

THE EVOLUTION OF NOTE-TAKING IN THE AGE OF AI-ASSISTED SIMULTANEOUS INTERPRETING: A THEORITICAL AND CONCEPTUAL REASSESSMENT

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Abstract. Artificial intelligence (AI) is changing interpreting process by introducing tools that offer automatic speech recognition, predictive terminology, and real-time transcription. While AI has been discussed widely in translation studies, its effect on note-taking remains underexplored, particularly in simultaneous interpreting (SI), where note-taking is subtle but significant. This article re-examines the function of note-taking in SI in light of emerging AI-assisted workflows. It is aimed to investigate how interpreters adapt note-taking strategies conceptually while using AI tools, by drawing on Gile's Effort Model, cognitive load theory and multimodal processing research. AI helps to reorganize not-taking enabling interpreters use it as a tool for monitoring errors, maintaining cognitive stability and ensure quality in the process. Even though AI may increase cognitive load as it causes split attention, it still mitigates other issues, such as terminological retrieval. These changes lead to restructuring the form of note-taking, rather than extinguishing it. The study concludes by proposing a conceptual model of "supervisory note-taking" and offering implications for interpreter training and future research.

Keywords: Artificial intelligence, simultaneous interpretation, automatic speech recognition, computer-assisted interpreting, cognitive load

Introduction

Artificial intelligence (AI) has rapidly become prominent across the language services industry, enabling the process more efficient, automated and professional. Using AI-driven tools such as automatic speech recognition (ASR), real-time transcription, predictive terminology systems, and computer-assisted interpreting (CAI) platforms, has started a technological evolution in interpreting. With the help of these tools, interpreters manage complex cognitive processes they come across during simultaneous interpreting (SI). There have been many debates on the topic of technological reliability, job displacement, and ethical considerations when but very few researches were done on its effect on note-taking. Although note-taking is traditionally associated with consecutive interpreting, research demonstrates that simultaneous interpreters also rely on rapid, condensed notes – sometimes termed "micro-notes" – to support memory retention, track discourse progression, and anchor key semantic elements. These notes serve as external cognitive aids that help interpreters manage the demanding real-time conditions of SI, particularly when confronted with dense terminology, fast delivery rates, numerically heavy segments, or structurally complex discourse. Their importance becomes even more pronounced in remote interpreting settings, where variations in audio quality and increased multimodal stimuli introduce additional cognitive and perceptual challenges.

The introduction of AI-assisted features within the SI workflow raises important conceptual questions. If interpreters now have access to live transcripts, predictive



glossaries, and automated terminology prompts, does this reduce their need to rely on note-taking for memory support? Conversely, does the presence of AI introduce new sources of cognitive load – such as split attention between audio, visual input, and machine-generated cues – that may actually increase the importance of strategic note-taking? And perhaps more fundamentally: does AI change what interpreters choose to note down, thereby altering the function of note-taking within the broader cognitive architecture of SI?

These questions form the core motivation for the present study. Rather than examining note-taking as a static technique, this paper conceptualizes it as a dynamic system that interacts with technological, cognitive, and professional variables. As AI continues to permeate interpreting environments, it is essential to revisit traditional assumptions about note-taking and consider how its role may be redefined in hybrid human–machine workflows.

To address this emerging problem space, the article offers a theoretical re-evaluation of note-taking in the context of AI-assisted SI. It synthesizes established models – such as Gile’s Effort Model and cognitive load theory – with recent findings on multimodal processing, remote interpreting, and human–machine interaction. Through this synthesis, the article argues that note-taking does not diminish in relevance due to AI, rather, it undergoes a conceptual transformation, shifting from a practice designed primarily to alleviate memory load toward a more supervisory and quality-oriented function.

This study adopts a conceptual research design, an approach commonly employed in translation and interpreting studies when the aim is to develop new theoretical perspectives, synthesize emerging research, or frame phenomena that have not yet been extensively investigated empirically. Conceptual papers serve a foundational role in academic inquiry by generating models, analytical categories, and interpretative frameworks that later guide data-driven research (Chesterman, 2017). Given that the impact of artificial intelligence (AI) on note-taking in simultaneous interpreting (SI) is an emerging topic with limited empirical evidence, a conceptual approach is both appropriate and necessary.

AI-assisted interpreting remains a rapidly evolving domain, with technological developments outpacing empirical research. As a result, the relationship between AI tools and interpreter cognition – particularly with respect to note-taking – has not yet been sufficiently theorised. This article aims to fill that gap by integrating existing theoretical models with recent technological insights. Rather than testing hypotheses through experiments or surveys, the objective is to: identify conceptual connections between AI support and established SI strategies, reassess how cognitive models account for the presence of machine-generated cues, offer theoretical predictions regarding changes in note-taking behaviour, and propose a framework to guide future empirical investigation. Such an approach allows for deeper reflection on the structural and cognitive implications of AI integration before operationalizing variables for empirical study.

The analysis is based on a targeted review of scholarly literature from interpreting studies, translation technology, cognitive science, and human–machine interaction. Sources include: classical work on interpreting cognition (e.g., Gile, 1995, Seeber, 2017),



foundational note-taking literature (Rozan, 1956, Gillies, 2017), recent research on computer-assisted interpreting (CAI) and AI-supported tools (Fantinuoli, 2018–2022, Prandi, 2023), studies on cognitive load and multimodal processing (Sweller, 1988, Korpál & Lipińska, 2021), and contemporary discussions of AI in professional language services (Bowker & Ciro, 2019). While the literature review is not exhaustive, sources were selected based on their relevance to three analytical domains: interpreting cognition, note-taking strategies, and AI/CAI implementation.

The relationship between note-taking, cognitive load, and technological support has been addressed in various strands of interpreting research, but the integration of artificial intelligence

introduces new conceptual dynamics that require a re-examination of established theories.

2.1 Classical Note-Taking Theory and Its Relevance to SI

Although note-taking is most commonly associated with consecutive interpreting, its principles have long been recognized as relevant to SI in more subtle forms. Rozan's (1956) pioneering work established the foundations of note-taking pedagogy through principles such as economy, abstraction, logical structuring, and symbolic representation. He proposed that notes should function as extensions of the interpreter's working memory, capturing only essential information needed to reconstruct meaning. Gillies (2017) expanded on Rozan's legacy by identifying how minimalistic notes can support comprehension and memory under time pressure. His work highlights the use of micro-notes, semantic anchors, and structural cues, which enable interpreters to track discourse progression even when full attention cannot be sustained on the speaker. Although SI is primarily an auditory and real-time task, research shows that interpreters regularly rely on quick visual aids – numbers, arrows, abbreviations – to stabilize cognitive processing (Albl-Mikasa, 2022).

These theoretical insights underscore that note-taking, even in its reduced SI form, remains tightly linked to cognitive management and is particularly useful in handling dense information, anticipating shifts, or maintaining coherence across segments.

2.2 Gile's Effort Model: A Cognitive Basis for Note-Taking

Gile's (1995) Effort Model continues to serve as a central theoretical reference in interpreting studies. The model conceptualises SI as comprising four simultaneous efforts:

1. Listening and Analysis,
2. Production,
3. Memory,
4. Coordination.

According to Gile, SI performance is vulnerable to bottlenecks because cognitive resources are limited and must be distributed among these efforts in real time. Note-taking plays a compensatory role, particularly in relation to the Memory Effort, by externalising specific pieces of information and reducing pressure on working memory. The Coordination Effort becomes especially significant in technologically rich environments. As interpreters manage additional visual input – such as presentation slides, terminology prompts, or ASR transcripts – they must allocate cognitive resources to juggling multiple channels. This creates new patterns of cognitive load that classical



models did not originally anticipate but which help explain why note-taking may become even more important in AI-assisted settings.

Cognitive load theory (Sweller, 1988) offers an additional lens for understanding SI as a high-demand cognitive task governed by the limits of working memory. In SI, interpreters manage:

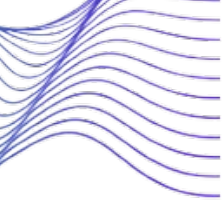
intrinsic load (complexity of message content), extraneous load (task-irrelevant demands such as poor sound quality or technical distractions), and germane load (effort devoted to processing and integrating meaning). Recent studies show that remote interpreting environments introduce new extraneous sources of cognitive load – including platform navigation, fluctuating audio quality, and the presence of visual stimuli (Bendazzoli & Sandrelli, 2020). Seeber's (2017) multimodal processing model further demonstrates that interpreters handle competing visual and auditory channels simultaneously, and that additional visual elements tend to increase cognitive strain.

Korpala and Lipińska (2021) confirm this in experiments showing that subtitles, slides, and on-screen text increase split attention and hinder comprehension. As AI-assisted SI introduces even more on-screen content, cognitive load theory becomes essential to predicting how interpreters adjust their strategies – including their reliance on note-taking – to maintain cognitive stability.

2.3. Emerging Research on AI-Assisted and CAI Tools

In recent years, researchers have begun to investigate how AI and CAI tools affect interpreter cognition, performance, and workflow. Fantinuoli (2018, 2021) has been instrumental in developing and analysing ASR-driven terminology tools, showing that such systems can support interpreters by reducing search effort and enhancing terminological consistency. However, Fantinuoli also notes that technological cues can add new decision-making burdens, requiring interpreters to monitor, evaluate, and sometimes override machine suggestions. Desmet et al. (2023) report mixed perceptions among professional interpreters: while many value the support offered by AI-driven prompts, they also express concerns regarding machine accuracy, distraction, and the risk of over-reliance. Prandi (2021) similarly argues that although AI can improve terminological retrieval, it does not replace human abilities to process nuance, context, or pragmatic meaning. Russo (2020) emphasises that the emotional dimension of interpreter–machine interaction remains underexplored. Anxiety, distrust, or confusion arising from machine outputs can shape cognitive strategies and lead to reactive behaviour such as increased note-taking for verification purposes. Together, these studies indicate that AI's impact on SI is complex and multifaceted, influencing not only cognitive load but also professional judgement, emotional responses, and workflow strategies.

The convergence of classical note-taking theory, cognitive models, and emerging AI research suggests that note-taking is not a static skill but a flexible cognitive resource that adapts to technological shifts. While traditional models emphasise memory support, contemporary technological environments introduce new functional roles. AI-generated cues may reduce memory pressure but simultaneously increase coordination and monitoring demands. These dynamics create conditions under which note-taking may evolve from a memory-oriented activity to a form of supervisory control, supporting interpreters as they manage both human and machine contributions to the



communicative event. This theoretical synthesis underscores the need to reconceptualise note-taking within AI-assisted SI as a dynamic and adaptive practice shaped by both cognitive constraints and technological affordances. It sets the stage for the next sections of the article, which analyse how AI tools interact with note-taking in practice and how these shifts can be conceptualised in a new model.

AI Tools in Modern Simultaneous Interpreting and Their Conceptual Impact

The rapid development of artificial intelligence (AI) and computer-assisted interpreting (CAI) technologies has introduced new dynamics into the simultaneous interpreting (SI) workflow. These tools vary in functionality, maturity, and cognitive impact, yet they share a common characteristic: they introduce an additional informational channel that interpreters must integrate into an already demanding multimodal task. This section outlines key AI-driven tools currently influencing interpreting practice and evaluates their conceptual implications for note-taking.

3.1 Automatic Speech Recognition (ASR) and Real-Time Transcription

Automatic speech recognition has become one of the most widely adopted AI-based features in interpreting environments. Modern ASR systems can generate near real-time transcripts of the speaker's discourse, often displayed within interpreting platforms or on external screens. At a conceptual level, ASR alters the distribution of cognitive tasks: Potential reduction in memory load: interpreters may no longer need to note down numbers, lists, or proper names to ensure accuracy, as the transcript serves as an accessible external memory.

Increased coordination demands: interpreters must divide attention between the auditory source, their own output, and the dynamic text stream. This requires constant monitoring for transcription errors, delays, or inconsistencies.

Errors in punctuation, segmentation, and domain-specific terminology remain common in ASR, meaning interpreters cannot rely on it uncritically. This introduces a new type of cognitive responsibility – verifying and supervising the transcript – which may lead to new forms of quick reference notes that complement the automated output rather than replace traditional strategies.

3.2 Predictive Glossaries and AI-Assisted Terminology Tools

AI-driven terminology tools, such as those integrated into platforms like InterpretBank and other CAI systems, use machine learning to predict and highlight domain-specific terminology. These tools are designed to support interpreters by: suggesting equivalent terms based on context retrieving relevant glossary entries, and offering terminological consistency during specialised events. From a conceptual standpoint, these systems influence note-taking by reducing the need for interpreters to pre-record or manually note terminology during SI. However, they introduce new micro-decisions:

- Should the interpreter trust the AI-suggested term?
- Is the suggestion contextually and pragmatically appropriate?
- Does the machine's prediction align with domain conventions?

This evaluative burden can increase cognitive load and may even prompt interpreters to jot down "alert notes" (e.g., query marks or comparison symbols) when



machine suggestions appear unreliable. Thus, rather than eliminating terminology notes, AI shifts their purpose toward monitoring and validation.

3.3 AI-Enhanced Remote Simultaneous Interpreting (RSI) Platforms

Remote simultaneous interpreting has become a mainstream mode of delivery, and many RSI platforms increasingly incorporate AI enhancements. These include: real-time quality monitoring indicators, noise-suppression algorithms, automatic detection of speaker changes, and overlays providing contextual cues or summaries. These features offer technical support but also contribute to visual and cognitive complexity. Research shows that RSI already increases fatigue due to the interplay of environmental instability, platform navigation, and reduced spatial cues (Bendazzoli & Sandrelli, 2020). The introduction of AI overlays adds further layers of input that interpreters must evaluate. For note-taking, this means interpreters may create notes that compensate for the distractions or uncertainties introduced by the platform – such as reminders about speaker identity, quick timeline markers, or brief structural cues. These notes help maintain coherence under conditions that demand heightened visual and cognitive coordination.

A growing frontier in interpreter technology involves AI-augmented note-taking tools. These systems allow interpreters to take digital notes that are: analysed by AI, linked automatically to glossary entries, or matched with predicted terms in real time.

While such tools are in early development, they illustrate how AI may reconfigure note-taking as a hybrid process involving human intentionality and machine augmentation. Rather than replacing the act of note-taking, smart systems embed it within a broader ecosystem of automated prompts and semantic suggestions. Conceptually, this challenges traditional distinctions between internal (memory-based), external (written), and digital supports. It suggests that note-taking may evolve into a multi-layered cognitive interface – a site where human strategic choices intersect with automated assistance.

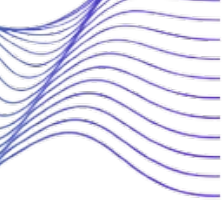
Across all categories of AI tools, a consistent pattern emerges: AI does not simply reduce cognitive effort, rather, it redistributes it. Memory load may decrease, but coordination and monitoring load increase. This redistribution reshapes note-taking not by making it obsolete, but by prompting new types of notation oriented toward: error tracking,

verification, contextual grounding, and anticipation of AI-related uncertainties.

Thus, AI-assisted SI creates conditions in which note-taking remains essential – but its role becomes more supervisory than mnemonic.

Conceptual Transformation of Note-Taking in AI-Assisted Simultaneous Interpreting

The introduction of artificial intelligence (AI) into simultaneous interpreting (SI) environments has prompted a reconfiguration of how interpreters manage cognitive demands. Rather than rendering note-taking obsolete, AI tools contribute to a redistribution of cognitive load, which reshapes the function, form, and purpose of notes. Building on the theoretical framework outlined earlier, this section articulates how note-taking practices are conceptually transformed in AI-assisted workflows.



One of the most frequently cited benefits of AI assistance – particularly automatic speech recognition (ASR) and predictive glossaries – is the potential to reduce memory pressure. These tools provide interpreters with written or suggested content that externalizes parts of the incoming message, particularly: proper names, numerals and dates, enumerations, domain-specific terminology. When such information is available visually, interpreters may no longer need to jot it down. However, this reduction is selective rather than universal. Interpreters frequently continue to note: discourse connectors, thematic transitions, emphasis markers, segments requiring reformulation, structural cues that are not captured well in ASR.

Thus, AI does not negate the need for note-taking, it shifts what interpreters choose to note and what they rely on external sources to provide.

While AI reduces some aspects of memory effort, it simultaneously increases coordination effort – a key component of Gile’s Effort Model. Interpreters must now juggle: the auditory speech stream, their own output, real-time transcripts, terminology suggestions, platform controls, and potential system notifications. This multimodal environment intensifies split attention and heightens the risk of cognitive overload. In this context, note-taking becomes a stabilizing mechanism, helping interpreters: maintain coherence when attention shifts, record key points that could be lost amidst multitasking, anchor their output with minimal cognitive effort.

These notes often take the form of shorthand cues that function as cognitive “reset points” during complex interpreting segments.

A major conceptual shift introduced by AI is the emergence of supervisory note-taking. In this expanded role, interpreters use notes not merely to support memory, but to: flag errors in ASR transcription (e.g., misrecognised terms), mark segments requiring post-event revision, track divergences between AI suggestions and their own terminological choices, monitor consistency,

and record cues to evaluate AI behaviour (e.g., persistent mis-segmentation). This supervisory role arises because AI outputs, while useful, remain fallible. Interpreters cannot rely on them unquestioningly. Notes become tools for quality assurance, enabling interpreters to critically assess the reliability of machine-generated cues while maintaining control over their final output.

Symbolic and Functional Expansion of Notes

The transformation of note-taking is also visible in the evolving symbolic repertoire interpreters employ. Traditional symbols (arrows, abbreviations, relational markers) continue to be used, but AI-assisted environments promote additional notational conventions, such as:

- “AI?” to question a machine suggestion,
- “chk” to signal the need for verification,
- “→AI” to mark agreement with a suggested term,
- “≠AI” to mark deliberate deviation, timestamps referencing problematic transcript segments.

These new symbols reflect an expanded functional purpose: notes are no longer solely about memory retrieval, but about decision-tracking, error-monitoring, and strategic reasoning. As a result, note-taking evolves into a hybrid practice that intersects



with digital monitoring. This does not constitute technological dependence, rather, it reflects interpreters' adaptive strategies in a technologically dense cognitive environment.

Emotional Regulation and Trust Dynamics

Interpreting performance is influenced not only by cognitive factors but also by emotional dynamics. Research shows that interpreters experience varying levels of trust, scepticism, and anxiety in response to AI-generated cues (Desmet et al., 2023, Russo, 2020). These emotional states shape note-taking behaviour in nuanced ways. For example: Low trust may lead interpreters to take more notes as a safeguard. High trust may reduce note-taking, but increase vulnerability to machine errors. Uncertainty about AI output can prompt "risk notes" – written markers used to verify questionable segments later. Stress induced by inconsistent AI behaviour may lead to more frequent micro-notes to regain cognitive control. Therefore, note-taking also functions as a mechanism for emotional regulation. It provides interpreters with a tangible sense of agency and cognitive grounding when dealing with unpredictable machine behaviour.

Taken together, the developments described above demonstrate that AI-assisted SI does not simplify the interpreter's task. Instead, it introduces new layers of responsibility and complexity. This gives rise to a hybrid model of note-taking characterised by: reduced reliance on notes for memory-heavy details, increased use of notes for coordination and stability, a new supervisory role oriented toward quality assurance, expanded symbolic systems reflecting human-machine interaction, emotional and strategic functions supporting interpreter agency. In this hybrid model, note-taking becomes a form of cognitive governance – an adaptable tool that helps interpreters navigate and regulate the dynamic interplay between human and machine contributions to meaning-making. This conceptual shift forms the foundation for the broader argument of the article and directly informs the subsequent discussion of pedagogical, ethical, and professional implications.

Discussion

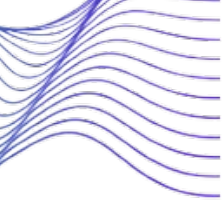
The conceptual transformation of note-taking in AI-assisted simultaneous interpreting (SI) has wider implications for interpreter training, professional practice, and ethical considerations. As AI systems increasingly permeate interpreting environments, the interpreter's role evolves from that of a purely linguistic mediator to a hybrid cognitive manager who must integrate human and machine-generated cues. This discussion synthesises the theoretical insights presented in earlier sections and outlines their broader significance.

Interpreter training has historically focused on developing linguistic competence, cognitive resilience, and core strategies such as anticipation, segmentation, reformulation, and note-taking. However, the introduction of AI tools requires a reorientation of pedagogical priorities. Training institutions must now equip students with digital literacy and AI literacy, encouraging interpreters to understand not only how AI tools function but also their limitations.

Three pedagogical shifts appear particularly important:

1. Training visual and multimodal attention management.

Students must learn to distribute their attention between the speech stream, AI-generated cues, and their own output without compromising accuracy. Controlled



practice environments using simulated AI interfaces could help students develop this competence safely.

2. Teaching critical evaluation of machine suggestions.

Interpreters must recognise when to accept or reject AI-generated terminology or transcripts. Training should therefore include activities that enhance metacognitive judgement, such as evaluating machine errors, comparing alternative formulations, or identifying biases in predictive glossaries.

3. Integrating new forms of note-taking.

The emergence of supervisory note-taking requires educators to broaden their instruction. Exercises may include marking inconsistencies between ASR output and the spoken message, annotating AI errors, or combining digital notes with automated cues – skills that are currently absent in most interpreting curricula.

These pedagogical adaptations acknowledge that the role of interpreters is expanding, not shrinking, in AI-assisted contexts.

The rise of AI tools introduces significant ethical issues that have direct implications for professional note-taking practices. Many AI features – ASR, automated summarisation, terminology extraction – operate using cloud-based processing. This raises concerns regarding:

- confidentiality, as sensitive information may be inadvertently stored or processed externally,
- data security, particularly when transcripts or suggestions are logged,
- consent, since participants may not be aware that their speech is processed by AI,
- data ownership, especially when machine outputs influence or supplement human production.

Interpreters must therefore remain vigilant about what they note down, how notes are stored, and how they integrate AI-generated content into their workflow. Handwritten note-taking, long considered secure due to its ephemerality, may be affected when interpreters use digital devices or AI-enabled platforms. Professional associations may need to revise codes of ethics to address these new risks, emphasising responsible use of AI tools and the protection of confidential information in hybrid environments.

The introduction of AI tools subtly shifts interpreters' professional identity. Instead of being solely responsible for listening, analysing, and reproducing speech, interpreters increasingly act as cognitive supervisors who must: monitor machine output, cross-check AI suggestions, evaluate the contextual fit of automated terms, and decide when to override machine contributions. This supervisory role elevates interpreters' responsibility rather than diminishing it. AI may take over certain mechanical aspects of information extraction, but the interpretive, pragmatic, and contextual aspects of meaning-making remain distinctly human. The requirement to supervise technology also reinforces the value of human agency, interpreters must ensure coherence, accuracy, and nuance in situations where AI fails to capture relevance, sarcasm, metaphor, or other pragmatic subtleties. Some interpreters may experience this shift as empowering, while others may perceive it as an additional cognitive and emotional burden – especially when AI suggestions conflict with professional judgement. These tensions underscore the need for



professional development programs that support interpreters in managing hybrid workflows.

Quality assurance in interpreting traditionally relies on preparation, subject-matter knowledge, and cognitive strategies such as anticipation and segmentation. In AI-assisted SI, quality assurance increasingly includes: monitoring and verifying AI transcripts, checking the accuracy of terminology prompts, using notes to track inconsistencies, managing split attention between inputs, anticipating machine errors, and maintaining stability during multitasking.

AI systems provide support but do not offer meaning-based understanding or contextual reasoning. Their suggestions require human evaluation. This dependency creates a scenario where interpreters must maintain an even more stable cognitive structure to manage both the linguistic task and the machine's behaviour. Note-taking thus becomes a critical anchor for navigating uncertainty introduced by the unpredictable nature of AI outputs.

As interpreters adopt supervisory note-taking, quality assurance emerges as a shared responsibility between human expertise and technological support, with humans retaining the decisive role.

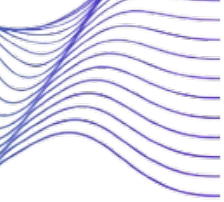
The integration of AI into interpreting calls for a new research agenda that goes beyond technological efficacy and explores cognitive, emotional, and social dimensions. Future studies might examine: eye-tracking and gaze distribution when interpreters interact with AI tools, working memory dynamics under hybrid processing conditions, emotional load and trust in machine-generated cues, long-term effects of AI reliance on skill retention, comparisons between handwritten, digital, and hybrid note-taking practices, the role of note-taking in interpreter self-regulation during high-technology tasks.

A systematic empirical exploration of these themes would enable the profession to better understand how interpreters adapt to AI-rich environments and which training interventions are most effective.

Across all these dimensions – pedagogy, ethics, identity, and quality assurance – one theme remains consistent: AI does not replace the interpreter, it redefines the interpreter's cognitive ecosystem. Rather than erasing traditional strategies such as note-taking, AI tools shift their role and strengthen their relevance as mechanisms of supervision, stabilisation, and cognitive control.

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