part of speech					
	Pronunciation					
	Structure					
	Usage					

Many of the means and options that are available to viewers to support their understanding have been described by previous studies (e.g., Wang & Pellicer-Sánchez, 2022) and are quite straightforward. Examples of this are using one's own global understanding of the world (context) or the association of word form with a word known in another language (word features). However, manipulation, which is defined as "operat[ing] … in a skillful manner" (Merriam-Webster, 2025) requires some elaboration. In the context of audiovisual media, it refers to a learner's video skills such as pausing, rewinding, re-playing and freeze-framing (Vanderplank, 2016a), as well as the changing of playback speed and the adding or removing of on-screen text (Pemberton et al., 2005). What is more, users can alter the input by enhancing the input to influence what they pay

attention to (Puimège et al., 2022). In general, teachers and researchers expect learners to have acquired some video skills as most grow up watching (online) video material, although not many learners might know how to enhance the input.

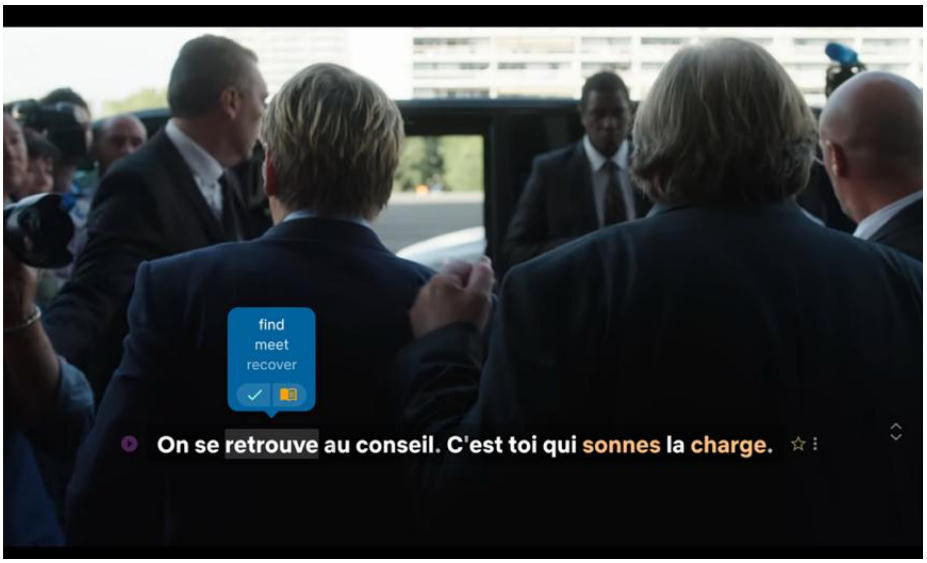
Digital language learning tools

Effective viewing behavior is not always self-evident. This is especially true for cognitive behavior, since it generally requires some interruption of the viewing experience which learners tend to avoid (Garcia, 2023). However, digital language learning tools such as the Language Reactor, FluentAI, and Lingopie have made it easier for learners to overcome knowledge gaps without having to interrupt the viewing experience, by expanding on the list of possible means and options in the cognitive strategy matrix, thus paving the way for viewing to become a semi-intentional activity rather than just an incidental one (Pellicer-Sánchez & Boers, 2018).

For example, viewing tools often allow for the additional manipulation of the on-screen text and the incorporation of glosses in the captions. When viewing narrative TV, on-screen text is typically presented in one of two forms: captions (in the same language as the audio) or subtitles (in a different language than the audio). Digital language learning tools, however, often allow for the simultaneous display of both types so that viewers can switch between the two languages depending on the support they need. Recent studies on such dual on-screen text have reported on its effectiveness on the overall learning experience (Dizon & Thanyawatpokin, 2021), without increasing viewers' cognitive load (Wang & Pellicer-Sáncez, 2022). What is more, some tools allow for input enhancement such as the color coding of words (see Figure 1) to emphasize specific input. Studies have shown that enhancement can increase the chances of language learning to occur (Choi, 2023; Montero Perez et al., 2014), as learners are more likely to pay attention to certain words or phrases (Finger-Bou & Muñoz, 2024).

Figure 1

Example of a Clip from Marseille with Activated Gloss for the French Word 'Retrouve'



[Reproduced as a quotation for scholarly discussion under Article 15a Dutch Copyright Act]

Viewing tools such as the Language Reactor also allow for glossed captions (see Figure 1). These captions are specifically designed to provide learners with access to additional information, such as a translation by hovering over the word, or a brief description of the word's context-bound meaning by clicking on it (Montero Perez et al., 2018). Such easy access only marginally interrupts a learner's viewing experience (Teng, 2022) and is therefore generally used more often by learners than traditional dictionaries (Alharbi, 2016). What is more, Fievez et al. (2021) state that glosses stimulate vocabulary learning more than regular captions by better drawing learners' attention to unknown words and thus contributing to small increments in vocabulary learning. Montero Perez et al. (2018) likewise report on finding a positive relation between gloss consultation and the encoding of word form-meaning links. Glosses thus allow learners to quickly verify information through translations or dictionary entries and encourage better memorization than the exclusive use of translations in subtitles.

To our knowledge, only a few other studies have been published on the maximization of language learning through digital tools, and, more specifically, on how users utilize such tools. Gouleti et al. (2020) revealed that learners spent more time on bilingual subtitles than on monolingual ones and that bilingual subtitles improved language learning. However, they did not allow participants control over the tool and only utilized one of its options. Fievez et al. (2021) did allow participants to take control by having them watch episodes on their own laptop. Their study focused on the use of glosses, revealing a positive relation between look-up behavior and learning gains, and while their study included qualitative data on evaluation and usage, this data was barely discussed, prioritizing a more quantitative approach related to vocabulary gains. Finally, Popova and Miralpeix (2024) allowed for participant control, included more than one option within their design, and complemented a focus on learning gains with learner usage. Still, their design only incorporated data on usage and evaluation based on student reports, even though much processing operates at the subconscious level (Gass & Mackey, 2017), which could have resulted in much less data on viewing behavior as learners might simply not have been aware of certain actions. Gass and Mackey further state that an introspective methodology such as stimulated recall might help "isolate events from the stream of consciousness" (p. 25) and determine "what strategies learners might be using at a given time" (p. 25).

In the studies above, using digital language learning tools to support learning from viewing has been touched upon, although the main focus of those studies was generally on learning gains rather than learner usage. Moreover, the methodology of learner reports might not comprehensively reflect the subconscious process of viewing behavior. However, introspection while using digital tools for language learning has not been examined yet.

The Present Study

Considering the research outlined above, language learning tools can be used to support the viewing process and enhance language learning when viewing narrative TV in a foreign language. However, there is a lack of research on using tools in an informal language learning activity and especially what language learners do *with* such tools. In this study, we therefore use both learner reports and introspection to ascertain how language learners use

digital tools to support their viewing process in a foreign language. To that end, we used the freely accessible Language Reactor as our digital tool, and addressed the following research questions:

RQ1 How do language learners of French evaluate the Language Reactor, and does t his change through repeated use?

RQ2 How do language learners of French use the Language Reactor to support their viewing process?

This study aimed to answer these research questions by studying the viewing behavior of adolescent intermediate language learners of French through a close-knit triangulation of a background survey, diary survey entries, and stimulated recall interviews over a 2-week period in a multiple-case study with nine participants. Quantitative data collected from our small sample were used primarily to support and elaborate on findings using qualitative measures.

Methodology

Participants

The participants (M_{AGE} = 16.3, SD = 0.5) in this study were nine adolescent intermediate learners of French as a foreign language. Eight identified as female and one as other. They were selected based on convenience sampling, as well as their motivation to learn French. Each participant was a native speaker of Dutch, had started learning French in secondary school, had five years of formal secondary education, and was used to watching subtitled and captioned TV, but not always in French. All students had achieved at least an intermediate level of proficiency (B1) in French. Furthermore, none of the participants had lived abroad in a French-speaking country, nor did any speak French in their day-to-day life.

Materials[1]

The Language Reactor

For our exploratory study, we decided to use the Language Reactor (LR) as our digital learning tool. The Language Reactor has incorporated glossed captions as well as the manipulation of on-screen text by allowing learners to color code words and phrases and present multiple types of text simultaneously (Popova & Miralpeix, 2024). It even provides learners access to additional built-in options, such as blurred subtitles, a detailed built-in dictionary, a glossed transcript of entire episodes, a personal word list, and the ability to automatically pause the video after each caption. The Language Reactor is compatible with all narrative TV available on Netflix, ensuring a good variety of choices for video materials, and, as the Language Reactor is a chrome-extension, it preserves all Netflix controls, allowing viewers to freely pause the video, rewatch certain scenes, and alter the playback speed. Finally, the tool is free to use and user-friendly.

TV Series

The video materials used in this study were the first 4 episodes taken from season 1 of *Marseille* (2016), which was available on Netflix at the time of the study. A teacher of

French had suggested the relevance of this series based on students' interests, which would ensure intrinsic motivation and foreign language enjoyment, an important factor for language learning (Zhang et al., 2020). Furthermore, Van Zeeland & Schmitt (2012) state that 91% coverage of the 3,000 most frequent words should be sufficient for relatively good comprehension. The vocabulary coverage for the episodes was calculated using the *Compleat Lexical Tutor* (Cobb, n.d.), which matches the words in the episodes to a corpus-based frequency list. All episodes used in this study reached acceptable lexical coverages between 94.2 and 94.8% with the 3,000 most frequency words.

Instruments

Background Survey

Participants were asked to fill out a survey via Qualtrics on their age, gender, French language proficiency, and know-how of meta-cognitive strategies. Participants were also asked to rate their use of narrative TV for language learning on a Likert-scale from 1 (never) to 5 (very often), both for online streaming services and traditional television. For any rating higher than 1, a follow-up question would appear, prompting them to elaborate. Responses illustrated to what extent participants used meta-cognitive strategies such as setting learning goals, analyzing task demands, or a form of monitoring (with or without evaluation and implementation).

Diary Surveys

To investigate participants' use of the Language Reactor (LR), a survey-based diary approach was used. Diaries are documents that consist of sequential dated entries that claim to provide a record of the diarists' observations and reflections (Alaszewski, 2006). They are useful for collecting information on phenomena that are hard to observe directly. Participants were asked to fill out a diary survey after every episode in line with Alaszewski's statement that a diary should be written soon after the events have transpired.

The survey diaries focused mainly on the participants' evaluation of LR and usage of various LR-specific options (glossed captions, glossed transcript, dual subtitles, built-in dictionary, auto-pause, word lists, and color coding), as well as general means (context, word features) and general manipulation options (rewinding, pausing, and playback speed) when viewing narrative TV. Participants were asked to score all uses of LR-specific options, general means, and general manipulation options dichotomously (yes or no). Whenever a participant answered with 'yes', a text box would pop-up requesting them to elaborate on how and/or why they used that particular option (i.e., cognitive method). Finally, participants were asked to evaluate LR based on its disruptiveness and usefulness on a 5-point Likert-scale, with the option to elaborate on their given score.

Stimulated Recall

The fourth episode of *Marseille* season 1 was viewed while the participants' screens were being recorded and was followed up with a stimulated recall interview using the screen recordings as stimulus, to visualize the participants' viewing behavior and usage of LR. For this stimulated recall, a protocol based on Gass and Mackey (2017) was used, to avoid

priming and limiting a participant's response to thoughts during the viewing session. Participants were instructed on the aim of the introspective interview, which was to understand what they were thinking at the moment of viewing the episode. Whenever the participant wanted to elaborate on their thoughts, or if the researcher noticed interesting behavior, the recording was paused, and a response was given or elicited. Such behavior generally entailed the participants' usage of LR-specific options or the lack thereof.

After the stimulated recall, follow-up questions could be asked based on the participants' responses in the diary surveys and the background questionnaire. To ensure that all learners could express their thoughts without a language barrier, all interviews were conducted in the native language of the participants, which was Dutch for all nine participants.

Procedure

The study consisted of three phases. In phase 1, participants signed a consent form and completed the background survey, as well as the VocabLab test, and vocabulary pre-test. Participants were then instructed face-to-face on how to watch *Marseille* using LR, and which options LR provides. They were also given the diary surveys and were instructed to complete a diary survey after watching each episode. In phase 2, participants had two weeks to watch the first three episodes of *Marseille* on Netflix using LR in an informal setting. They were informed that they could watch them whenever and wherever they chose, as long as they only watched one episode at a time. Phase 3 involved watching episode 4 of *Marseille* on Netflix using LR, but in a more controlled environment and with the participant's screen being recorded. Language learners were instructed on how to record their own screens and shared this recording afterwards with the researcher. After viewing episode 4, they completed the vocabulary post-test. A stimulated recall interview was then conducted for each individual participant, allowing both the researcher and participant to pause the recording for the participant to elaborate on their viewing behavior or usage of the Language Reactor.

Data Analysis

To provide an answer to RQ1, both qualitative and quantitative data from the diary surveys were examined. The quantitative Likert-scores on disruptiveness and usefulness were analyzed in R (version 4.3.1.; R Core Team, 2023) using a within-subjects (repeated measures) design, as each participant was exposed to all three episodes and provided ratings for both perceived usefulness and disruptiveness after each episode. In addition, Qualitative Content Analysis (QCA) was employed to systematically examine the qualitative data. Each response to an open-ended question on disruptiveness or usefulness resulted in a unit of analysis. In cases of lengthy responses with varied content, responses were divided into separate units of analysis, based on the distinctiveness of the content within them.

To answer RQ2, Qualitative Content Analysis (QCA) was similarly employed to examine the data from the background survey, diary surveys, and stimulated recall interviews. Each of these materials was analyzed separately but in essence, each response to an open-ended question resulted in a unit of analysis, with lengthy responses with varied content being divided into separate units of analysis, based on the distinctiveness of the

content within them. The background survey was coded based on language background, narrative TV used for language learning, and meta-cognitive strategies, while the survey diaries and stimulated recall were coded based on LR-specific options (glossed captions, glossed transcript, dual subtitles, dictionary, auto pause, word lists, and color coding), and the various methods, means, and options in the cognitive strategy matrix in general (see Table 1). When an option used was deemed to encompass learning on a higher level than immediate (cognitive) processing, it was coded as meta-cognitive analyzing.

Results[2]

Language Learning Background

Participants reported to use streaming services ($M = 3.8$, $SD = 1.0$) more often compared to traditional television ($M = 2.3$, $SD = 1.0$) to improve their proficiency in a foreign language. When asked specifically about learning French, participants reported lower scores for using streaming services ($M = 2.9$, $SD = 0.5$) and fully avoided traditional television ($M = 1.0$, $SD = 0.0$) when specifically asked about learning French as a foreign language. There was also a visible difference in their use of meta-cognitive strategies for traditional television ($M = 0.6$, $SD = 0.5$) and streaming services ($M = 0.9$, $SD = 0.6$). When asked what they generally do while viewing narrative TV on streaming services most participants reported rarely using any strategies for traditional television, but more detailed strategies for streaming services. Participant 3, 4, and 7 reported the type of on-screen text they use depending on the contexts, with participant 6 only mentioning that they use on-screen text. Participants 5 and 9 noted that they looked up unknown or difficult words in a dictionary while viewing, while participant 2 described having a specific learning goal when viewing narrative TV, specifically grammar. Only participants 1 and 8 reported no use of strategies.

Language Reactor Evaluation

In total, 134 units from the diary surveys after episodes 1-3 indicating participants' evaluation of LR for language learning were analyzed. Based on the 5-point Likert scores, the participants reported that LR was barely disruptive ($M = 2.07$, $SD = 0.78$) and more than sometimes useful ($M = 3.33$, $SD = 0.92$). For example, participant 2 reported that it was "difficult to know where to look" after viewing episode 1, and that they "found it difficult to know where to look" after viewing episode 2, but they made no comment on disruptiveness after viewing episode 3. Most participants showed a similar trend, with the exception of participant 4 and participant 8. Participant 4 did not reveal a decrease in disruptiveness, and experienced "much distraction with all that is happening on the screen" even after repeated use. Conversely, participant 8 first observed an increase in disruption as "they could not focus on the series itself due to all the built-in options", before they "gradually get used to it." What is more, participants 3, 4 and 8 all reported that it was unlikely they would use LR again after the study, with participant 3 stating that through LR, "it's not really watching a series in a chill manner anymore. You have to constantly pay attention to it."

These findings on disruptiveness are supported by our quantitative data. A repeated-measures ANOVA with Greenhouse–Geisser correction was conducted to examine

differences in perceived disruptiveness across the three episodes. The analysis revealed a significant main effect of episode, $F(1.57, 12.53) = 8.71$, $p = .006$, $ges = .285$, indicating a moderate-to-large effect. A Bonferroni-corrected pairwise comparisons showed that episode three was rated as significantly less disruptive than episode one ($p = .026$), and episode two ($p = .040$). However, there was no significant difference in disruptiveness between episode one and episode two ($p = .311$). Estimated marginal means indicated that episode one had the highest perceived disruptiveness ($M = 2.56$, $SE = 0.18$), followed by episode two ($M = 2.11$, $SE = 0.26$), while episode three had the lowest disruptiveness ($M = 1.56$, $SE = 0.24$). No significant differences between episodes could be found for usefulness (all ps > .05).

Language Reactor Usage

In total, 594 units describing participants' usage of LR for language learning were analyzed, consisting of 196 units from the diaries, 295 from the stimulated recall, and 175 from follow-up questions. Diary units exclusively illustrated *reported* usage while units in the stimulated recall exclusively illustrated *recalled* usage. Units in the follow-up questions could describe either and were used to elaborate on diary and recall data.

LR-specific Options

Participants reported on the different LR-specific options that they used while watching episodes 1, 2, and 3 and recalled while watching episode 4 (see Table 2). Participants only mentioned the dictionary and dual subtitles during the stimulated recall. Conversely, participants did not mention color coding during recall although they did report on it in their diaries. All options were linked to a respective cognitive method. The reports lacked mention of guessing but did include meta-cognitive analysis. Both the diaries and recall lacked mentions of synthesis.

Most participant used the glosses in both the captions and the transcript to verify information and ensure comprehension. For example, participant 2 reported that "at some time, [they] opened those transcripts so that [they] could see which words [they] missed and then view them in the sentence." Conversely, glossed captions were used more often for single words: "Just checking what it means, but not in the sentence. You can see what the sentence means, but not that one word" (participant 1). Only participant 7 stopped using the glosses after one episode to just "read the Dutch subtitles" instead. Glossed captions were also quite often used to memorize word meaning and sometimes even for guessing. Participants 3 and 8 also used the glossed transcript to predict information in episodes 2 and 3. Dual subtitle usage, however, was not reported on, even though some participants did recall using it for verifying, and participant 2 for memorization. Participant 2, for instance, mentioned: "This was a very difficult structure and then I just read the literal translation every time, and, yes, I thought they were weird words together." In such cases, to ensure comprehension, participant 2 compared the Dutch subtitles to the French captions word-for-word.

The use of input enhancement generally had one of two reasons: planning or memorization. Participant 4 recalls that adding words to a personal word list, additionally "ensured that it keeps on coming back and that it becomes yellow." Not only does it allow

them to practice these words after viewing, but it also increased salience while viewing. Participant 6 likewise reported that color coding "ensured that they focused on words that they did not know (well) yet." Such color coding was categorized as planning since the Language Reactor allowed learners to determine their own vocabulary level, resulting in many words receiving a purple color, which many participants used.

Other built-in options were used to a much lesser extent. Participants 4 and 8 very rarely used the built-in dictionary to verify information when simple glosses were insufficient, and four out of nine participants sometimes used the dictionary to better commit new words to memory. In addition, only three participants (2, 8, and 9) reported using automatic pausing rather consistently, with two participants (1 and 3) using it only once. The participants who did use it noted that it allowed them to "take their time reading the French and Dutch on-screen text" (participant 9), even though they also reported it to be "annoying […] that [the video] constantly stopped" (participant 8).

Table 2

Cognitive Methods With LR-specific Options for Episodes 1, 2, 3, and 4

Episodes 1-3						
		Planning	Memorizing	Predicting	Verifying	Total
Manipulation	Auto pause	6	2	-	2	10
	Color coding	15	-	-	10	15
	Word lists	1	10	-	-	11
Translations	Glossed captions	-	4	-	22	26
	Glossed transcript	-	4	4	16	24
Total		22	20	4	40	86
Episode 4						
		Guessing	Memorizing	Predicting	Verifying	Total
Manipulation	Auto pause	-	-	-	4	4
	Word list	-	50	-	-	50
Translations	Built-in Dictionary	-	7	-	4	11
	Dual text subtitles	-	1	-	12	13
	Glossed captions	7	26	-	67	100
	Glossed transcript	3	9	7	63	82
Total		10	93	7	150	260

General Means

Participants reported the general means and options a total of 11 times after watching episodes 1, 2 and 3 of *Marseille*, and they were able to recall using them a total of 59 times

while watching episode 4. Manual pausing (28 times), context (17 times) and word features (9 times) were only mentioned during recall, whereas playback speed was mentioned in both the diary surveys (5 times) and recall (1 time), as was the option to rewind (6 and 4 times, respectively). All options were linked to their respective cognitive method. The reports lacked mention of guessing and predicting but included meta-cognitive planning. Both the diaries and recall lacked mentions of synthesis.

To some extent, participants 3, 4 and 5 used manual pausing to verify information "as it went too fast again, so that I can read everything" (participant 3), whereas the other six participants never manually paused the episode. Context was generally used for guessing at unknown information, such as when "the translation was not available […] that was kind of difficult" (participant 3). Participant 2 also used it for verification and participant 3 for predicting. In most cases, local context (i.e., the plot) was used, although participant 3 used global context (i.e., general knowledge) once. Participants used rewinding for verifying information when they were too late to do so through other options. Only participant 3 used it to "re-watch when they learned a new word". Participants 2, 4, and 5 used word features such as cognates (form) or affixes (structure) to guess at the meaning of unknown words, and sometimes to try and consolidate it to memory. Participant 5 also changed the playback speed to a faster pace to "practice with the fast pace of French" but changed it back soon after since "it just went too fast". Participant 2 conversely changed the playback speed to a slower pace as an alternative to automatic pausing, as both options allowed them to "understand the French language better".

Discussion

As there is still a lack of research on learners' usage of digital tools for language learning in an informal setting, such as the Language Reactor, this exploratory study looked at what learners do *with* the Language Reactor when trying to improve their language learning through diary surveys and stimulated recall.

Language Reactor Evaluation

While each participant used LR to a different extent and in different ways most of them gradually grew accustomed to the extension's overlay and the options for language learning it provided. The disruptiveness that participants initially experienced, was most likely a result of overload due to the many options that LR provides (in line with Dizon, 2018). Similar to Popova and Miralpeix (2024)'s study, this overwhelming feeling seemed to disappear after repeated use of the extension, and like their study, most participants reported that LR was rather useful, and they were (quite) likely to continue using it. Interestingly, learners who showcased high activity also reported a higher perceived usefulness, which could indicate that the extent to which learners engage with the Language Reactor helps them realize its potential for language learning. Such a distinction between users has been defined before (see Bird, 2005) with high activity users prioritizing learning and low activity users prioritizing enjoyment while postponing learning. For example, one participant with low reported activity claimed that they believed the various options were not quite useful even though they had never tried them, whereas a high

activity participant tried out built-in options before passing their verdict. A learner's (un)willingness to utilize various options could therefore be tied to what Piniel and Albert (2018) describe as freedom and control over the learning process, and to what extent options in a language learning tool disrupt a learner's enjoyment. Even if a learner did not report the program itself to be overly disruptive, participants used the options that they believed had value while ignoring the others.

Language Reactor Usage

Participants often used LR-specific options while viewing narrative TV, generally for verification or memorization, but sometimes for guessing or prediction. The availability of glosses, for example, allowed participants constant access to translations in order to overcome knowledge gaps without much disruption (as proposed by Teng, 2022) compared to having to consult an external dictionary. Such glosses were mainly used to verify information but also for memorization (in line with e.g., Fievez et al., 2021). Furthermore, most participants reported a form of selective reading when using the dual on-screen text (see Wang & Pellicer-Sáncez, 2022), switching between the French captions and Dutch subtitles. Two participants even opted to include two forms of Dutch subtitles – a human translation and a machine translation – which expended potential selective reading based on learning needs. The use of Dutch subtitles was less often recalled or reported on compared to the use of French captions, but responses in the interviews point towards heavy use, mainly for verification (similar to Dizon & Thanyawatpokin, 2021). This difference could be a result of glossed captions requiring slightly more active and intentional use of the Language Reactor compared to simply viewing a different set of subtitles.

Color-coding enhancement was another LR-specific option that was used often. Participants reported that it allowed them to more easily notice words and phrases so that they could add them to their vocabulary, which is in line with Puimège et al. (2022). One participant in particular utilized color much more than other participants. However, such eager and enthusiastic usage might have accidentally resulted in cognitive overload (Mayer, 2014), as a leaner's ability to effectively focus on and process enhancement might be affected by their proficiency level (Cintrón-Valentín & Carcía-Amaya, 2021). Results therefore suggest that participants could benefit from instruction (in line with Popova & Miralpeix, 2024) on how to use language learning tools such as LR efficiently as "[s]imply providing learners with the latest mobile tool [does] not automatically result in more effective learning" (Chen, 2013, p. 25).

It is noteworthy that participants depended on context and word features only sparingly during this study. This could be ascribed to the easy use of translations for verification (Fievez et al., 2021), rendering guessing obsolete. Guessing through context or word features was only used when alternative means were inaccessible. While verifying information quickly through glosses could solve short term gaps, it might not have the same long-term effect as other cognitive methods that require a more intentional approach, such as guessing or memorizing. As described by the theory on *Cognitive Apprenticeship*

(Collins et al., 1991), knowing when to use which cognitive strategy requires insight into viewing behavior and the ability to reflect on it.

Conclusions & Limitations

To conclude, this exploratory study looked at informal language learning while engaging with foreign language materials and incorporating a (digital) tool to enhance the learning process. Our aim was to further explore learners' evaluation and usage of such language learning tools, as well as their (dis)advantages for informal foreign language learning through the lens of (meta-)cognitive viewing behavior. Similar to previous studies (e.g. Popova & Miralpeix, 2024), most learners deemed the Language Reactor to be useful as a digital language learning tool and would use it again in an informal setting. While some participants found LR to be disruptive initially, that overwhelmed feeling gradually lessened through repeated use (similar to Dizon, 2018). The most used LR-specific options were glosses and dual on-screen text as they were evaluated to be the least disruptive (in line with Teng, 2022) and mainly aided in verifying information. Color enhancement was also used quite often, mainly for memorization processes, as they could help direct learners' attention (as also stated by Puimège et al., 2022). The easy accessibility of these LR-specific options seems to have resulted in a reduced dependency on context or word features, as they provided less precise information.

The study also encountered certain limitations which could have impacted its outcomes. As the study only looked at the viewing behavior of nine participants, the statistical power for RQ1 was rather low, which could have resulted in effects not having been made visible. A larger sample would also allow the inclusion of language learning tests, such as vocabulary tests, to measure the effect of viewing with tools on learning gains. In addition, future research could carry out longer studies to examine how learners use and evaluate digital language learning tools such as the Language Reactor after extended exposure and familiarization. Such longitudinal data could help illuminate the weak and strong points of viewing for learning using digital tools. Finally, participants had not received prior extended instruction on viewing behavior while using LR. Such a lack of instruction could have impeded effective use of the digital language learning tool and its abundant options. Instruction on and practice with the Language Reactor could bypass the initial disruptiveness that participants experienced, enabling future studies to collect data not distorted by cognitive overload.

Even with these limitations in mind, all learners evaluated the Language Reactor to be rather useful and not very disruptive, with most participants using many built-in options while viewing. This active approach to viewing in a foreign language seemed much more limited before using the Language Reactor, as described in the background survey, and signifies the positive implications of digital language learning tools on language learning. To promote informal digital learning (see Lee, 2022), language teachers could point their students towards tools such as the Language Reactor, providing learners with access to foreign language input outside the classroom in combination with easy-to-use options that support their learning process without disrupting their viewing experience. While simply watching narrative TV could result in (incidental) learning gains (e.g., Fievez et al., 2021),

language learning tools allow for a more semi-intentional approach to learning (see Pellicer-Sánchez & Boers, 2018), embracing features from both education and entertainment.

Footnotes

1 All materials can be accessed through an OSF online repository.
2 Quotes from participants have been translated by the researcher word-for-word to enhance readability.

Funding

This research has been financed by the Dutch Research Council through a doctoral grant for teachers and has been approved of by an ethical committee on 15 January 2021.

Competing interests

The author(s) declare none.

References

Alharbi, M. A. (2016). Using different types of dictionaries for improving EFL reading comprehension and vocabulary learning. *JALT Call Journal, 12*(2), 123–149. https://doi.org/10.29140/jaltcall.v12n2.j204

Alaszewski, A. (2006). *Using Diaries for Social Research*. SAGE Publications Ltd.

Alm, A. (2021). Language learning with Netflix: from extensive to intra-formal learning. *The EuroCALL Review, 29*(1), 81–92. https://doi.org/10.4995/eurocall.2021.14276

Bird, S. A. (2005). Language learning edutainment: Mixing motives in digital resources. RELC Journal, 36 (3), 311–339. https://doi.org/10.1177/0033688205060053

Cintrón-Valentín, M. C., & García-Amaya, L. (2021). Investigaing textual enhancement and captions in L2 grammar and vocabulary: An experimental study. *Studies in Second Language Acquisition*, *43*(5), 1068-1093. https://doi.org/10.1017/S0272263120000492

Chamot, A. U. (2005). Language learning strategy instruction: current issues and research. *Annual Review of Applied Linguistics, 25*, 112–130.

Chen, X. B. (2013). Tablets for informal language learning: Student usage and attitudes. *Language Learning & Technology, 17*(1), 20-36. https://doi.org/10.1017/S0272263120000492

Choi, S. (2023). Visual saliency in captioned digital videos and learning of English collocations: An eye-tracking study. *Language Learning & Technology, 27*(1), 1–21. https://doi.org/10125/73536

Cobb, T. (n.d.). Compleat Lexical Tutor (Version 8.5) [Online resource]. Retrieved from http://www.lextutor.ca/.

Collins, A., Brown, J. S., & Holum, A. (1991). Cognitive apprenticeship: Making thinking visible. *American Educator*, *15*(3), 6-23.

Danan, M. (2004). Captioning and subtitling: Undervalued language learning strategies. Meta, 49(1), 67–77. https://doi.org/10.7202/009021ar

DataReportal (2025, October). *Digital 2026 Global Overview Report.* Retrieved April 15, 2026 from https://datareportal.com/reports/digital-2026-global-overview-report

Dizon, G. (2018). Case study Netflix and L2 learning: A case study. *The EUROCALL Review, 26*(2), 30–40. https://doi.org/10.4995/eurocall.2018.9080

Dizon, G., & Thanyawatpokin, B. (2021). Language learning with Netflix: Exploring the effects of dual subtitles on vocabulary learning and listening comprehension. *Computer Assisted Language Learning Electronic Journal (CALL-EJ), 22*(3), 52–65.

Dressman, M., & Sadler, R. W. (Eds.). (2020). *The Handbook of Informal Language Learning* (1st ed.). John Wiley & Sons Ltd.

Fievez, I., Montero Perez, M., Cornillie, F., & Desmet, P. (2021). Promoting incidental vocabulary learning through watching a French Netflix series with glossed captions. *Computer Assisted Language Learning*, *36*(1–2), 26–51. https://doi.org/10.1080/09588221.2021.1899244

Finger-Bou, R., Muñoz, C. (2024). The effects of textual enhancement on young learners' attention and vocabulary acquisition through captioned cartoons. In C. Muñoz & I. Miralpeix (Eds.) *Audiovisual input and second language learning* (pp. 48–73). John Benjamins. https://doi.org/10.1075/lllt.61.03fin

Frumuselu, A., De Maeyer, S., Donche, V., & Colon Plana, M. del M. G. (2015). Television series inside the EFL classroom: Bridging the gap between teaching and learning informal language through subtitles. *Linguistics and Education, 32,* 107–117. https://doi.org/10.1016/j.linged.2015.10.001

Garcia, N. (2023). *Learning a Language through Watching Television: A Comparative Analysis of Subtitles and Glossed Captions for Beginner Informal Language Learners.* [Unpublished doctoral dissertation/master's thesis]. Leiden University.

Gass, S. M., & Mackey, A. (2017) *Stimulated Recall Methodology in Applied Linguistics and L2 Research*. Taylor & Francis.

Gouleti, A., Dimitriadis, G., & Kokonis, M. (2020). Exploring the educational potentials of language learning with Netflix tool: An eye-tracking study. *Ex-centric Narratives: Journal of Anglophone Literature, Culture and Media*, (4), 113-136.

Kim, D. (2020). Learning Language, Learning Culture: Teaching Language to the Whole Student. *ECNU Review of Education, 3*(3), 519–541. https://doi.org/10.1177/2096531120936693

Lee, J. S. (2022). *Informal digital learning of English: Research to practice*. Routledge.

Lindenburg, S., Dorst, A.G., Janssen, F., & De Jong, N. (2024). Een taal leren door te kijken: Het kijkgedrag van experttaalleerders. *Levende Talen Tijdschrift, 25*(4), 16-25.

Mayer, R. (2014). Introduction to multimedia learning. In R. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 1–24). Cambridge, England: Cambridge University Press. https://doi.org/10.1017/CBO9781139547369

Merriam-Webster. (n.d.). Manipulation. In *Merriam-Webster.com dictionary*. Retrieved September 10, 2025, from https://www.merriam-webster.com/dictionary/manipulation

Montero Perez, M., Peters, E., Clarebout, G. & Desmet, P. (2014). Effects of captioning on video comprehension and incidental vocabulary learning. *Language Learning & Technology, 18*(1), 118–141. http://dx.doi.org/10125/44357

Montero Perez, M., Peters, E., & Desmet, P. (2018). Vocabulary learning through viewing video: the effect of two enhancement techniques. *Computer Assisted Language Learning, 31*(1– 2), 1–26. https://doi.org/10.1080/09588221.2017.1375960

Montero Perez, M. (2022). Second or foreign language learning through watching audio-visual input and the role of on-screen text. *Language Teaching*, 1–30. https://doi.org/10.1017/S0261444821000501

Muñoz, C. & Miralpeix, I. (2024) More pieces in the puzzle about language learning through audiovisual input. In C. Muñoz & I. Miralpeix (Eds.) *Audiovisual input and second language learning* (pp. 221–240). John Benjamins. https://doi.org/10.1075/lllt.61.10mun

Oxford, R. L., & Schramm, K. (2007). Bridging the gap between psychological and sociocultural perspectives on L2 learner strategies. *Language learner strategies: Thirty years of research and practice*, *30*, 47-65.

Pellicer-Sánchez, A., & Boers, F. (2018). Pedagogical approaches to the teaching and learning of formulaic language. In A. Siyanova-Chanturia & A. Pellicer-Sánchez (Eds.), *Understanding formulaic language: A second language acquisition perspective* (pp. 153–173). Routledge. https://doi.org/10.4324/9781315206615-9

Pemberton, L., S. Fallahkhair & J. Masthoff (2005). Learner-centred development of a mobile and iTV language learning support system. *Educational Technology & Society 8*(4), 52–63.

Piniel, K., & Albert, Á. (2018). Advanced learners' foreign language-related emotions across the four skills. *Studies in Second Language Learning and Teaching, 8*(1), 127–147. https://doi.org/10.14746/ssllt.2018.8.1.6

Popova, M., & Miralpeix, I. (2024). Maximizing L2 learning from captioned TV viewing: Repeated viewing and the Language Reactor. In C. Muñoz & I. Miralpeix (Eds.) *Audiovisual input and second language learning* (pp. 100–125). John Benjamins. https://doi.org/10.1075/lllt.61.05pop

Puimège, E., Montero Perez, M., & Peters, E. (2022). Promoting L2 acquisition of multiword units through textually enhanced audiovisual input: An eye-tracking study. *Second Language Research, 39*(2), 471–492. https://doi.org/10.1177/02676583211049741

Pujadas, G. (2019). Language learning through extensive TV viewing: A study with adolescent EFL learners (Unpublished doctoral dissertation). Spain: University of Barcelona.

R Core Team (2023). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Rubin, J. (2005). The expert language learner: A review of good language learner studies and learner strategies. In K. Johnson (Ed.), *Expertise in second language learning and teaching* (pp. 37-63). Palgrave Macmillan, London.

Teng, M. F. (2022). Incidental L2 vocabulary learning from viewing captioned videos: Effects of learner-related factors. *System, 105*. https://doi.org/10.1016/j.system.2022.102736

Vanderplank, R. (2016a). *Captioned media in foreign language learning and teaching*. Palgrave Macmillan UK.

Vanderplank, R. (2016b). 'Effects of' and 'effects with' captions: How exactly does watching a TV programme with same language subtitles make a difference to language learners? *Language Teaching, 49*(2), 235–250. https://doi.org/10.1017/S0261444813000207

Vanderplank, R. (2020). Video and Informal Language Learning. In M. Dressman & R.W. Sadler (Eds.), *The Handbook of Informal Language Learning* (pp. 183- 201). John Wiley & Sons Ltd.

Van Zeeland, H., & Schmitt, N. (2012). Lexical coverage in L1 and L2 listening comprehension: The same or different from reading comprehension? *Applied Linguistics, 34*(4), 457–479. https://doi.org/10.1093/applin/ams074

Wang, A., & Pellicer-Sánchez, A. (2022). Examining the effectiveness of bilingual subtitles for comprehension: An eye-tracking study. *Studies in Second Language Acquisition*, *45*(4), 882–905. https://doi.org/10.1017/S0272263122000493

Wi, I., & Boers, F. (2025). A synthesis of research on L2 vocabulary learning through audiovisual input and on-screen text. *Digital Applied Linguistics, 3*, 102774. https://doi.org/10.29140/dal.v3.102774

Zhang, H., Dai, Y., & Wang, Y. (2020). Motivation and second foreign language proficiency: The mediating role of foreign language enjoyment. *Sustainability, 12*(4). https://doi.org/10.3390/su12041302