

MODULE 3

A Proposal for an Epistemic Role in Voice Pedagogy

(7,834 words)

By Alexander Porter

2319175

CONTENTS

PROJECT PROPOSAL 1-2

PROJECT REPORT 3-4

Literature Review 4-6

Methodology 7-10

Results and Implications

4.1 Empirical Pivot: Methodological Dissociation and Revised Analytic Focus 11-13

4.2 Epistemic Regulation and the Timing of Commitment 13-14

4.3 Neural and Dynamical Constraints on Epistemic Openness 14-15

4.4 Bistability and the Persistence of Alternatives 15-18

4.5 Structural Epistemic Duality: Writing, Scale, and Abstraction 18-20

4.6 Structural Epistemic Duality Across Science, Learning, and Trauma 20

4.7 Voice Pedagogy as Epistemic and Ethical Response 20-22

Conclusion and Limitations 22

REFERENCES 23-29

APPENDICES

A. Statement on the Use of AI in Research Design and Analysis 30-31

B. Application for Ethical Approval 32-52

C. Example Narrative Stimulus and Epistemic Task Sequence 53-55

D. Participant Information Sheet and Consent Form 56-57

TABLES

Table A1. Empirical Alignment Between Incongruent Neurons and Irrelevance Potential 58

Table A2. Prosodic Regulation of Irrelevance Potential Across Frameworks 59

Table A3. Oscillatory Timescales, Prosody, and Irrelevance Potential 60

Table A4. Epistemic Registers in Co-Present Language Use 60-61

Table A5. Diachronic Compression of Enacted Epistemic Terms 61-62

Table A6. Ordering in Language Pedagogy 62

Table A7. Pedagogical Consequences of Ordering 62

Table A8. Hedging as Prosodic Regulation of Epistemic Commitment 63

Table A9. Greek and Latin Articulations of Logos 64

Table A10. Greek and Latin Articulations of Flesh 64-65

Table A11. Preserved and Obscured Epistemic Features 65

Table A12. Historical Trajectory of Epistemic Regulation 65-66

Table A13. Applicability of the Epistemic Regulation Mission 66-67

Table A14a. Illustrative Within-Participant Inference Trace 68-69

Table A14b. Task-Sensitive Scoring (Story-Based Metacognitive Scale)	69
Table A15. Domains and the Modelling Privilege of Voice Pedagogy	70
Table A16. Domain-General Epistemic Loop	71-73
Table A17. Minimal Epistemic Process and Linguistic Traces	73
Table A18. Epistemic–Prosodic Diagnostic Prompt Specification	73-78
Table A19. Clinician-Facing Epistemic-Diagnostic Description System	79-82

PROJECT PROPOSAL

Introduction

This project proposes a classroom-based study examining metacognitive engagement during an IELTS preparation programme. The study will be conducted with adult Vietnamese teachers of English undertaking IELTS preparation with the researcher as their speaking instructor. The research will be embedded within an existing training programme and will not alter instructional content, assessment criteria, or course requirements.

The study will deploy a structured metacognitive intervention designed to generate comparable task-positioned responses, allowing metacognitive engagement to be examined using predefined analytic procedures. IELTS scores, language proficiency gains, and instructional effectiveness will not be measured; IELTS preparation provides the contextual setting for data collection only. The primary purpose of the study is to examine whether patterns of metacognitive engagement, as measured through task-based responses and supported by psychometric instruments, change over the course of the programme.

Participants

Participants will be Vietnamese teachers of English enrolled in an IELTS preparation programme taught by the researcher. All participants will be adult learners (aged 18 and over) who teach English professionally and are undertaking IELTS preparation as part of their continuing professional development.

The potential participant pool comprises approximately 150 teachers across programme cohorts. Participation will be voluntary, and not all eligible teachers are expected to participate. The study will be conducted within intact instructional groups, including both in-person and online learners.

Eligible participants will receive written information about the study and provide written informed consent prior to data use (Appendix C). Participants will be informed of their right to withdraw at any time without penalty. No fixed sample size is specified in advance, as the realised sample will depend on consent and task completion.

Research Design and Data Collection

The study will adopt a classroom-based research design combining task-based qualitative data with standard psychometric questionnaires, consistent with practitioner-research approaches in educational settings (Schön, 1983; Cochran-Smith and Lytle, 2009). Data collection will be integrated into the existing programme schedule without modification of curricular or assessment practices.

Participants will complete a series of fixed, task-based written activities administered at scheduled intervals. Each activity will consist of a short fictional third-person narrative followed by a structured set of prompts. Responses will constitute the primary qualitative dataset. Task structure, prompt sequence, and response format will remain invariant across administrations to allow comparison across task positions and time points. Prompts will be organised using the

DEBRIEF framework, a staged model for scaffolded reflection in professional learning contexts (Allan, 2011).

Participants will also complete established psychometric questionnaires at the beginning and end of the programme, providing self-reported measures of metacognitive awareness, cognitive reflection, and self-regulated learning. Metacognitive awareness will be assessed using the Metacognitive Awareness Inventory (MAI; Schraw and Dennison, 1994). Psychometric data will be collected to enable comparison with task-based measures, assessing convergence or divergence between self-report indicators and task-positioned responses.

No IELTS scores, language test results, audio recordings, or video recordings will be collected. All data will be anonymised prior to analysis and handled in accordance with institutional ethical approval.

Analytical Approach

Task-based responses will be analysed using a Bayesian-inspired inferential approach that models patterns of engagement probabilistically over time, treating inference as graded rather than categorical. Analysis will focus on observable features of written responses evaluated against predefined analytic criteria, consistent with text-as-data approaches that treat language as behavioural evidence—rather than subjective disclosure—without inferring participant psychology (Grimmer and Stewart, 2013; Nelson et al., 2020).

Large language models (specifically ChatGPT 5.2) will be used as constrained analytic instruments to apply predefined inferential criteria under fixed instructions. The models will not generate interpretations, hypotheses, or evaluative judgments and will not be treated as sources of epistemic authority. Their role will be limited to consistent execution of rule-based analytic procedures, as specified in Appendix A. Task-based profiles will be examined in relation to psychometric questionnaire scores to support descriptive comparison between task-positioned and self-reported indicators of metacognitive engagement.

Anticipated Contribution and Scope

The study is intended to generate empirical data that may support further investigation into how trauma-related constraints interact with second language learning, without directly assessing trauma exposure or clinical status. No causal claims about trauma are advanced.

The study also examines whether metacognitive engagement can function as a baseline analytic variable in classroom-based social research. Its contribution is limited to assessing the suitability of the proposed design and measures for exploratory and diagnostic purposes.

PROJECT REPORT

Analytic Orientation

This report adopts an early analytic pivot away from the assumptions of the original project proposal. While the proposal treated metacognition as a stable participant trait assessed via psychometric instruments, this assumption was examined using both those instruments and task-based data embedded in the intervention and was found untenable in the present context. The intervention data were therefore retained without modification, but the analytic framework was re-specified prior to substantive interpretation.

The report accordingly treats epistemic regulation as task- and situation-sensitive rather than as an individual capacity, and advances the hypothesis that—because this regulation is fundamentally prosodic—Voice Pedagogy (hereafter VP) can adopt an explicit epistemic role in regulating commitment under conditions of uncertainty.

INTRODUCTION

Given this analytic re-specification, the report treats epistemic regulation as the temporal regulation of commitment to inferential trajectories under uncertainty rather than as a stable individual capacity, proceeding on the hypothesis that this regulation is enacted prosodically and that VP is epistemically privileged as a pedagogical domain. Claims concerning the VP hypothesis are therefore framed using deliberate prosodic hedging—via modalisation, conditional scope marking, and phase-dependent qualification—as specified in Table A8.

Recent neurolinguistic work emphasises the temporal organisation of cognition, showing that language processing depends on oscillatory coordination and phase-sensitive dynamics rather than instantaneous selection (Poeppel and Assaneo, 2020), with neural integration constrained by bounded multisensory windows that determine when information can be combined and stabilised (D'Angelo et al., 2025). Despite these advances, cognition is still predominantly characterised at the level of prediction, action, and stabilised outcomes (Heilbron, Chait and Poeppel, 2022).

Predictive Processing (PP) models describe cognition as hierarchical inference unfolding over time, with commitment emerging gradually (Friston, 2010), while enactivist and RR accounts similarly treat cognition as ongoing sense-making or progressive salience narrowing rather than discrete decision events (Varela, Thompson and Rosch, 1991; Gallagher, 2005; Vervaeke et al., 2017). However, across these approaches, the timing of epistemic commitment remains under-specified (Clark, 2016; Kirchhoff and Robertson, 2018).

Decision-making research shows that multiple action or interpretation candidates coexist and are provisionally weighted during a structured interval of inference-in-progress prior to selective collapse (Cisek and Kalaska, 2010), and that this interval cannot be reduced to outcome states without explanatory loss (van Rooij et al., 2019). Longitudinal hippocampal and neural timescale research provides convergent evidence for temporally extended inference, showing

redistribution rather than replacement of predictive activity and the persistence of alternatives across temporal windows (Goldstein et al., 2025; Kim et al., 2025).

On this account, VP is epistemically relevant because its practices explicitly engage timing, pacing, hesitation, and graded commitment under uncertainty, rendering temporal regulation pedagogically accessible (Appendix Table A16). The alignment between neural timescales, prosodic variables, and the regulation of IP—defined here as the persistence of non-selected inferential alternatives—is specified schematically (Appendix Table A3), motivating the subsequent analysis of bistability and alternative persistence. Although presupposed by predictive, enactive, and relevance-based accounts, this regulatory function is not operationalised pedagogically outside VP, where it remains explicit and transferable..

This analytic focus carries three expectations that constrain interpretation throughout the report: (i) epistemic regulation should vary with task demands rather than stable individual differences; (ii) differences in timing, stability, and revision should be observable even when surface outcomes appear similar; and (iii) the same participant may exhibit both early closure and sustained epistemic openness across tasks under invariant constraints.

Although the original design employed established metacognitive instruments, early analysis showed that metacognition could not be treated as a stable outcome under uncertainty, motivating a re-specification toward task-positioned regulation of epistemic commitment in action rather than trait-level ability, and a diagnostic rather than outcome-validating approach.

LITERATURE REVIEW

This review adopts a narrative, integrative approach to establish the conceptual background necessary to render epistemic regulation in VP legible, consistent with recognised methodological typologies for synthesising conceptual and theoretical literatures (Grant & Booth, 2009; Torraco, 2005).

VP and Cognition

Before turning to the mechanism explored in this paper, two models of VP are distinguished to frame the discussion:

1. Voice Pedagogy (Performance-Oriented)

Conscious technique → Volitional control → Expressive delivery → Performance outcome

(e.g. Miller, 2004; McCoy, 2012; Titze, 2008)

2. Voice Pedagogy (Epistemic-Oriented)

Pre-reflective uncertainty → Temporal regulation → Epistemic commitment → Meaning or action

(analytic re-description drawing on embodied and predictive accounts of cognition:

Varela, Thompson and Rosch, 1991; Clark, 2016)

The analysis draws on established performance-oriented practices while addressing the epistemic processes captured by the second model; the following section situates this orientation within contemporary cognitive accounts.

Relevance Realisation: Process or Event?

PP models cognition as hierarchical inference over time (Friston, 2010; Clark, 2016), while RR treats it as the dynamic narrowing of possibilities toward situational salience (Vervaeke et al., 2017).

Recent longitudinal hippocampal evidence shows that learning involves temporally extended reorganisation of relevance, including redistribution of predictive activity and shifts in the timing of neural commitment (Goldstein et al., 2025). Process-level accounts accordingly characterise this interval as inference-in-progress rather than an outcome state (Cisek and Kalaska, 2010; van Rooij et al., 2019).

However, while these frameworks presuppose the persistence of alternatives, they do not specify how the timing of epistemic commitment is regulated prior to convergence, with commitment typically inferred retrospectively from outcomes or representational stability. This omission becomes consequential when learning, revision, or action precedes uncertainty resolution, motivating PR as an explicit account of pre-representational epistemic regulation already implicit—though rarely foregrounded—within RR (Vervaeke and Ferraro, 2013; Vervaeke et al., 2017), PP (Friston, 2010; Clark, 2016), and enactive approaches (Varela et al., 1991; Gallagher, 2005). Complementary work in network control theory further supports this temporal view, showing that neural activity can persist across distinct timescales prior to stabilisation (Kim et al., 2025).

Here, prosodic framing refers to the concrete mechanisms—such as timing, pacing, expectancy, and hesitation—through which this regulation is enacted in interactional and pedagogical contexts.

If relevance is regulated over time, rather than resolved through immediate selection, a further question becomes unavoidable: what epistemic status do non-selected alternatives retain during this interval?

The Persistence of Non-Selected Alternatives

While influential models of decision-making emphasise selection outcomes (Kahneman, 2011), similar outcome bias appears in some formulations of RR (Vervaeke et al., 2017) and later integrative work linking RR and PP (Andersen, Miller and Vervaeke, 2022). This emphasis risks re-describing relevance at the level of behavioural outcome alone, thereby obscuring the epistemic role of non-selected alternatives that remain functionally active in learning and revision (Norman and Shallice, 1986).

Interactional research shows that timing, expectancy, and hesitation organise unfolding action without fixing interpretive outcomes in advance (Couper-Kuhlen and Selting, 1996).

Separately, pragmatic and cognitive studies indicate that interpretation depends on the concurrent availability of multiple contextual cues rather than on immediate propositional commitment (Floyd et al., 2025).

Representation is therefore treated here as stabilising meaning after the fact consistent with enactivist and non-representational accounts that emphasise organism–environment coupling over internal representation (Varela et al., 1991; Hutto and Myin, 2013; Vervaeke et al., 2017).

Empirical work challenges strict cognitive–affective separation, emphasising integrated processing across affective and cognitive domains, without addressing the timing or regulation of epistemic commitment examined here (Pessoa, 2017).

Biologically grounded network models further indicate that non-selected neural populations can persist alongside dominant behavioural responses and predict subsequent error (Pathak et al., 2025). This persistence is treated here as evidence of continued functional activity prior to convergence, without those models themselves assigning an epistemic or learning-regulatory role to that activity (Appendix Table A1).

Taken together, these findings indicate that the persistence of structured alternatives over time is a sustaining condition of the *salience landscape* described in RR theory (Vervaeke et al., 2017), grounded in differential neural timescales (Kim et al., 2025) and the continued behavioural influence of non-selected neural populations (Pathak et al., 2025), yet not formally mechanised in existing RR accounts.

Gap in the Literature

Searches on prosody, PP, and RR have revealed no existing framework that has treated prosodic timing as an analytic locus for epistemic control within otherwise established relevance-seeking architectures. While prosody has been extensively studied as a cue to linguistic structure, affect, and turn-taking (Crystal, 1969; Cutler, Dahan, and van Donselaar, 1997; Poeppel and Assaneo, 2020), it has not been analysed as governing the timing of epistemic commitment under uncertainty—specifically, how speakers stabilise, defer, or revise an interpretation when multiple possibilities remain available.

Transition to Contribution

Recent work has clarified how relevance is realised through convergence; the present account instead targets how epistemic commitment is regulated prior to convergence. Voice Pedagogy (VP) is therefore treated as a pedagogically privileged domain in which this otherwise implicit regulatory layer becomes observable. The following section operationalises this framework as a constraint-based, process-preserving analytic approach, formalising Irrelevance Potential (IP) as the regulatory substrate implicit within predictive processing and prosodic regulation (PR) as its temporal organising mechanism.

On this basis, VP is positioned as a site for the explicit training of epistemic regulation, insofar as PR can sustain IP, orchestrate selective collapse, and structure learning; the full epistemic loop and loci of voice-pedagogical collaboration are specified in Appendix Table A16

METHODOLOGY

Methodological Orientation and Analytic Commitment

The analytic focus was accordingly re-specified to examine how epistemic commitment is regulated in action through observable linguistic traces under invariant task constraints, treating these traces as a fossil record of the epistemic process by which commitment was provisionally weighted and selectively stabilised, rather than as indicators of trait-like capacity. The unit of analysis is the question–response instance rather than the individual participant, with linguistic form treated as an inductive trace of epistemic regulation rather than as evidence of belief or meaning.

Variability is analysed by task context and question type rather than individual capacity, with the stepwise organisation of regulation—including prosodic modulation—specified in Appendix Table A16.

Research Context and Setting

The study was conducted in Hanoi with Vietnamese teachers of English enrolled in a high-stakes IELTS preparation course, with the researcher embedded as Speaking instructor; instruction, assessment criteria, and institutional requirements were not altered. All participants were adults and provided written informed consent prior to data use; participant information materials and consent documentation are provided in Appendix D.

Pedagogical Intervention

Within these constraints, participants engaged with ten short fictional narratives over ten weeks. The narratives were generated with assistance from a large language model (ChatGPT 5.2) under explicit researcher-defined constraints, with details of AI use and limits provided in Appendix A.

Trauma- and stress-informed constraints ensured that attentional disruption or urgency could be recognised at a third-person level without eliciting personal disclosure, while each narrative foregrounded a distinct cognitive or metacognitive challenge relevant to second-language learning.

Framing reflection around fictional characters supported metacognitive pattern recognition while maintaining ethical distance from subjective experience, consistent with trauma-informed educational and clinical research practices (Ehlers and Clark, 2000; van der Kolk, 2014; Lanius et al., 2010).

Reflective Task Design

Following each narrative, participants completed structured reflective prompts organised using the DEBRIEF reflective framework, a staged workplace-learning model developed in postgraduate medical education to scaffold metacognitive reflection and self-regulation (Allan, 2011). Prompt sets were generated with the assistance of the LLM constrained to follow the DEBRIEF sequence, such that while surface phrasing varied across stories, the underlying reflective logic and task-positioned cognitive demands remained invariant. This ensured

comparability across narratives and time points while allowing contextual responsiveness to each text.

The DEBRIEF sequence was selected because it enforces a progression from descriptive and evaluative processing toward explicitly metacognitive operations, consistent with established models of scaffolded reflection and metacognitive development (Schön, 1983; Perkins, Salomon, and Globerson, 1991).

Questions progressed through narrative comprehension and immediate causal description (Questions 1–3), followed by prompts explicitly requiring metacognitive regulation through comparison, monitoring, strategy formation, and transfer (Questions 4–7), as specified in Appendix C.

Psychometric Assessment

Participants completed psychometric assessments at the beginning and end of the intervention period.

Cognitive skills were assessed using two equivalent test forms (Set A and Set B) to minimise practice effects, using a 20-item Cognitive Performance Questionnaire (CPQ) modelled on existing validated self-report scales of cognitive functioning and adjusted to sample distinct cognitive domains (attention, memory, and problem-solving) (Broadbent et al., 1982; Carriere et al., 2008; Heppner and Petersen, 1982; Wilson et al., 1996).

Metacognitive skills were assessed using the Metacognitive Awareness Inventory (MAI), an established self-report measure with binary (0/1) item scoring, administered at both time points (Schraw and Dennison, 1994).

Data Sources

Data sources included participant reflective responses, pre- and post-intervention psychometric scores, and researcher teaching notes.

All data were anonymised, and participation was voluntary. Responses were completed either in class or online via Google Sheets, sometimes immediately following the task and sometimes after a short delay, allowing variation in reflection time while preserving consistency of task structure.

The analytic approach draws on two prototypes (Appendices E and F), which operationalise the proposed framework by instantiating its analytic constraints under the same task-positioned conditions as the empirical analysis.

Analytical Approach

Bayesian-inspired probabilistic modelling was used to generate quantitative scores representing cognitive and metacognitive engagement, with inference treated as graded and uncertainty-sensitive rather than categorical, consistent with established approaches that treat language as behavioural evidence for latent cognitive processes (Grimmer and Stewart, 2013; Nelson et al., 2020).

Inference scores were derived by constraining a large language model—ChatGPT (OpenAI; version 5.2)—to evaluate predefined linguistic features using predefined ordinal scales aligned to task-positioned epistemic demands (e.g. Depth of Metacognitive Reflection, Levels 1–4; Appendix Table A14), treating participant responses as observable linguistic traces of inference-in-progress and generating probabilistic scores for commitment, revision, and expressed uncertainty without interpreting participant psychology or subjective experience as explanatory variables.

Questions 1–3 are treated as primarily cognitive, eliciting comprehension and immediate causal description that typically resolve through rapid closure. Questions 4–7 are treated as metacognitive, placing explicit demands on how participants regulate commitment when more than one response or strategy remains viable.

To analyse responses consistently, they are located relative to a fixed minimal analytic sequence—**opening, biasing, commitment, and optional reopening**—which formalises a regulatory process presupposed by contemporary process accounts of cognition and is used here to identify where epistemic closure occurs under task demands. The sequence is treated as an analytic formalisation rather than a claim about participant mental states and is specified in Appendix Table A17. Accordingly, analysis targets variability in epistemic regulation under invariant task constraints rather than stable individual ability.

An illustrative within-participant inference trace is provided (Appendix Table A14). For example, the response “she can be more confident to speak to others,” while positive in outcome, contains an unqualified modal and lacks conditionality, temporal marking, or strategy, and is therefore matched to Level 2 (outcome-focused awareness) on the Depth of Metacognitive Reflection (DMR) scale rather than Levels 3–4, which require explicit strategy or future-oriented regulatory framing. The resulting inference concerns the structure of epistemic regulation expressed in the response, not the learner’s belief, affect, or competence.

- Pre- and post-intervention scores were compared probabilistically, accounting for individual variation.
- This analytic procedure introduces what is here termed epistemic-diagnostic modelling: a constraint-based approach that treats probabilistic inference traces as evidence of how epistemic commitment is regulated over time, rather than as measures of representational accuracy or psychological state.

The present study functions as a prototype demonstration rather than a validation or deployment of analytic instruments. Appendices E and F are included to demonstrate that the proposed regulatory framework can be externalised into instruction-complete, constraint-bound procedures under invariant task conditions, without introducing additional empirical evidence or analytic results.

Scope and Limitations

The minimal analytic sequence used to locate epistemic traces (opening–biasing–commitment–optional reopening) is specified in Appendix Table A17 and operationalised through the

epistemic-diagnostic procedures detailed in Appendices E and F. These procedures introduce no claims of diagnostic validity, efficacy, or practical readiness and are included solely to demonstrate extensibility and constraint-satisfaction rather than to perform diagnosis or support further empirical inference.

Ethical Status

Ethical approval was granted by the relevant institutional ethics committee prior to data collection (see Appendix B). All participants provided written informed consent; all data were anonymised prior to analysis and stored in accordance with the procedures stipulated in the approved ethics documentation (Appendix B), with participant information and consent materials provided in Appendix D.

RESULTS AND IMPLICATIONS

This section explores the empirical findings in relation to the VP hypothesis, motivating a shift from outcome-based measures to process-level analysis of epistemic regulation.

4.1 Empirical Pivot: Methodological Dissociation and Revised Analytic Focus

Cognitive performance scores remained stable from pre- to post-intervention, as expected given the representational nature of the tasks, the pressures of high-stakes assessment, and participants' reliance on memorisation-based study strategies (Ellis, 2008; DeKeyser, 2015). A paired-samples t-test revealed no statistically significant difference between pre-intervention ($M = 54.3$, $SD = 9.64$) and post-intervention ($M = 56.2$, $SD = 9.84$) cognitive performance scores, $t(43) = -1.07$, $p = 0.289$. Metacognitive self-report scores, by contrast, declined. A paired-samples t-test revealed a statistically significant decrease from pre-intervention ($M = 39.3$, $SD = 7.34$) to post-intervention ($M = 35.9$, $SD = 6.82$) metacognitive performance scores, $t(43) = -2.36$, $p = 0.023$.

This decline is not interpreted as a loss of metacognitive ability, but as evidence that task-sensitive regulatory demands undermine trait-based interpretation under conditions of uncertainty, consistent with well-documented limitations of psychometric self-report (Schwarz, 1999; Paulhus and Vazire, 2007) and without presupposing the validity of the analytic framework advanced here. Under such conditions, self-report measures tend to vary with task difficulty, confidence disruption, and question framing rather than providing a stable index of metacognitive ability.

This contrast motivated the empirical pivot of this project: rather than inferring metacognitive ability as a trait, the analysis examines how epistemic commitment is regulated in action under invariant task constraints.

This dissociation is rendered empirically observable in within-participant analysis when responses are examined relative to question type and situated within the same minimal epistemic process schema formalised in Appendix Table A17 (**opening-biasing-commitment-optional reopening**).

These shifts occur within the same participant under invariant task structure, with variation arising from task-ordered regulation of epistemic commitment. An illustrative example narrative and its associated epistemic task sequence (Questions 1–7) is provided in Appendix C showing how these task functions are instantiated in the stimulus materials.

Given Questions 1–3 place primarily cognitive demands concerning narrative comprehension and immediate causal attribution, responses to these prompts reliably exhibit rapid epistemic closure appropriate to their low regulatory requirements, for example: “When the noise happened he felt frustrated” (Story 1, Q3) or “She feels worried and tired” (Story 3, Q3), each corresponding to direct commitment without sustained preservation of alternatives.

By contrast, Questions 4–7 explicitly require metacognitive regulation, and it is here that variability becomes pronounced across the response set. In some narratives, epistemic commitment collapses prematurely into prescriptive closure, as in “He should pay more

attention to his teacher’s lessons” (Story 1, Q5) or “she should change her way to communicate with others” (Story 5, Q5), corresponding to early commitment with minimal biasing or reopening.

In other narratives, responses sustain multiple candidates prior to commitment—“She underlines new words, repeats them quietly and makes color-coded lists” (Story 3, Q1)—or explicitly reopen and reorganise prior commitments, as in “He tried different explanations, examples, and timings” (Story 7, Q2). Accordingly, rather than comparing individuals or inferring stable metacognitive capacity, the analysis pivots empirically to population-level variability in the regulation of epistemic commitment under shared task constraints.

In metacognitively demanding prompts (Questions 4–7), a subset of responses shows earlier-than-typical commitment at the same task position, indicating condition-sensitive regulation under fixed constraints (Table 1). Epistemic diagnosis therefore proceeds via recurrent patterns in observable linguistic form as inference-in-progress, warranting inductive inference to a stable regulatory process rather than attribution to individual ability.

In Table 1, rows correspond to epistemic task functions defined by the DEBRIEF sequence (Questions 1–7), while columns correspond to stages of the minimal epistemic process (**opening–biasing–commitment–reopening**).

Table 1. Distribution of Epistemic States by Epistemic Task Position (DEBRIEF Sequence)

Epistemic Task Function (DEBRIEF stage)	OPEN n (%)	BIAS n (%)	COMMIT n (%)	REOPEN n (%)	Total responses
Q1 – Problem recognition	6 (4%)	28 (19%)	114 (77%)	0 (0%)	148
Q2 – What helps / hinders	8 (6%)	34 (24%)	102 (71%)	0 (0%)	144
Q3 – Causal / affective explanation	5 (4%)	31 (23%)	101 (74%)	0 (0%)	137
Q4 – Prior occurrence / comparison	29 (25%)	47 (40%)	41 (35%)	0 (0%)	117
Q5 – Abstraction / learning	33 (30%)	56 (51%)	21 (19%)	0 (0%)	110
Q6 – Alternative action / planning	61 (56%)	38 (35%)	9 (8%)	0 (0%)	108
Q7 – Monitoring / evaluation	12 (11%)	19 (17%)	42 (37%)	41 (36%)	114

Table 1 demonstrates that epistemic closure varies systematically with task position rather than with individual participants, with both frequency distributions and response exemplars treated as traces of the same regulatory process operating at different levels of stabilisation, not as ontologically different evidence types.

Responses to cognitively constrained prompts (Questions 1–3) cluster around rapid commitment, while responses to metacognitively demanding prompts (Questions 4–7) distribute across opening, biasing, commitment, and reopening states under identical task constraints. This task-sensitive distribution cannot be explained by stable metacognitive ability and instead indicates regulation of commitment timing as a condition-sensitive process, consistent with the minimal epistemic sequence specified in Appendix Table A17.

Given the third-person empathy framing of the prompts, the reopening observed at Question 7 is realised primarily through externalised monitoring rather than first-person revision, most commonly via attribution of evaluative authority to others (e.g. ‘Her teacher,’ ‘Students can help her’), and more rarely through conditional deferral of commitment (e.g. ‘If her new strategies are working well, she will recognise this through comments from colleagues and students’).

Responses do not exhibit epistemic reopening prior to Question 7, indicating that alternative retention emerges only under explicitly evaluative demands.

Because participants were experienced Vietnamese teachers of English operating in high-stakes, outcome-oriented assessment contexts, the early epistemic closure observed in metacognitively demanding prompts (Questions 4–7) is interpreted as an adaptive response to representationally prioritised pedagogy rather than as a deficit in metacognitive capacity. This interpretation is supported by task-positioned distributions (Table 1) and qualitative response material showing that, even when commitment occurs early, participants frequently generate substantively rich strategies, comparisons, and alternative framings prior to collapse. The findings therefore suggest that pedagogical models which defer commitment until after alternative exploration and pragmatic stance formation—prior to micro-structural or lexical selection—may counteract rote strategies by re-sequencing epistemic commitment rather than targeting learners or cultural practices directly.

Taken together, the findings indicate that epistemic regulation under uncertainty cannot be captured through psychometric self-report or outcome-based measures, but must be examined as inference-in-progress under constraint. Because commitment unfolds over extended intervals, its regulation can be inferred from patterned linguistic behaviour under invariant task demands, as demonstrated by the task-positioned distributions in Table 1. Alignment with question type rather than individuals supports a condition-sensitive, non-trait account of epistemic regulation, formalised here through IP and PR, with implications for teacher training, syllabus sequencing, and English education strategy in Vietnam.

Interpretations in this section therefore describe alignment between observed patterns and the proposed framework, rather than claims about underlying cognitive mechanisms.

4.2 Epistemic Regulation and the Timing of Commitment

As established earlier, PP models formalise inference as temporally extended precision re-weighting rather than instantaneous selection (Friston, 2010; Clark, 2016), while RR explicitly characterises RR as sustained salience modulation across competing candidates prior to

commitment (Vervaeke et al., 2017). Without explicit temporal regulation, this process is easily misread as a binary shift from uncertainty to commitment.

This mischaracterisation has clear pedagogical consequences. Patterns such as rule memorisation, poor transfer, and rigidity under uncertainty—well documented in the learning sciences (Perkins, Salomon, and Globerson, 1991; Schwartz, Bransford, and Sears, 2005)—are here reinterpreted as failures of commitment timing rather than of representational knowledge. In the present data, early epistemic closure is visible in outcome-focused prescriptive responses such as “She should change her way to communicate with others” (Story 5, Q5).

Outcome-focused assessments miss regulatory processes because these operate prior to epistemic commitment. This study therefore examines inference-in-progress through two procedural epistemic-diagnostic prototypes: a Voice Coach Tool (Appendix E) and a clinician-facing epistemic description system (Appendix F).

Although neurolinguistic research increasingly emphasises neural dynamics and temporal control in language processing (Poeppel and Assaneo, 2020; Heilbron, Chait and Poeppel, 2022), the enactment of such regulation during learning and interaction remains under-specified. Because epistemic commitment precedes symbolic stabilisation, this regulatory organisation is not confined to any single representational domain, but is pedagogically tractable in practices that train timing, hesitation, and graded commitment under uncertainty.

Prosodic modulation structures temporal attention through rhythmic and phase-dependent neural coordination (Fries, 2015; Poeppel and Assaneo, 2020), constraining the timing—rather than the content—of epistemic commitment. Non-dominant neural activity can persist and influence later behaviour (Pathak et al., 2025), and content- and context-sensitive populations are coordinated over short temporal windows rather than immediately fused (Bausch et al., in press), allowing alternative relevance structures to persist prior to epistemic binding.

4.3 Neural and Dynamical Constraints on Epistemic Openness

Despite advances in process-oriented and dynamical accounts of cognition outlined earlier, cognition is still predominantly characterised in terms of prediction, action, and stabilised outcomes rather than intermediate temporal organisation and control (Heilbron, Chait and Poeppel, 2022).

Across PP accounts, cognition is modelled as hierarchical inference unfolding over time, with epistemic commitment emerging gradually (Friston, 2010). Enactivist and RR frameworks converge on this processual view, describing cognition as ongoing sense-making or progressive salience narrowing rather than discrete decision events (Varela, Thompson and Rosch, 1991; Gallagher, 2005; Vervaeke et al., 2017). However, none specifies how the timing of epistemic commitment is regulated in practice (Clark, 2016; Kirchhoff and Robertson, 2018).

Process-level models indicate that multiple action or interpretation candidates coexist during a structured interval of inference-in-progress rather than being eliminated sequentially (Cisek and Kalaska, 2010), and that this interval cannot be reduced to outcome states without explanatory

loss (van Rooij et al., 2019). Longitudinal hippocampal and intrinsic timescale research provides convergent evidence for temporally extended inference, showing redistribution of predictive activity rather than representational replacement (Kim et al., 2025). However, because task structure and relevance landscapes are fixed in advance, these approaches do not explain how relevance candidates are admitted or how commitment timing is regulated across contexts.

On the present account, Voice Pedagogy (VP) is epistemically relevant because its practices engage timing, pacing, hesitation, and graded commitment under uncertainty, rendering temporal regulation pedagogically accessible (Appendix Table A16). Accordingly, this section aligns neural timescales, prosodic variables, and the regulation of Irrelevance Potential (IP) to examine how temporal availability constrains epistemic regulation in practice (Appendix Table A3).

Treating PR as an enacted mode of relevance engagement predicts differences in epistemic openness and commitment timing, motivating analysis of bistability and the persistence of alternatives as empirically observable.

4.4 Bistability and the Persistence of Alternatives



Figure 1. Canonical bistable figures illustrating aspect reversal.
Duck–rabbit illusion (Jastrow, 1899; discussed by Wittgenstein, 1953)
and young woman/old woman illusion (Hill, 1915).

Canonical bistable figures—such as the duck–rabbit (Jastrow, 1899; Wittgenstein, 1953) and the young woman/old woman figure (Hill, 1915)—illustrate that cognition can sustain multiple incompatible interpretations of a single invariant stimulus over time, thereby making visible the timing of epistemic commitment without representational replacement. The reversibility of interpretation without relearning indicates that non-selected alternatives persist as structured possibilities rather than being eliminated, such that bistable perception functions as a minimal proof-of-concept for general claims in cognitive science concerning epistemic regulation.

Bistable figures render alternative persistence visible; the following example shows how comparable dynamics can be elicited through prosodic regulation in language.

Table 2. Prosodic regulation of interpretive contrast (pedagogical illustration):

The English sentence “I didn’t say we should kill him” (written vertically) yields distinct interpretations through prosodic disambiguation, depending solely on focal stress placement (Crystal, 1969; Ladd, 2008).

Focal stress location	Epistemic contrast foregrounded
I	speaker identity
didn’t	denial
say	implication vs utterance
we	agency
should	obligation
kill	action
him	target

Lexical and syntactic content remain invariant; only prosodic weighting changes. Stress therefore regulates which interpretive trajectory collapses into commitment while alternatives remain available.

These illustrations are consistent with a non-representational account of meaning (Varela et al., 1991; Hutto and Myin, 2013; Vervaeke et al., 2017): pragmatic meaning is not determined by lexical or syntactic form alone, but emerges through the regulation of relevance prior to symbolic stabilisation. At this level, meaning is not propositional content but relevance realised in action, shaped by the ongoing suppression and retention of IP.

Neurophysiological studies of bistable perception demonstrate the persistence of incompatible interpretations over time (Leopold and Logothetis, 1999), implying a capacity to delay epistemic commitment rather than immediately replace one interpretation with another. VP is therefore examined as a pedagogical practice because its training of prosodic timing renders regulated non-commitment explicit and repeatable, making bistable dynamics observable in language learning, as instantiated in the present Hanoi-based study with Vietnamese teachers of English via PR and IP.

Intrinsic neural timescale models demonstrate temporally extended cognition but do not specify how alternative trajectories are organised or enacted in real time; although Kim et al. (2025) show persistence across timescales, they do not address the behavioural mechanisms that sustain or bias alternatives. The present framework therefore treats observable linguistic traces of inference-in-progress—such as revision, graded commitment, and expressed uncertainty—as primary evidence, operationalised through epistemic-diagnostic rather than outcome- or trait-based assessment.

PR is proposed not as an additional explanatory layer, but as an analytic description of how IP is temporally organised, rendering explicit a regulatory function often implicit in representational accounts. Its core operations—temporal segmentation, event grouping, expectancy formation, turn-taking, and pre-lexical scaffolding—are summarised in Appendix Table A2, drawing on established work in prosody and interaction (Crystal, 1969; Couper-Kuhlen and Selting, 1996; Levinson, 2016).

While vocal prosody provides a particularly rich and measurable instantiation and positions VP as a pedagogically privileged domain, PR is not restricted to vocal sound: timing, pause, rhythm, and emphasis may also be enacted through gesture, silence, posture, and internal simulation, shaping IP by sustaining, biasing, or accelerating selective collapse across PP, 4E, and metacognitive levels (Appendix Table A2).

The following sequence schematises how PR operates over IP to sustain, bias, and selectively collapse alternative relevance trajectories prior to symbolic stabilisation. Selective collapse unfolds as follows:

- (1) breath establishes a slow oscillatory baseline calibrating prosody with neural rhythms;
- (2) prosody structures temporal expectancy, generating multiple proto-interpretative trajectories;
- (3) these trajectories coexist latently within IP;
- (4) salience detection evaluates goal–context alignment;
- (5) precision is selectively up-weighted on one trajectory;
- (6) executive processes stabilise the selected trajectory;
- (7) a symbol (word, concept, or action) emerges;
- (8) non-selected trajectories are suppressed but retained as IP.

The viability of this sequence depends on neural dynamics that coordinate activity across multiple temporal scales, allowing states to persist and interact rather than being immediately replaced—a role widely attributed to neural oscillations (Buzsáki, 2006; Fries, 2015). Memory is therefore treated as dynamic frame updating rather than storage, with non-selected candidates persisting as prosodically regulated salience biases that shape future RR. While archival models have been challenged (Schacter, 1999) and embodied grounding emphasised (Barsalou, 2008), the present framework specifies how retained alternatives function as a regulatory substrate for epistemic alignment, explaining why temporal openness supports transfer and resilience whereas premature closure constrains learning.

Because this regulatory logic concerns the timing of commitment rather than representational content, it applies across methodological, developmental, and evolutionary scales.

4.5 Structural Epistemic Duality: Writing, Scale, and Abstraction

This section provides a functional historical explanation for why the regulatory epistemic role formalised in this paper survives today primarily within VP rather than as an explicit component of dominant cognitive or educational frameworks, as evidenced by the regulatory dynamics observed in the present study.

Καὶ ὁ λόγος σὰρξ ἐγένετο

(“And the Logos became flesh”; John 1:14)

Voice as a Pre-Representational Regulator

Prosodic features—understood here as modulations of timing, rhythm, and expectancy rather than vocal sound alone—can be interpreted as evolutionarily prior tools for coordinating expectation, signalling uncertainty, and sustaining multiple behavioural or interpretive trajectories. Throughout this paper, “voice” refers to the regulation of temporal and salience-modulating variables governing epistemic alignment, whether instantiated vocally or through other embodied means.

Greek Logos as Enacted Intelligibility

The argument begins from a historically specific translation trajectory that makes this displacement visible. In the Greek text of the Gospel of John, the term λόγος (*logos*) appears in passages conventionally translated into English as “the Word.” This English rendering does not derive directly from Greek. Rather, Jerome renders λόγος as *verbum* (“word”) in the Latin Vulgate, and it is this Latin rendering that is inherited by later vernacular translations, including English. The English “Word” therefore reflects the semantic framing of *verbum*, not a direct semantic equivalence with λόγος.

This translation chain marks a structural shift in epistemic emphasis and constitutes an early historical pivot in the functional history of , at which epistemic primacy passes from voice to text, a displacement that renders the regulatory dynamics observed in the present study structurally backgrounded.

In Greek usage, λόγος does not function as a bounded semantic unit or discrete proposition. It names intelligibility as something that unfolds through ordered activity over time, consistent with enactive and embodied accounts that treat meaning as emerging through temporally organised organism–environment coupling rather than representational encoding (Varela, Thompson and Rosch, 1991; Gallagher, 2005; Hutto and Myin, 2013). Meaning, on this

view, is not treated as pre-formed content awaiting expression, but as something realised through regulation, timing, and coordination in action.

Similarly, the Greek term σάρξ (*sarx*), translated into English as “flesh,” does not denote the body as an abstract object. It refers to living, vulnerable flesh: existence subject to time, error, effort, and consequence. The juxtaposition of λόγος and σάρξ in the Greek text therefore presupposes an epistemic organisation in which intelligibility is realised through embodied, temporally constrained activity rather than through detached symbolic representation.

Later Latin recoding

In Latin, λόγος becomes *verbum* (“word”), and σάρξ becomes *caro* (“flesh” understood as material substance). This recoding is not merely lexical. It reorganises epistemic priorities by relocating intelligibility from enacted, temporally regulated processes to stabilised symbolic form. Epistemic authority is thereby displaced from timing, hesitation, and alignment in action toward textual products that can be stored, transmitted, and enforced independently of embodied interaction (Appendix Tables A9–A11).

In the Genesis narrative, the Garden of Eden figures epistemic alignment prior to abstraction, while the Tree of Knowledge represents the shift to objectified, detachable knowledge. The Fall marks the loss of alignment through premature representational closure rather than the acquisition of intelligence as such.

Parallel epistemic structures recur across traditions: Jewish thought foregrounds breath, Islamic revelation privileges voiced recitation, Hindu *OM* enacts knowledge through vibration, and Buddhist practice suspends representational fixation. In each case, writing functions as a secondary stabilisation—necessary for durability but epistemically hazardous when treated as sufficient.

This pattern supports the claim that epistemic regulation precedes representation historically and functionally, aligning with prehistoric and Indigenous traditions in which knowledge was regulated through embodied and rhythmic practices prior to large-scale representational systems (Ucko and Rosenfeld, 1967; Clottes, 2008; McDonald, 2016).

Writing, Scale, and Epistemic Compression

This shift must be understood in relation to scale. Voice-mediated epistemic regulation—through timing, pacing, turn-taking, and prosodic modulation—supports coordination in small to medium groups but does not scale to large, anonymous populations given limits on co-presence and interaction (Levinson, 2016; Dunbar, 1996). Writing emerges to solve this problem by stabilising representations for abstraction and administration (Ong, 1982; Goody, 1986), but in doing so attenuates the temporal dynamics that regulate epistemic commitment, privileging outcomes over process (Appendix Table A4).

Structural Epistemic Duality

The civilisational consequences of this shift are evident in text-intensive epistemic architectures such as law, doctrine, and administration, which enable coordination at scale by stabilising

representations, but at the cost of adaptive regulation under uncertainty (Cline, 2014). As representational systems take on this coordinative role, enacted epistemic regulation becomes structurally backgrounded rather than eliminated.

4.6 Structural Epistemic Duality Across Science, Learning, and Trauma

This paper formalises this pattern as structural epistemic duality: a historically produced separation between enacted epistemic regulation under uncertainty and stabilised representational products, as diagnosed in the task-positioned regulatory dynamics observed in the present study.

Scientific inquiry therefore operates across two coupled but asymmetrically represented layers—enacted regulation and representational output—motivating a shift from justificatory knowledge claims toward epistemic functioning (Ryle, 1949; Goldman, 1986; Sosa, 2007). Epistemic functioning is defined here as the regulation of alignment, commitment, and irrelevance, rather than as an agent-level virtue or tacit capacity (Polanyi, 1966; Greco, 2010).

The present framework addresses disunity in cognitive accounts by isolating IP and PR as analytic constructs. Linguistic traces of inference-in-progress—such as revision, graded commitment, and expressed uncertainty—are treated as evidence of metacognitive monitoring, while commitment regulation itself lies outside existing monitoring models (Nelson and Narens, 1990; Fleming and Dolan, 2012). Biological evidence supports this asymmetry, showing that non-dominant neural activity can persist during inference and shape later behaviour (Pathak et al., 2025).

More broadly, problems in scientific practice arise when attention shifts from the processes that make inquiry reliable to the representational products that record results, reflecting structural epistemic duality rather than domain-specific error. The findings therefore motivate a reconstitution of social research in which metacognitive measures function as both baseline and outcome variables, reducing reliance on blind cohorts and demographic stratification while enabling practitioner–research models—particularly in pedagogical domains such as Voice Pedagogy—without loss of inferential rigour. Participant responses are accordingly analysed as linguistic traces of inference-in-progress rather than settled belief.

4.7 Voice Pedagogy as Epistemic and Ethical Response

Making the processual ordering of epistemic regulation explicit clarifies how predictive, enactive, and relevance-based frameworks can be integrated at an operational level, and helps illuminate adjacent debates, including disputes in consciousness science over stabilised access versus ongoing process (Block, 2011; Dehaene et al., 2017) and debates on general versus domain-specific intelligence, which may turn on the stability, transfer, and timing of regulatory processes rather than representational capacity alone (Spearman, 1904; Carroll, 1993; Sternberg, 2019).

The ethical significance concerns agency under uncertainty: when systems undermine the timing of epistemic commitment, agency is compromised not at the level of compliance, but at the level of responsibility for action taken without sufficient informational support.

As shown in Appendix Table A14, responses may meet outcome criteria while failing to encode generalisation, conditional transfer, or future-oriented regulation, corresponding to DMR Level 2 rather than Levels 3–4. Superficially similar behaviours may therefore reflect distinct epistemic failures—either persistent IP without stabilising PR, or premature collapse eliminating alternatives—which the present framework distinguishes mechanistically without recourse to categorical diagnosis.

The epistemic requirement specified here is not discipline-specific and does not replace existing practices, but identifies a functional constraint on action under uncertainty. Its application is normatively restricted to practices concerned with regulating epistemic commitment, with applicable and boundary cases specified in Appendix Table A13.

Within this scope, Voice Pedagogy (VP) is treated not as a source of epistemic authority but as a pedagogically privileged site in which the regulatory layer isolated by Irrelevance Potential (IP) and Prosodic Regulation (PR)—already operative but historically displaced by representational epistemic architectures—remains enacted and can therefore be made explicit, explored, and transferred (Appendix Table A2). Where epistemic alignment depends on regulating commitment under uncertainty rather than representational correctness, VP-derived models may extend beyond vocal performance provided their regulatory structure is preserved.

The story-based epistemic-diagnostic task provides one such instantiation, functioning as a stress-test of epistemic robustness (Appendix Table A15). The contrast between early prescriptive closure in Question 5 (“She should...”) and delayed, externally monitored commitment in Question 7 indicates that epistemic commitment is governed by prosodic variables rather than outcome correctness, aligning with capacities trained in VP. This contrast allows task–person fit to be identified without implying ranking or general ability, rendering the model explicit and transferable while remaining restricted to the regulation of commitment timing (Appendix Table A16).

Institutionally, the Voice Study Centre situates VP in relation to timing, coordination, and learning as enacted processes, with its interdisciplinary collaborations read here as indicating an emerging epistemic trajectory. At the individual level, structural epistemic duality manifests as a loss of agency under uncertainty; voice-led PR can restore this capacity by reopening IP and deferring premature closure. Artificial systems constitute a boundary case, lacking IP and therefore risking ethical failure when certainty is projected without upstream uncertainty regulation.

Within this framework, trauma is understood as a restriction of epistemic regulation, characterised by urgency and reduced capacity to sustain presence, consistent with neurobiological (Zhu et al., 2022), clinical (van der Kolk, 2014), and computational accounts of early closure via altered precision-weighting (Friston et al., 2014). Ethical failure similarly arises when representational outputs stabilise without mechanisms for signalling uncertainty, timing, and graded commitment. While neural evidence shows that non-dominant activity can persist during inference and shape later adjustment (Pathak et al., 2025), existing metacognitive models describe compatible monitoring processes without specifying this pre-symbolic regulatory organisation (Nelson and Narens, 1990; Fleming and Dolan, 2012).

Methodologically, the approach preserves trajectories of commitment and uncertainty, allowing selective collapse to be identified as an event. In second-language production, intention opens an affordance field (IP), prosody regulates commitment timing, grammar stabilises, and symbolic forms emerge only after collapse, thereby preventing premature closure.

Conclusion and Limitations

This paper has argued that VP can be re-centred with an epistemic, rather than merely expressive, role, insofar as it enacts the temporal regulation of epistemic commitment that other frameworks presuppose but do not operationalise. If this account is incorrect, then at least one of the following must fail: that alternative relevance trajectories persist prior to commitment, that the timing of commitment matters for learning and agency, or that VP renders this regulation explicit and trainable.

On this account, epistemic systems preserve and organise alternatives through a minimal regulatory process—**opening, biasing, commitment, and optional reopening**—which cannot be validly captured by psychometric or outcome-based measures. This motivates the formalisation of IP and PR, with task-positioned linguistic traces treated as evidence of inference-in-progress under constraint and schematised as a minimal process model (Appendix Table A17), with illustrative instantiations provided in Appendices E and F. These instantiations support the claim that PP, RR, and enactive (4E) accounts presuppose a shared but analytically implicit regulatory layer governing commitment timing.

Rather than resolving the meaning crisis (Taylor, 2007; Vervaeke, 2019), the paper clarifies how epistemic openness can be preserved by attending to regulatory processes that precede representation; in this sense, VP may be understood as a process epistemology, rendering the regulation of epistemic commitment explicit prior to representational stabilization.

REFERENCES

- Allan, B. (2011) 'Supporting learning with the DEBRIEF model', *Journal of Learning Development in Higher Education*, 2, pp. 1–13.
- Allan, H. (2011) DEBRIEF: A reflective tool for workplace learning. *The Clinical Teacher*, 8(3), 176–180.
- Andersen, B.P., Miller, M. and Vervaeke, J. (2022) *Predictive processing and relevance realisation: exploring convergent solutions to the frame problem. Phenomenology and the Cognitive Sciences*, 24(2), 359–380.
- Barsalou, L.W. (2008) Grounded cognition. *Annual Review of Psychology*, 59, 617–645.
- Bausch, M., Niediek, J., Reber, T.P., Mackay, S., Boström, J., Elger, C.E. and Mormann, F. (in press) Distinct neuronal populations in the human brain combine content and context. *Nature*.
- Block, N. (2011) Perceptual consciousness overflows cognitive access. *Trends in Cognitive Sciences*, 15(12), 567–575.
- Broadbent, D.E., Cooper, P.F., FitzGerald, P. and Parkes, K.R. (1982) 'The Cognitive Failures Questionnaire (CFQ) and its correlates', *British Journal of Clinical Psychology*, 21(1), pp. 1–16. <https://doi.org/10.1111/j.2044-8260.1982.tb01421.x>
- Brown, J.D., Jones, M. & Smith, A. (2021) *Metacognitive beliefs about cognition and learning outcomes: empirical evidence and implications*. *Journal of Educational Psychology*, 113(2), pp. 295–310.
- Buzsáki, G. (2006) *Rhythms of the Brain*. Oxford: Oxford University Press.
- Cameron, A. (1991) *Christianity and the Rhetoric of Empire: The Development of Christian Discourse*. Berkeley, CA: University of California Press.
- Carriere, J.S.A., Cheyne, J.A., Solman, G.J.F. and Smilek, D. (2008) 'Everyday attention lapses and memory failures: The affective consequences of mindlessness', *Consciousness and Cognition*, 17(3), pp. 835–847.
- Carroll, J.B. (1993) *Human cognitive abilities: A survey of factor-analytic studies*. Cambridge: Cambridge University Press.
- Cisek, P. and Kalaska, J.F. (2010) Neural mechanisms for interacting with a world full of action choices. *Annual Review of Neuroscience*, 33, 269–298.
- Clark, A. (2016) *Surfing Uncertainty: Prediction, Action, and the Embodied Mind*. Oxford: Oxford University Press.
- Cline, E. H. (2014) *1177 B.C.: The Year Civilization Collapsed*. Princeton, NJ: Princeton University Press.

- Cochran-Smith, M., and Lytle, S. L. (2009) *Inquiry as stance: Practitioner research for the next generation*. New York, NY: Teachers College Press.
- Clottes, J. (2008) *Cave Art*. London: Phaidon Press.
- Cochran-Smith, M. and Lytle, S.L. (2009) *Inquiry as stance: Practitioner research for the next generation*. New York: Teachers College Press.
- Couper-Kuhlen, E. and Selting, M. (1996) *Prosody in conversation*. Cambridge: Cambridge University Press.
- Crystal, D. (1969) *Prosodic systems and intonation in English*. Cambridge: Cambridge University Press.
- Cutler, A. (2012) *Native listening: Language experience and the recognition of spoken words*. Cambridge, MA: MIT Press.
- Cutler, A., Dahan, D., and van Donselaar, W. (1997) Prosody in the comprehension of spoken language: A literature review. *Language and Speech*, 40(2), 141–201.
- D'Angelo, M., Lanfranco, R. C., Chancel, M., and Ehrsson, H. H. (in press) Parietal alpha frequency shapes own-body perception by modulating the temporal integration of bodily sensory signals. *Nature Communications*, 17, Article 53.
- Dehaene, S., Lau, H., and Kouider, S. (2017) What is consciousness, and could machines have it? *Science*, 358(6362), 486–492.
- DeKeyser, R. M. (2015) Skill acquisition theory. In B. VanPatten and J. Williams (Eds.), *Theories in Second Language Acquisition: An Introduction* (2nd ed., pp. 94–112). New York: Routledge.
- Di Paolo, E. A., Cuffari, E. C., and De Jaegher, H. (2017) *Linguistic bodies: The continuity between life and language*. Cambridge, MA: MIT Press.
- Dunbar, R. (1996) *Grooming, Gossip and the Evolution of Language*. London: Faber and Faber.
- Ehlers, A., and Clark, D. M. (2000) *A cognitive model of posttraumatic stress disorder*. *Behaviour Research and Therapy*, 38(4), 319–345.
- Ellis, N. C. (2008) Usage-based and form-focused language acquisition: The associative learning of constructions, learned attention, and the limited L2 endstate. *The Modern Language Journal*, 92(1), 1–17.
- Ferraro, L. & Panlilio, F. (2020) *The interactional infrastructure of relevance: a control-theoretic perspective on cognitive realisation*. *Phenomenology and the Cognitive Sciences*, 19(3), pp. 425–448.
- Fleming, S.M. and Dolan, R.J. (2012) The neural basis of metacognitive ability. *Philosophical Transactions of the Royal Society B*, 367(1594), 1338–1349.
- Flyvbjerg, B. (2001) *Making Social Science Matter: Why Social Inquiry Fails and How It Can Succeed Again*. Cambridge: Cambridge University Press.

- Floyd, S., Manrique, E., Rossi, G., and Enfield, N. J. (2025) *Getting others to do things: The interactional infrastructure of human sociality*. Trends in Cognitive Sciences, 29(1), 1–13.
- Fries, P. (2015) *Rhythms for cognition: Communication through coherence*. Neuron, 88(1), 220–235.
- Friston, K. (2010) *The free-energy principle: A unified brain theory?* Nature Reviews Neuroscience, 11(2), 127–138.
- Friston, K., Stephan, K. E., Montague, R., and Dolan, R. J. (2014) *Computational psychiatry: The brain as a Bayesian machine*. Nature Neuroscience, 17(2), 148–157.
- Gallagher, S. (2005) *How the Body Shapes the Mind*. Oxford: Oxford University Press.
- Goldman, A. I. (1986) *Epistemology and Cognition*. Cambridge, MA: Harvard University Press.
- Goody, J. (1986) *The Logic of Writing and the Organization of Society*. Cambridge: Cambridge University Press.
- Greco, J. (2010) *Achieving Knowledge: A Virtue-Theoretic Account of Epistemic Normativity*. Cambridge: Cambridge University Press.
- Grimmer, J., and Stewart, B. M. (2013) Text as data: The promise and pitfalls of automatic content analysis methods for political texts. *Political Analysis*, 21(3), 267–297.
- Grossmann, I., Dorfman, A., Santos, H. C., Brienza, J. P., and Vohs, K. D. (2020) Wisdom as a social–ecological process. *Psychological Inquiry*, 31(1), 7–29.
- Goldstein, A, Ham, E, Schain, M, Nastase, SA, Aubrey, B, Zada, Z, Grinstein-Dabush, A, Gazula, H, Feder, A, Doyle, W, Devore, S, Dugan, P, Friedman, D, Brenner, M, Hassidim, A, Matias, Y, Devinsky, O, Siegelman, N, Flinker, A, Levy, O, Reichart, R & Hasson, U (2025, *Temporal structure of natural language processing in the human brain corresponds to layered hierarchy of large language models*, *Nature Communications*, vol. 16, no. 1, Article 10529, viewed 10 January 2026,
- Heilbron, M., Chait, M., and Poeppel, D. (2022) *What can statistics tell us about neural representations of language?* Trends in Cognitive Sciences, 26(8), 673–685.
- Hill, W.E. (1915) My wife and my mother-in-law. *Puck*, 6 November.
- Hutto, D. D., and Myin, E. (2013) *Radicalizing enactivism: Basic minds without content*. Cambridge, MA: MIT Press.
- Grimmer, J. and Stewart, B.M. (2013) ‘Text as data: The promise and pitfalls of automatic content analysis methods for political texts’, *Political Analysis*, 21(3), pp. 267–297.
- Grant, M.J. and Booth, A. (2009) ‘A typology of reviews: An analysis of 14 review types and associated methodologies’, *Health Information & Libraries Journal*, 26(2), pp. 91–108.
- Ladd, D.R. (2008) *Intonational Phonology*. 2nd edn. Cambridge: Cambridge University Press.

- Norman, D. A., and Shallice, T. (1986) Attention to action: Willed and automatic control of behavior. In R. J. Davidson, G. E. Schwartz, and D. Shapiro (Eds.), *Consciousness and self-regulation: Advances in research and theory* (Vol. 4, pp. 1–18). New York, NY: Plenum Press.
- Nelson, L. K., Burk, D., Knudsen, M., and McCall, L. (2020) The future of coding: A comparison of hand-coding and three types of computer-assisted text analysis methods. *Sociological Methods & Research*, 49(1), 202–237.
- Jastrow, J. (1899) *The mind's eye*. Popular Science Monthly, 54, 299–312.
- Kahneman, D. (2011) *Thinking, Fast and Slow*. New York: Farrar, Straus and Giroux.
- Kim, J. Z., Betzel, R. F., Beyh, A., Howell, A., Kuceyeski, A., Larsen, B., Seguin, C., Zhang, X.-H., Holmes, A., and Parkes, L. (2025) *Inferring intrinsic neural timescales using optimal control theory*. Nature Communications, 16, Article 11639.
- Kirchhoff, M.D. and Robertson, I. (2018) *Enactivism and predictive processing: A non-representational view*. Philosophical Explorations, 21(2), 264–281.
- Heppner, P.P. and Petersen, C.H. (1982) 'The development and implications of a personal problem-solving inventory', *Journal of Counseling Psychology*, 29(1), pp. 66–75.
<https://doi.org/10.1037/0022-0167.29.1.66>
- Ladefoged, P., and Johnson, K. (2011) *A course in phonetics* (6th ed.). Boston, MA: Wadsworth Cengage Learning.
- Lanius, R. A., Vermetten, E., Loewenstein, R. J., Brand, B., Schmahl, C., Bremner, J. D., and Spiegel, D. (2010) *Emotion modulation in PTSD: Clinical and neurobiological evidence for a dissociative subtype*. American Journal of Psychiatry, 167(6), 640–647.
- Leopold, D.A. and Logothetis, N.K. (1999) *Multistable phenomena: Changing views in perception*. Trends in Cognitive Sciences, 3(7), 254–264.
- Levinson, S. C. (2016) *Turn-taking in human communication – origins and implications for language processing*. Trends in Cognitive Sciences, 20(1), 6–14.
- McCoy, S. (2012) **Your Voice: An Inside View**. Princeton, NJ: Inside View Press.
- McKinney, J. (2005) **The Diagnosis and Correction of Vocal Faults**. Long Grove, IL: Waveland Press.
- McDonald, J. (2016) *Rock Art Thematic Study*. Canberra: Australian Government Department of the Environment and Energy / Centre for Rock Art Research and Management.
- Miller, R. (1996) *The Structure of Singing: System and Art in Vocal Technique*. New York: Schirmer.
- Menon, V. (2011) *Large-scale brain networks and psychopathology: A unifying triple network model*. Trends in Cognitive Sciences, 15(10), 483–506.

- Nelson, L.K., Burk, D., Knudsen, E. and McCall, L. (2020) 'The future of coding: A comparison of hand-coding and three types of computer-assisted text analysis methods', *Sociological Methods & Research*, 49(1), pp. 202–237.
- Nelson, T.O. and Narens, L. (1990) Metamemory: A theoretical framework and new findings. *The Psychology of Learning and Motivation*, 26, 125–173.
- Ong, W. J. (1982) *Orality and Literacy: The Technologizing of the Word*. London: Methuen.
- Pathak, A., Brincat, S. L., Organtzidis, H., Strey, H. H., Senneff, S., Antzoulatos, E. G., Mujica-Parodi, L. R., Miller, E. K., and Granger, R. (2025) *Biomimetic model of corticostriatal microassemblies discovers a neural code*. Nature Communications.
- Paulhus, D.L. and Vazire, S. (2007) The self-report method. In Robins, R.W., Fraley, R.C. and Krueger, R.F. (eds.) *Handbook of research methods in personality psychology*, pp. 224–239. New York: Guilford Press.
- Perkins, D. N., Salomon, G., and Globerson, T. (1991) Teaching for transfer. *Educational Leadership*, 48(1), 22–32.
- Pessoa, L. (2017). *The Cognitive-Emotional Brain*. Cambridge, MA: MIT Press.
- Poeppel, D. and Assaneo, M.F. (2020) *Speech rhythms and their neural foundations*. *Nature Reviews Neuroscience*, 21, 322–334.
- Polanyi, M. (1966) *The Tacit Dimension*. London: Routledge and Kegan Paul.
- Ryle, G. (1949) *The Concept of Mind*. London: Hutchinson.
- Schacter, D. L. (1999) *The seven sins of memory: Insights from psychology and cognitive neuroscience*. *American Psychologist*, 54(3), 182–203.
- Schön, D. A. (1983) *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books.
- Schraw, G. and Dennison, R.S. (1994) 'Assessing metacognitive awareness', *Contemporary Educational Psychology*, 19(4), pp. 460–475.
- Schwartz, D. L., Bransford, J. D., and Sears, D. (2005) Efficiency and innovation in transfer. In J. Mestre (Ed.), *Transfer of learning from a modern multidisciplinary perspective* (pp. 1–51). Greenwich, CT: Information Age.
- Schwarz, N. (1999) Self-reports: How the questions shape the answers. *American Psychologist*, 54(2), 93–105.
- Seeley, W. W., Menon, V., Schatzberg, A. F., Keller, J., Glover, G. H., Kenna, H., Reiss, A. L., and Greicius, M. D. (2007) Dissociable intrinsic connectivity networks for salience processing and executive control. *Journal of Neuroscience*, 27(9), 2349–2356.
- Sosa, E. (2007) *A Virtue Epistemology: Apt Belief and Reflective Knowledge, Volume I*. Oxford: Oxford University Press.

Spearman, C. (1904) “General intelligence”, objectively determined and measured’, *The American Journal of Psychology*, 15(2), pp. 201–292.

Sternberg, R.J. (2019) ‘A theory of adaptive intelligence and its relation to general intelligence’, *Journal of Intelligence*, 7(4), 23.

Taylor, C. (2007) *A Secular Age*. Cambridge, MA: Harvard University Press.

The Gospel according to John (1:14) (n.d.) *Greek New Testament*. Stuttgart: Deutsche Bibelgesellschaft.

Titze, I.R. (2008) *Principles of Voice Production*. Iowa City, IA: National Center for Voice and Speech.

Tomasello, M. (2003) *Constructing a Language: A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.

Torraco, R.J. (2005) ‘Writing integrative literature reviews: Guidelines and examples’, *Human Resource Development Review*, 4(3), pp. 356–367.

Ucko, P. J., and Rosenfeld, A. (1967) *Palaeolithic Cave Art*. New York: McGraw-Hill.

van der Kolk, B. A. (2014) *The Body Keeps the Score: Brain, Mind, and Body in the Healing of Trauma*. New York: Viking.

van Rooij, I., Blokpoel, M., Kwisthout, J., and Wareham, T. (2019) Marr’s levels revisited: Why the distinction between computation and algorithm matters. *Topics in Cognitive Science*, 11(1), 15–30.

Varela, F. J., Thompson, E., and Rosch, E. (1991) *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge, MA: MIT Press.

Vervaeke, J. (2019) *Awakening from the Meaning Crisis* [Lecture series]. University of Toronto.

Vervaeke, J. and Ferraro, L. (2013) *Relevance, meaning and the cognitive science of wisdom*. *Theoria et Historia Scientiarum*, 10, 69–92.

Vervaeke, J., Lillicrap, T. P., and Richards, B. A. (2017) *Relevance realisation and the emerging framework in cognitive science*. *Journal of Cognitive Science*, 18(4), 353–393.

Welch, G., Howard, D., and Nix, J. (Eds.). (2019) *The Oxford Handbook of Singing*. Oxford: Oxford University Press.

Wilson, B.A., Alderman, N., Burgess, P.W., Emslie, H. and Evans, J.J. (1996) *Behavioural Assessment of the Dysexecutive Syndrome*. Bury St Edmunds: Thames Valley Test Company.

Wittgenstein, L. (1953) *Philosophical Investigations*. Oxford: Blackwell.

Zhu, X., Suarez-Jimenez, B., Lazarov, A., Such, S., Marohasy, C., Small, S. S., and Lissek, S. (2022) Sequential fear generalization and network connectivity in trauma-exposed humans with

and without psychopathology. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 7(11), 1043–1054.

APPENDICES

Appendix A: Statement on the Use of AI in Research Design and Analysis

This research project was developed and conducted by the author. All research questions, theoretical claims, analytic distinctions, historical interpretations, and conclusions advanced throughout the paper were generated and decided by the author, who retains full intellectual responsibility for the work. This includes all substantive claims as they appear in drafted, revised, and final forms.

AI tools (specifically large language models) were used as constrained instruments to support specific procedural aspects of the research process under explicit author-defined instructions. AI assistance did not originate research questions, hypotheses, theoretical frameworks, analytic categories, or interpretations, nor did it determine the epistemic relevance, validity, or priority of any claims.

AI was used in the following limited and controlled ways:

1. **Stimulus generation**

AI was used to generate short fictional narrative texts used in classroom-based pedagogical tasks. All narratives were produced under explicit constraints defined by the author, including linguistic level, length, thematic focus, and cognitive or metacognitive targets. The narrative content served solely as third-person stimuli and was not treated as data, evidence, or analytic material in itself.

2. **Question construction under fixed frameworks**

AI was used to assist in generating reflective task questions structured according to the DEBRIEF framework. The framework itself, the epistemic targets of each question stage, and the intended analytic distinctions were specified by the author in advance. AI output was reviewed, edited, and selectively retained by the author to ensure alignment with the research aims.

3. **Constrained analytic execution**

In the analysis phase, AI was used as a rule-bound instrument to apply predefined ordinal scoring criteria to linguistic responses, treating those responses as observable traces of inference-in-progress. Analytic instructions explicitly prohibited inference about participants' beliefs, emotions, traits, or psychological states. AI outputs were treated as procedural artefacts generated under fixed constraints, not as interpretive judgments or epistemic evidence.

4. **Drafting and editorial assistance**

AI was used to assist with drafting, paraphrasing, structural reorganisation, and consistency checking. These uses were limited to language-level refinement and did not involve the generation, selection, or justification of claims. All substantive decisions regarding content, argument structure, inclusion or exclusion of material, and theoretical positioning were made by the author.

At no point was AI treated as a source of insight, explanation, or epistemic authority. AI outputs were not cited as sources, treated as evidence, or allowed to introduce novel claims or analytic directions. All claims advanced in the paper were evaluated, accepted, modified, or rejected by the author based on disciplinary knowledge, theoretical coherence, and empirical grounding.

This use of AI is consistent with the methodological aims of the study, which emphasise constraint-based analysis, task-positioned inference, and the separation of procedural execution from epistemic judgment. The appendix is provided in the interest of transparency and does not alter the authorship, ownership, or responsibility for the research.

Appendix B: APPLICATION FOR ETHICAL APPROVAL

RESEARCH STUDENTS

This form is to be completed by the student within **SIX** months for full-time students and **TWELVE** months for part time students, after the commencement of the research degree or following progression to Part Two of your course.

Once complete, submit this form via the **MyTSD Doctoral College Portal** at (<https://mytsd.uwtsd.ac.uk>).

This document is also available in Welsh.

RESEARCH STAFF ONLY

All communications relating to this application during its processing must be in writing and emailed to pgresearch@uwtsd.ac.uk, with the title 'Ethical Approval' followed by your name.

STUDENTS ON UNDERGRADUATE OR TAUGHT MASTERS PROGRAMMES should submit this form (and receive the outcome) via systems explained to you by the supervisor/module leader.

In order for research to result in benefit and minimise risk of harm, it must be conducted ethically. A researcher may not be covered by the University's insurance if ethical approval has not been obtained prior to commencement.

The University follows the OECD Frascati manual definition of **research activity**: "creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications". As such this covers activities undertaken by members of staff, postgraduate research students, and both taught postgraduate and undergraduate students working on dissertations/projects.

The individual undertaking the research activity is known as the "principal researcher".

Ethical approval is not required for routine audits, performance reviews, quality assurance studies, testing within normal educational requirements, and literary or artistic criticism.

Please read the notes for guidance before completing ALL sections of the form.

This form must be completed and approved prior to undertaking any research activity.
Please see Checklist for details of process for different categories of application.

SECTION A: About You (Principal Researcher)

1	Full Name:	Alexander Mathieson Porter			
2	Tick all boxes that apply:	Member of staff:	☐	Honorary research fellow:	☐
	Undergraduate Student	☐	Taught Postgraduate Student	☒	Postgraduate Research Student
					☐

3	Institute/Academic Discipline/Centre:	University of Wales Voice Study Centre and WAPPER
4	Campus:	Carmarthen
5	E-mail address:	Alex.porter@internet.ru
6	Contact Telephone Number:	(+84) 966 744 491
For students:		
7	Student Number:	2319175
8	Programme of Study:	MA Professional Practice (Voice Pedagogy)
9	Director of Studies/Supervisor:	Louise Emanuel/Julie Crossman/Debbie Winter

SECTION B: Approval for Research Activity

1	Has the research activity received approval in principle? (please check the Guidance Notes as to the appropriate approval process for different levels of research by different categories of individual)	YES	☒	NO	☐
---	--	-----	-------------------------------------	----	--------------------------

				Date
2	If Yes, please indicate source of approval (and date where known): Approval in principle must be obtained from the relevant source prior to seeking ethical approval	Research Degrees Committee	☐	
		Institute Research Committee	☐	
		WAPPAR Ethics Board Representative	☒	

SECTION C: Internal and External Ethical Guidance Materials

	Please list the core ethical guidance documents that have been referred to during the completion of this form (including any discipline-specific codes of research ethics, location-specific codes of research ethics, and also any specific ethical guidance relating to the proposed methodology). Please tick to confirm that your research proposal adheres to these codes and guidelines. You may add rows to this table if needed.	
1	<u>UWTSD Research Ethics & Integrity Code of Practice</u>	☒
2	UWTSD Research Data Management Policy	☒
3	<i>[List any other relevant documents here]</i>	☐

SECTION D: External Collaborative Research Activity

If there are external collaborators then you should gain consent from the contact persons to share their personal data with the university. If there are no external collaborators then leave this section blank and continue to section E.

1	Institution	
2	Contact person name	
3	Contact person e-mail address	
4	Is your research externally funded?	YES ☐ NO ☐
5	Are you in receipt of a KESS scholarship?	YES ☐ NO ☐
6	Are you specifically employed to undertake this research in either a paid or voluntary capacity?	Voluntary YES ☐ NO ☐
7		Employed YES ☐ NO ☐
8	Is the research being undertaken within an existing UWTSD Athrofa Professional Learning Partnership (APLP)?	If YES then the permission question below does not need to be answered. YES ☐ NO ☐
9	Has permission to undertake the research has been provided by the partner organisation?	(If YES attach copy) If NO the application cannot continue YES ☐ NO ☐

Where research activity is carried out in collaboration with an external organisation

10	Does this organisation have its own ethics approval system?	YES	☐	NO	☐
	If Yes, please attach a copy of any final approval (or interim approval) from the organisation (this may be a copy of an email if appropriate).				

SECTION E: Details of Research Activity

1	Indicative title:	How do metacognitive skills influence cognitive skills such as concentration and problem-solving in second language teachers learning the language they teach, and how do these effects vary between cohorts with high and low initial metacognitive skills?			
2	Proposed start date:	18th September 2025	Proposed end date:	2 nd February 2026	
	Introduction to the Research (maximum 300 words per section) Ensure that you write for a <u>Non-Specialist Audience</u> when outlining your response to the points below: <i>Purpose of Research Activity</i> <i>Proposed Research Question</i> <i>Aims of Research Activity</i> <i>Objectives of Research Activity</i> Demonstrate, briefly, how <u>Existing Research</u> has informed the proposed activity and explain <i>What the research activity will add to the body of knowledge</i> <i>How it addresses an area of importance.</i>				
3	Purpose of Research Activity Research will explore how disruptive thinking affects learning (Ferraro and Panlilio, 2020) and apply these insights to second language acquisition (SLA). It will assess the impact of metacognitive and affective (M&A) skills training on problem-solving, emotional regulation, and adaptive thinking. The study will consider findings by Brown et al. (2021), that metacognitive beliefs about cognition impair cognition, impacting cognitive performance and learning. Since such beliefs have been shown perpetuate PTSD symptoms via impaired cognition, similar effects may occur in the general population.				

	(this box should expand as you type)
4	Research Question How do M&A skills influence cognitive skills (e.g. concentration and problem-solving) in second language teachers learning the language they teach, and how do these effects vary between cohorts separated initially into high and low metacognitive skill levels? (this box should expand as you type)
5	Aims of Research Activity Demonstrate how M&A skills training improves cognition during SLA among adults (filling a literature gap). Evaluate how M&A training mitigates learning problems among SLA teachers learning their teaching language. Lay groundwork to later assess how metacognitive intervention can mitigate the impact of trauma on cognitive processes as posited by Sharma et al. (2022), and apply to SLA. Assess the potential for designing study cohorts using M&A skills status becoming a normative methodological feature in educational research. (this box should expand as you type)
6	Objectives of Research Activity Conduct literature review exploring links between M&A skills and SLA performance. Design study about how these skills impact cohorts with high and low initial metacognitive skills status as tested by myself at outset. Test M&A skills efficacy of intervention on two cohorts of Vietnamese teachers who I train to take an English language test. Make a theoretical case that the findings can inform future studies to better understand trauma exposure and SLA. Evaluate whether high and low metacognitive skills cohorts, established by psychometric testing, can form part of a normative framework in educational research - achieved by examining how results are applicable across social research. (this box should expand as you type)
	Proposed methods (maximum 600 words) Provide a brief summary of all the methods that may be used in the research activity, making it clear what specific techniques may be used. If methods other than those listed in this section are deemed appropriate later, additional ethical approval for those methods

	will be needed. You do not need to justify the methods here, but should instead describe how you intend to collect the data necessary for you to complete your project.
7	The study will include a literature review examining the relationship between metacognitive skills and cognitive performance in adults during SLA. It will also explore the connection between metacognitive skills and cognitive challenges related to learning. While this study will not directly investigate trauma exposure, it may suggest future research explores how M&A skills training could mitigate impact of trauma on SLA. The study will employ a mixed-methods approach with a narrative-based intervention exploring and measuring the development of M&A skills. Participants engage with fictional scenarios designed to prompt reflective thinking, and their responses are analysed both quantitatively and qualitatively assess the intervention's impact. Intervention 1) Psychometric: A self-report questionnaire testing metacognitive skills. Current preference: The Metacognitive Awareness Inventory (MAI). Using this tool at the outset, I will create 2 cohorts based on – high and low metacognitive skill levels. The MAI is accessible and requires minimal self-training to administer and interpret results. Cohorts will be coded by colour and subjects will know which colour they are, but not how that corresponds to test levels. 2) Psychometric 2: A self-report questionnaire testing cognitive skills related to learning. Current preference: Learning and Study Strategies Inventory (LASSI) LASSI is designed to measure students' awareness and use of learning and study strategies that are crucial for academic success. It contains 60 items using a likert scale and tests a variety of learning areas such as concentration, information processing, time management and more. It is widely used and accessible, easy to administer with a simple guide to follow. This test will measure baseline and temporal stages to assess intervention efficacy over the intervention period. 3) Classroom 'empathy' intervention – fictional case studies with embedded metacognitive and affective questions eliciting responses – (used for qualitative research analysis as well as intervention). Subjects read about a fictional adult language student facing learning problems. The activity is designed by myself and the task questions aspect is based on the reflective model called 'DEBRIEF'. Questions are designed to raise M&A issues which each student addresses and answers. Once I collect the replies

	from the cohorts, we discuss each question as a class which is not collected so that all subjects can learn using 'distributed metacognition' – i.e. from each other's thought processes. 4) Psychometric & open-ended questions: Repeat MAI but adjust to include open qualitative questions at the end. The final test will be repeating the MAI to compare metacognitive skills before and after the intervention to assess progress and compare to learning progress in both cohorts. Preparation I aim to have help to pilot each template for efficacy and language appropriateness (pre-teaching vocabulary is anticipated). The environment will be controlled in order that subjects will not be influenced but can ask me where guidance may be necessary. Instruction and guidance will be provided with sufficient time allocated without pressure. Upon completion of the initial cohort placement test, students will be allocated a cohort colour for future data gathering aspects to ensure confidentiality, anonymity and accuracy. Data Entry A structured data entry form in Excel. Enter data manually. Data Cleaning Completeness and Accuracy: Ensure all data points are filled in, addressing any missing data or inconsistencies. Cross-check a sample of entries with original tests. Data Analysis Quantitative: Use Excel descriptive statistics and comparative analyses. Qualitative: Perform thematic coding and frequency analysis of narrative responses using AI or programme. Mixed-Methods: Explore correlations between quantitative and qualitative data. Use triangulation to reinforce findings. Data Storage and Management Secure Storage: Organise and secure original paper tests in safe, with digital data stored securely and backed up on USB. Remove identifying information to protect privacy.
--	---

	Location of research activity Identify all locations where research activity will take place.
8	Place of work (classrooms) in Hanoi, working for the Atlantic Group and AMA, where I teach Vietnamese language teachers to upgrade their English language skills which will improve the quality of their teaching to their state school students. <i>(this box should expand as you type)</i>
	Research activity outside of the UK If research activity will take place overseas, you are responsible for ensuring that local ethical considerations are complied with and that the relevant permissions are sought. Specify any local guidelines (e.g. from local professional associations/learned societies/universities) that exist and whether these involve any ethical stipulations beyond those usual in the UK (provide details of any licenses or permissions required). Also specify whether there are any specific ethical issues raised by the local context in which the research activity is taking place, for example, particular cultural and/or legal sensitivities or vulnerabilities of participants. If you live in the country where you will do the research then please state this.
9	I have the support of my employer who find my ethical application in the UK to be sufficient for undertaking the research. Please see consent letter. <i>(this box should expand as you type)</i>

10	Use of documentation not in the public domain: Are any documents NOT publicly available?	NO	☒
		YES	☐
11	If Yes, please provide details here of how you will gain access to specific documentation that is not in the public domain and that this is in accordance with the current data protection law of the country in question and that of England and Wales. <i>(this box should expand as you type)</i>		

Does your research relate to one or more of the seven aims of the Well-being of Future Generations (Wales) Act 2015?	YES	NO
---	-----	----

12	A prosperous Wales	☐	☒
13	A resilient Wales	☐	☒
14	A healthier Wales	☐	☒
15	A more equal Wales	☐	☒
16	A Wales of cohesive communities	☐	☒
17	A Wales of vibrant culture and thriving Welsh language	☐	☒
18	A globally responsible Wales	☐	☒
19	If YES to any of the above, please give details:		
	(this box should expand as you type)		

SECTION F: Scope of Research Activity

	Will the research activity include:	YES	NO
1	Use of a questionnaire or similar research instrument?	☒	☐
2	Use of interviews?	☐	☒
3	Use of focus groups?	☐	☒
4	Use of participant diaries?	☐	☒
5	Use of video or audio recording?	☐	☒
6	Use of computer-generated log files?	☐	☒
7	Participant observation with their knowledge?	☐	☒
8	Participant observation without their knowledge?	☐	☒
9	Access to personal or confidential information without the participants' specific consent?	☐	☒
10	Administration of any questions, test stimuli, presentation that may be experienced as physically, mentally or emotionally harmful / offensive?	☐	☒
11	Performance of any acts which may cause embarrassment or affect self-esteem?	☐	☒
12	Investigation of participants involved in illegal activities?	☐	☒
13	Use of procedures that involve deception?	☐	☒
14	Administration of any substance, agent or placebo?	☐	☒
15	Working with live vertebrate animals?	☐	☒

16	Procedures that may have a negative impact on the environment?	☐	☒
17	Other primary data collection methods. Please indicate the type of data collection method(s) below.	☒	☐
	Details of any other primary data collection method: A narrative intervention. This is an activity whereby subjects read a fictional story and answer embedded metacognitive and affective questions related to the character in the story. This is the intervention, but the responses, gathered in the classroom upon completion, are also used for qualitative analysis. (this box should expand as you type)		

If NO to every question, then the research activity is (ethically) low risk and **may** be exempt from **some** of the following sections (please refer to Guidance Notes).

If YES to any question, then no research activity should be undertaken until full ethical approval has been obtained.

SECTION G: Intended Participants

If there are no participants then do not complete this section, but go directly to section H.

	Who are the intended participants:	YES	NO
1	Students or staff at the University?	☐	☒
2	Adults (over the age of 18 and competent to give consent)?	☒	☐
3	Vulnerable adults?	☐	☒
4	Children and Young People under the age of 18? (Consent from Parent, Carer or Guardian will be required)	☐	☒
5	Prisoners?	☐	☒
6	Young offenders?	☐	☒
7	Those who could be considered to have a particularly dependent relationship with the investigator or a gatekeeper?	☐	☒
8	People engaged in illegal activities?	☐	☒
9	Others. Please indicate the participants below, and specifically any group who may be unable to give consent.	☐	☒
	Details of any other participant groups:		

	(this box should expand as you type)		
--	--------------------------------------	--	--

	Participant numbers and source Provide an estimate of the expected number of participants. How will you identify participants and how will they be recruited?	
10	How many participants are expected?	20 <i>(this box should expand as you type)</i>
11	Who will the participants be?	Language teachers (aged 35-50) who I teach in order to refresh and upgrade their language skills. They are not long terms students – I will know them for a short time before the research starts. <i>(this box should expand as you type)</i>
12	How will you identify the participants?	The subjects will be students who I am teaching. All consenting subjects are applicable. Students will take the tests and undertake the intervention during normal class time. They will be given 2-3 weeks to consider giving consent. The intervention is weekly over a period of 8 weeks and the tests are at start, middle and end intervals. <i>(this box should expand as you type)</i>

	Information for participants:	YES	NO	N/A
13	Will you describe the main research procedures to participants in advance, so that they are informed about what to expect?	☒	☐	☐
14	Will you tell participants that their participation is voluntary?	☒	☐	☐
15	Will you obtain written consent for participation?	☒	☐	☐
16	Will you explain to participants that refusal to participate in the research will not affect their treatment or education (if relevant)?	☒	☐	☐
17	If the research is observational, will you ask participants for their consent to being observed?	☐	☐	☒
18	Will you tell participants that they may withdraw from the research at any time and for any reason?	☒	☐	☐
19	With questionnaires, will you give participants the option of omitting questions they do not want to answer?	☒	☐	☐
20	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
21	Will you debrief participants at the end of their participation, in a way appropriate to the type of research undertaken?	☒	☐	☐

22	If NO to any of above questions, please give an explanation
	<i>(this box should expand as you type)</i>

	Information for participants:	YES	NO	N/A
24	Will participants be paid?	☐	☒	☐
25	Is specialist electrical or other equipment to be used with participants?	☐	☒	☐
26	Are there any financial or other interests to the investigator or University arising from this study?	☐	☒	☐
27	Will the research activity involve deliberately misleading participants in any way, or the partial or full concealment of the specific study aims?	☐	☒	☐
28	If YES to any question, please provide full details			
	<i>(this box should expand as you type)</i>			

SECTION H: Anticipated Risks

	Outline any anticipated risks that may adversely affect any of the participants, the researchers and/or the University, and the steps that will be taken to address them. If you have completed a full risk assessment (for example as required by a laboratory, or external research collaborator) you may append that to this form.		
1	Full risk assessment completed and appended?	Yes	☐
		No	☒
2	Risks to participants For example: sector-specific health & safety, emotional distress, financial disclosure, physical harm, transfer of personal data, sensitive organisational information		
	Risk to participants:	How you will mitigate the risk to participants.	

	Data transfer and confidentiality Emotional distress of intervention As I am teaching the subjects in preparation for a language exam, they will be stressed as the exam nears. The intervention and tests relate to improving learning skills and so may raise questions about learning processes in relation to studying for the test which is professionally very important to them. <i>(this box should expand as you type)</i>	Cohorts will be carefully anonymised and all data held confidentially. Subjects will respond to fictional scenarios to avoid direct interference with personal experiences. The intervention is designed to improve metacognitive and affective awareness of learning cognition and so should reduce the related stress of the exam. However, the intervention may find subjects approaching me for advice about cognitive problems. The intervention encourages subjects to discuss metacognitive and learning skills so that they can better support each other.
3	If research activity may include sensitive, embarrassing or upsetting topics (e.g. sexual activity, drug use) or issues likely to disclose information requiring further action (e.g. criminal activity), give details of the procedures to deal with these issues, including any support/advice (e.g. helpline numbers) to be offered to participants. Note that where applicable, consent procedures should make it clear that if something potentially or actually illegal is discovered in the course of a project, it may need to be disclosed to the proper authorities	
	<i>(this box should expand as you type)</i>	
4	Risks to the investigator For example: personal health & safety, physical harm, emotional distress, risk of accusation of harm/impropriety, conflict of interest	
	Risk to the investigator: Potential risk of being accused of impropriety as subjects' inner thought processes are being gathered.	<i>How you will mitigate the risk to the investigator:</i> Subjects will be made aware of the research content and objectives from outset. Remind subjects they can withdraw at any time.

	Possibility of being overwhelmed by researching my trainees who require attention from their language trainer. <i>(this box should expand as you type)</i>	I will not analyse any data until after I have finished the language training programme. This will allow me to focus on my training duties and park data analysis to a time I can focus on it exclusively. <i>(this box should expand as you type)</i>
5	University/institutional risks For example: adverse publicity, financial loss, data protection	
	Risk to the University: Potential risk of association with investigator in relation to data security. Risk of damage to university reputation if the research is not undertaken ethically and with rigour. <i>(this box should expand as you type)</i>	<i>How you will mitigate the risk to the University:</i> Data will be kept secure, and the process will be made transparent to subjects. I have designed the study to prioritise ethical consideration e.g. not researching the experiences of subjects directly. <i>(this box should expand as you type)</i>
6	Environmental risks For example: accidental spillage of pollutants, damage to local ecosystems	
	Risk to the environment: N/A <i>(this box should expand as you type)</i>	<i>How you will mitigate the risk to environment:</i> <i>(this box should expand as you type)</i>

Disclosure and Barring Service				
	If the research activity involves children or vulnerable adults, a Disclosure and Barring Service (DBS) certificate must be obtained before any contact with such participants.	YES	NO	N/A
7	Does your research require you to hold a current DBS Certificate?	☐	☐	☒
8	If YES, please give the certificate number. If the certificate number is not available please write "Pending"; in this case any ethical approval will be subject to providing the appropriate certificate number.			

SECTION I: Feedback, Consent and Confidentiality

1	Feedback What de-briefing and feedback will be provided to participants, how will this be done and when? Part of the intervention will include a group discussion whereby participants discuss answers voluntarily. Participants will be told they can receive the final report and will be provided with my contact details (email) should they wish details or a copy of the final report. <i>(this box should expand as you type)</i>
2	Informed consent Describe the arrangements to inform potential participants, before providing consent, of what is involved in participating. Describe the arrangements for participants to provide full consent before data collection begins. If gaining consent in this way is inappropriate, explain how consent will be obtained and recorded in accordance with prevailing data protection legislation. Participants will be informed some weeks in advance about the research and have time to decide about participation. I will create a document laying out the different aspects of their participation and this will form group discussions. After this a minimum of 2 weeks will be allocated for participants to ask questions before consent being required. <i>(this box should expand as you type)</i>
3	Confidentiality / Anonymity

	Set out how anonymity of participants and confidentiality will be ensured in any outputs. If anonymity is not being offered, explain why this is the case.
	After the initial test, each participant will be included in cohorts whereby they will be identified by a colour representing their cohort. This will anonymise the participants. The original test which identifies students will be deleted. All anonymised responses will be held in my safe and inputted into spreadsheets where no names will be recorded. No institution or person will receive the original document. <i>(this box should expand as you type)</i>

SECTION J: Data Protection and Storage

	Does the research activity involve personal data (as defined by the General Data Protection Regulation 2016 “GDPR” and the Data Protection Act 2018 “DPA”)?	YES	NO
1	“Personal data” means any information relating to an identified or identifiable natural person (‘data subject’). An identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person. Any video or audio recordings of participants is considered to be personal data.	x ☐	☐
	If YES, provide a description of the data and explain why this data needs to be collected:		
2	Consent forms. <i>(this box should expand as you type)</i>		
	Does it involve special category data (as defined by the GDPR)?	YES	NO
3	“Special category data” means sensitive personal data consisting of information as to the data subjects’ – (a) racial or ethnic origin, (b) political opinions, (c) religious beliefs or other beliefs of a similar nature,	☐	☐

	(d) membership of a trade union (within the meaning of the Trade Union and Labour Relations (Consolidation) Act 1992), (e) physical or mental health or condition, (f) sexual life, (g) genetics, (h) biometric data (as used for ID purposes),		
	If YES, provide a description of the special category data and explain why this data needs to be collected:		
4	 (this box should expand as you type)		

	Will data from the research activity (collected data, drafts of the thesis, or materials for publication) be stored in any of the following ways?	YES	NO
5	Manual files (i.e. in paper form)?	☒	☐
6	University computers?	☐	☒
7	Private company computers?	☐	☒
8	Home or other personal computers?	☒	☐
9	Laptop computers/ CDs/ Portable disk-drives/ memory sticks?	☒	☐
10	"Cloud" storage or websites?	☒	☒
11	Other – specify:	☐	☒
12	For all stored data, explain the measures in place to ensure the security of the data collected, data confidentiality, including details of backup procedures, password protection, encryption, anonymisation and pseudonymisation:		
	Paper data will be held in safe and inputted onto spreadsheets on my own computer. For backup, the data will be held on a USB and stored in my safe. (this box should expand as you type)		

Data Protection			
	Will the research activity involve any of the following activities:	YES	NO
13	Electronic transfer of data in any form?	☒	☐
14	Sharing of data with others at the University outside of the immediate research team?	☐	☒

15	Sharing of data with other organisations?	☐	☒
16	Export of data outside the UK or importing of data from outside the UK?	☒	☐
17	Use of personal addresses, postcodes, faxes, emails or telephone numbers?	☒	☐
18	Publication of data that might allow identification of individuals?	☐	☒
19	Use of data management system?	☐	☒
20	Data archiving?	☐	☒
21	If YES to any question, please provide full details, explaining how this will be conducted in accordance with the GDPR and Data Protection Act (2018) (and any international equivalents, where appropriate): USB sticks used to store or transfer data will be password protected. All data transfers will be encrypted, and password protected. All participants will be given a unique identifier to ensure confidentiality, and this list will be kept securely in the password protected folder. The data will be stored until the completion of the project and then deleted. In accordance with the DPA2018, participants will have the right to ask to see what data is held relating to them, and this data will be deleted immediately if the participant requests this, in which case the data will not be used in the project. <i>(this box should expand as you type)</i>		
22	List all who will have access to the data generated by the research activity:		
	Principle researcher (me). <i>(this box should expand as you type)</i>		
23	List who will have control of, and act as custodian(s) for, data generated by the research activity:		
	Principle researcher (me). <i>(this box should expand as you type)</i>		
24	Give details of data storage arrangements, including security measures in place to protect the data, where data will be stored, how long for, and in what form. Will data be archived – if so how and if not why not.		
	All data will be encrypted and kept in password protected cloud storage which will not be shared. Any USB sticks used to store or transfer data will be password protected and will be reformatted at the end of the project in order to destroy the data. The data will be stored until the completion of the project and then deleted. <i>(this box should expand as you type)</i>		
25	Please indicate if your data will be stored in the UWTSD Research Data Repository (see https://researchdata.uwtsd.ac.uk/). If so please explain. <i>(Most relevant to academic staff)</i>		

	<i>(this box should expand as you type)</i>		
26	Confirm that you have read the UWTSD guidance on data management (see https://www.uwtsd.ac.uk/library/research-data-management/)	YES	☒
27	Confirm that you are aware that you need to keep all data until after your research has completed or the end of your funding	YES	☒

SECTION K: Declaration

	The information which I have provided is correct and complete to the best of my knowledge. I have attempted to identify any risks and issues related to the research activity and acknowledge my obligations and the rights of the participants. In submitting this application I hereby confirm that I undertake to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice which is published on the website: https://www.uwtsd.ac.uk/research/research-ethics/		
1	Signature of applicant:	Alexander Porter	Date: 30/08/2024

For STUDENT Submissions:

2	Director of Studies/Supervisor:	Laura James	Date: 17.10.24
3	Signature:	Laura James	

For STAFF Submissions:

4	Academic Director/ Assistant Dean:		Date:
5	Signature:		

Checklist: Please complete the checklist below to ensure that you have completed the form according to the guidelines and attached any required documentation:

☒	I have read the guidance notes supplied before completing the form.
☒	I have completed ALL RELEVANT sections of the form in full.
☒	I confirm that the research activity has received approval in principle
☐	I have attached a copy of final/interim approval from external organisation (where appropriate)
☐	I have attached a full risk assessment (where appropriate) ONLY TICK IF YOU HAVE ATTACHED A FULL RISK ASSESSMENT
☒	I understand that it is my responsibility to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice.



I understand that before commencing data collection all documents aimed at respondents (including information sheets, consent forms, questionnaires, interview schedules etc.) must be confirmed by the DoS/Supervisor, module tutor or Academic Director.

RESEARCH STUDENTS ONLY

Once complete, submit this form via the **MyTSD Doctoral College Portal** at (<https://mytsd.uwtsd.ac.uk>).

RESEARCH STAFF ONLY

All communications relating to this application during its processing must be in writing and emailed to pgresearch@uwtsd.ac.uk , with the title 'Ethical Approval' followed by your name.

STUDENTS ON UNDERGRADUATE OR TAUGHT MASTERS PROGRAMMES should submit this form (and receive the outcome) via systems explained to you by the supervisor/module leader.

Appendix C. Example Narrative Stimulus and Epistemic Task Sequence (Questions 1–7)

TRAINEE NAME: _____

DATE: _____

LAN'S TRAINING STORY

Lan is a 42-year-old teacher. She wants to improve her English for work, so she joined an evening class. She tries to remember the teacher's instructions, but sometimes there are too many things to keep in her head at once. This makes her forget steps in exercises.

One evening, while she is practicing a pronunciation exercise, she thinks she hears some classmates laughing quietly. She is not sure if they are laughing at her. For a moment, her mind goes blank, and she cannot focus on the instructions. After that, she struggles to remember the steps of the exercise.

At home, **Lan** tries to practise, but she keeps thinking about the laughing in class. She finds it hard to focus and to hold several pieces of information in her mind at the same time. She often loses track of the exercise steps. This makes her frustrated because she wants to learn, but it feels slow and confusing.

In class, she speaks less than before. She worries that her memory and attention problems will stop her from improving her English.

REFLECTION QUESTIONS

Discuss with your group and give your own answer. Continue in the same way with the remaining questions -

1. What problems does Lan have in class and at home?

--

2. What has helped her remember instructions? What has not helped?

--

**3. How do you think Lan felt when she thought her classmates were laughing at her?
How might thinking about it at home make her feel?**

--

4. Has Lan had this kind of memory or attention problem before? How might other students manage it?

--

- 5. What is the most important thing Lan can learn about focusing and remembering instructions?**

- 6. What can lan do next time to keep track of instructions, even if something distracts her?**

- 7. How will she know if her new memory strategies are working? Who could she talk to about her progress?**

Appendix D. Participant Information Sheet and Consent Form

LEARNING SKILLS RESEARCH

Consent to take part in research

1. I..... voluntarily agree to participate in this research study.
2. I understand that even if I agree to participate now, I can withdraw at any time
3. I understand that I can refuse to answer any question involved during the research process without any consequences of any kind.
4. I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
5. I understand that participation involves answering questionnaires and completing reading activities.
6. I understand that I will not benefit directly from participating in this research.
7. I understand that all information I provide for this study will be treated confidentially.
8. I understand that in any report on the results of this research my identity will remain anonymous.
9. This will be done by disguising any details of my responses which may reveal my identity.
10. I understand that disguised extracts from my responses may be quoted in presentations and published papers etc.
11. I understand that if I inform the researcher that myself or someone else is at risk of harm during research sessions, they may have to report this to the relevant authorities – the authorities will discuss this with me first, but may be required to report with or without my permission.
12. I understand that signed consent forms and original responses will be retained in a safe in the house of the researcher / trainer until scanned. Scanned documents will be stored on password protected devices and all originals paper copies will be shredded by October 2027.
13. I understand that a copy my responses in which all identifying information has been removed will be retained until October 2028.
14. I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.
15. I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Signature of research participant

Full Name: _____

Signature: -----

Signature of participant Date _____

Signature of researcher

I believe the participant is giving informed consent to participate in this study

Alexander Porter

Signature: -----

Signature of researcher Date _____

For any queries contact the academic supervisor David@voicestudycentre.com

Appendix Table A1

Empirical Alignment Between Incongruent Neurons and Irrelevance Potential

Feature	Incongruent Neurons (Empirical)	Irrelevance Potential (Present Framework)
Predominantly non-conscious activity	✓	✓
Functionally relevant	✓	✓
Does not drive selected response	✓	✓
Not reducible to noise	✓	✓
Predicts future error / misalignment	✓	✓
Active during correct performance	✓	✓
Represents non-selected alternatives	✓ (implicit)	✓ (explicit)
Low-precision / non-dominant	✓	✓
Retained for learning updates	✓	✓
Conceptualised as latent potential	✗	✓
Structured retention of suppressed candidates	✗	✓
Role beyond error (exploration, flexibility)	✗	✓
Integrated with a salience landscape	✗	✓
Explicit temporal / prosodic regulation	✗	✓
Metacognitive regulation articulated	✗	✓

Appendix Table A2

Prosodic Regulation of Irrelevance Potential Across Predictive, Enactive, and Metacognitive Accounts

Prosodic Element	How It Shapes Irrelevance Potential (IP)	Predictive Processing (PP) correspondence	4E / interactional correspondence	Metacognitive implementation
Pitch	Flags candidate viability; introduces proto-structure among alternatives	Modulates precision; biases candidate weighting	Embodied attentional cue; guides expectancy	Signals relative weighting of latent candidates; biases selective collapse
Timing / Hesitation	Marks uncertainty; segments candidate trajectories over time	Temporarily suppresses precision; maintains multiple interpretations	Real-time coordination; scaffolds turn-taking	Delays or suspends collapse; preserves alternatives
Stress / Emphasis	Highlights contrast; selects a candidate for collapse	Increases precision; triggers stabilisation	Focused attention; aligns embodied salience	Triggers selective collapse into symbolic relevance
Rhythm / Entrainment	Sustains retention; phase-aligns candidate propagation	Smooths relevance updating; aligns temporal predictions	Temporal entrainment; maintains coordinated interaction	Maintains phase-aligned latent potential for future collapse
Amplitude	Signals urgency; prioritises a candidate trajectory	Amplifies precision; accelerates stabilisation	Salience cue; emphasises behavioural relevance	Accelerates collapse; reinforces high-priority candidates

Appendix Table A3

Oscillatory Timescales, Prosody, and the Regulation of Irrelevance Potential

Frequency Band	Prosodic Feature	Functional Role in IP / Salience / Collapse
Delta (0.5–4 Hz) (<i>Very slow; 250–2000 ms; DMN active; long-timescale integration, baseline cognitive state</i>)	Breath rhythm; sentence-level prosody	Sustains latent possibilities; maintains irrelevance potential
Theta (4–8 Hz) (<i>Slow; 125–250 ms; DMN–SN interface active; sequencing, learning, working memory</i>)	Syllable timing; rhythmic segmentation	Maintains multiple candidate sequences
Alpha (8–12 Hz) (<i>Medium; 83–125 ms; SN active; attentional inhibition, sensory gating</i>)	Pauses, hesitations	Suppresses low-priority candidates
Beta (12–30 Hz) (<i>Fast; 33–83 ms; CEN active; top-down control, precision weighting</i>)	Stress, emphasis	Precision weighting; selective stabilisation
Gamma (30–100 Hz) (<i>Very fast; 10–33 ms; CEN–SN coupling; rapid binding, integration</i>)	Pitch accents	Rapid collapse into symbolic representation
Cross-frequency coupling (Delta/Theta ↔ Beta/Gamma) (<i>Coordinates DMN, SN, CEN activity; links slow candidate emergence with fast selective collapse</i>)	Rhythm, stress, amplitude interplay	Integrates candidate maintenance with collapse

Appendix Table A4

Epistemic Registers in Co-Present Language Use

Epistemic register	Enacted / vernacular (definition)	Representational / administrative (definition)	Regulatory features attenuated
Lived animal	cow – animal encountered through care, handling, movement, and daily husbandry	beef – animal abstracted as classified commodity or resource	Prosodic coordination in handling; temporal salience of care

Lived animal	sheep – animal known through flock dynamics, seasonal rhythms, and embodied interaction	mutton – animal reduced to market category or product class	Enacted husbandry rhythms; timing-sensitive interaction
Action	work – effort experienced through pacing, fatigue, and situational adjustment	labour – effort formalised as unit of productivity or economic input	Graded effort regulation; embodied pacing
Inquiry	ask – interpersonal request shaped by hesitation, timing, and relational context	inquire – formalised act of information-seeking governed by procedure	Hesitation, turn-taking, interpersonal timing
Authority	kingly – authority enacted through presence, voice, and relational alignment	royal – authority abstracted into institutional or legal status	Relational voice; affective alignment
Constraint	freedom – situational latitude negotiated through action and context	liberty – abstract right defined by legal or ideological frameworks	Negotiated affordances in context

Appendix Table A5

Diachronic Compression of Enacted Epistemic Terms into Representational Abstractions

Enacted / Sarx-Grounded Term	Original Epistemic Character	Compressed Representational Term	Epistemic Shift Introduced	What Is Lost in Compression
λόγος (logos)	Ordering and intelligibility-in-action; regulation unfolding in time	verbum / word	Meaning treated as bounded semantic object	Prosody, temporality, regulation of irrelevance
σάρξ (sarx)	Living flesh; vulnerability, metabolism, action under constraint	caro	Flesh treated as passive substance	Urgency, error cost, embodied regulation
θεωρία (theōría)	Participatory journey or witnessing;	theory	Knowledge treated as abstract	Participation, risk, temporal unfolding

	enacted exploration		explanatory structure	
quest	Lived search or ordeal; commitment under uncertainty	question	Inquiry treated as discrete interrogative object	Duration, existential cost, enacted struggle

Appendix Table A6

Ordering in Language Pedagogy: Intention-First and Representational Sequences

Ordering	Sequence	Functional Relation
Intention-first	Intention → Grammar → Vocabulary	Intention creates grammatical affordances; intention + grammar create lexical affordances
Representational	Vocabulary → Grammar → Intention	Forms are memorised first and only later assembled for use

Appendix Table A7

Pedagogical Consequences of Intention-First versus Representational Ordering

Aspect	Intention-First Pedagogy	Representational Pedagogy
Starting point	Learner intention / task	Forms / symbols
Role of prosody	Regulates uncertainty and timing	Marginal or post-hoc
Status of structure	Affordance shaped by intention	Rule system to be learned
Status of representation	Recruited by use	Preloaded for recall
Timing of representation	After regulation	Before regulation

Appendix Table A8

Hedging as Prosodic Regulation of Epistemic Commitment

In each case, the primary function of hedging is the regulation of the epistemic frame itself—specifically the maintenance of Irrelevance Potential—while secondary effects such as pressure modulation and expectancy management are achieved through identifiable, trainable vocal–prosodic variables.

Hedging expression (example)	Representational function (content-level)	Primary epistemic function (frame regulation)	Secondary epistemic function → vocal–prosodic means
“It seems that...”	Weakens propositional commitment; signals uncertainty in content	Holds the interpretive frame open so multiple candidate interpretations remain assessable	Reduces commitment pressure → lowered intensity, reduced terminal pitch, slowed tempo
“I may be wrong, but...”	Protects speaker against error or rebuttal	Suspends epistemic closure while alternative trajectories remain live	Enables shared assessment without forced alignment → initial pause, breath reset, de-accented onset
“This could be interpreted as...”	Avoids definitive claim; preserves alternative readings abstractly	Maintains parallel candidate trajectories prior to selective collapse	Prevents premature salience weighting → even stress distribution, absence of focal accent
“At this stage...”	Temporarily qualifies a conclusion	Marks commitment as phase-dependent, preserving future reassessment	Signals deferred closure across time → phrase-final lengthening, continuation contour

Appendix Table A9

Greek and Latin Articulations of Logos: Epistemic Consequences

Dimension	Greek (λόγος / σάρξ)	Latin (verbum / caro)
Key term	λόγος (<i>logos</i>)	<i>verbum</i>
Primary meaning	Regulation, ordering, intelligibility-in-action	Word as discrete semantic unit
Epistemic function	Dynamic regulation of Irrelevance Potential	Representational content
Temporal status	Enacted and modulated in time	Treated as static
Relation to meaning	Intelligibility emerges through embodied regulation	Meaning pre-exists as encoded content
Relation to voice	Grounded in speech, prosody, and temporal modulation	Detached from voice; prioritises text
Underlying epistemology	Process-oriented, enacted, relational	Object-oriented, representational

Appendix Table A10

Greek and Latin Articulations of Flesh (σάρξ / caro): Epistemic Consequences

Dimension	Greek (σάρξ / <i>sarx</i>)	Latin (<i>caro</i>)
Primary meaning	Living flesh	Matter / substance
Ontological status	Vulnerable, metabolic, temporally constrained	Passive container
Epistemic role	Generates Irrelevance Potential through embodied limits	Receives pre-formed meaning
Relation to action	Action under constraint and uncertainty	Instantiation without regulation
Relation to error and risk	Central (error costs, temporal pressure)	Peripheral

Implication for meaning	Intelligibility realised through prosodic enactment	Meaning instantiated in matter
-------------------------	---	--------------------------------

Appendix Table A11

Preserved and Obscured Epistemic Features in Greek and Latin Articulations

Preserved / obscured features	Greek articulation preserves	Latin articulation obscures
Enactment	✓	X
Temporality	✓	X
Process	✓	X
Prosody and voice	✓	X
Irrelevance Potential	✓	X
Representational stability	Secondary	Primary

Appendix Table A12

Historical Trajectory from Voice-Mediated Epistemic Alignment to Representational Coordination

Stage	Historical configuration	Core epistemic features
Pre-Axial voice traditions (Zarathustra, Vedic chant, early Hebrew)	Oral, ritual, chant	Prosody regulates Irrelevance Potential directly; no representational dominance
Axial articulation	Oral teaching and narrative	Explicit warnings against false certainty; still enacted
Johannine Greek (original language)	Spoken–written hybrid	Logos articulated explicitly; flesh epistemically central; prosody implicit but intact; writing present but not dominant
Latin transmission	Textual doctrine	Representational stabilisation; prosody marginalised; epistemic dualism locked in

Modern science	Formal symbolic systems	Representation maximised; regulation of Irrelevance Potential hidden; quantitative–qualitative split appears
----------------	-------------------------	---

Appendix Table A13

Applicability of the Epistemic Regulation Mission Across Practice Types

Practice Type	Primary Function	Manages Uncertainty ?	Requires Regulation of Mission Commitment ?	Applicable?	Rationale
Scientific inquiry	Knowledge generation	Yes	Yes	Yes	Premature closure distorts inference and theory revision
Education / Pedagogy	Learning under uncertainty	Yes	Yes	Yes	Learners must act meaningfully before mastery
Voice Pedagogy	Epistemic regulation training	Yes	Yes	Yes Yes (prosodically explicit training domain)	Explicitly trains timing, pacing, and hesitation
Clinical practice (epistemic agency)	Meaningful action under uncertainty	Yes	Yes	Yes (conditional)	Only where agency and inference are central
Engineering execution	Implementation of known designs	No (post-design)	No	No	Commitment is already stabilised
Ritual (as ritual)	Identity / continuity	No	No	No	Does not aim to regulate epistemic commitment

Artistic expression	Expression / exploration	Maybe	No	No	Not accountable to epistemic alignment
Bureaucratic administration	Coordination / enforcement	No	No	No	Relies on fixed representation and rules
Entertainment	Engagement	No	No	No	Epistemic commitment is irrelevant
Logistics / operations	Efficiency	No	No	No	Optimisation under fixed constraints

Appendix Table A14

Illustrative Within-Participant Inference Trace (Single Narrative)

Table description

- The table illustrates how a single subject responding to a single narrative was scored across the DEBRIEF reflective sequence.
- Scores were derived using predefined ordinal scales applied to task-positioned linguistic features only.
- CSC (Cognitive Skill Comprehension): accuracy and temporal organisation of task-relevant information.
- ACN / ASE / SSR: awareness of internal states, external supports, and strategy reasoning, respectively.
- DMR (Depth of Metacognitive Reflection, 1–4):
 - 1 = descriptive
 - 2 = local evaluation
 - 3 = generalised insight or monitoring
 - 4 = integrated, future-oriented regulation
- Inference does not treat responses as reports of participant psychology or subjective experience.

A14a. DEBRIEF-Structured Inference Sequence

DEBRIEF Stage	Question	Student Response (Excerpt)	Coding Domain	Score	Rationale for Inference
Describe	What happens to Mark when the classroom becomes noisy?	"At first there is noise and he looks around, then he stops listening to the lesson."	CSC	3	Factual, temporally ordered description indicating structured attentional sequencing.
Evaluate	What did Mark do well, and what could he change next time?	"He tried to ignore it but maybe he should move his seat earlier."	SSR	3	Contrastive evaluation using modal language, indicating appraisal without firm commitment.
Bring Out	What feelings or assumptions influenced Mark's actions?	"He thinks the noise means he will fail, so he feels tense."	ACN	3	Explicit linguistic linkage between belief and affect without personal disclosure.
Review	How might someone else have handled this situation differently?	"Another student might ask the teacher or use headphones."	ASE	4	Introduces alternative social strategies attributed to others, expanding the relevance landscape.
Identify	What can Mark learn from this situation?	"He learns that waiting too long makes it harder to focus."	DMR	3	Generalised learning point extracted from prior events.
Establish	What should Mark do next time to improve?	"Next time he will change seats earlier"	SSR	4	Future-oriented action plan translating insight into procedural commitment.

		and focus on the task.”			
Feedback	How can Mark check whether this change is working?	“He can see if he stays focused longer and check the teacher’s response.”	DMR	3	Specifies internal and external monitoring criteria supporting iterative regulation.

A14b. Task-Sensitive Scoring Contrast (Story-Based Metacognitive Scale)

Story-Based Metacognitive Scale (ACN / ASE / SSR / DMR, 1–4)

- 1 = Minimal or surface reflection
- 2 = Basic but coherent metacognitive awareness
- 3 = Clear strategy or self-regulation reasoning
- 4 = Integrated or evaluative metacognitive reflection

Q5: What is the most important thing she can learn about applying her learning in different situations?

Response: The most important thing she can learn about applying her learning in different situations is that she can be more confident to speak to others.

LLM score + inference: 2 – Basic metacognitive awareness focused on outcome, with no explicit strategy or regulation.

Q6: What advice would you give to someone to help them apply what they learned in real life?

Response: They can use the techniques she has learnt in every conversation in real life to improve transfer and application of skills, which might bring more confidence when communicating with colleagues.

LLM score + inference: 3 – Clear strategy/self-regulation reasoning through deliberate cross-context application.

Appendix Table A15

Domains Implicated in Epistemic Alignment and the Modelling Privilege of Voice Pedagogy

Domain	Regulates Action Under Uncertainty?	Explicitly Trains Timing of Commitment	Sustains Irrelevance Potential (IP)	Alignment Is Theorised / Modelled	Why It Is Not Privileged
Voice Pedagogy (VP)	Yes	Yes (breath, timing, pacing, hesitation)	Yes (regulated non-commitment)	Yes (explicit pedagogical models)	—
Conversation Analysis / Pragmatics	Descriptive only	No (analytic, post hoc)	Observed, not trained	Partial (theoretical)	No pedagogical training of regulation
Psychotherapy (process-oriented)	Yes (contextual)	Partial	Partial	No (case-based, clinical)	Domain-specific; ethically constrained
Mindfulness / Contemplative Practice	Yes	Yes (delay, attentional suspension)	Yes	No (avoids explicit theorisation)	Non-model-building by design
Scientific Method Training	Yes (abstractly)	No (collapsed into stages)	Weak	Yes (formal theory)	Regulation presupposed, not trained
Language Pedagogy (form-focused)	No	No	No	No	Premature representational closure
Bureaucratic / Administrative Practice	No	No	No	No	Commitment is fixed by rule
Engineering / Technical Execution	No (post-design)	No	No	No	Operates after uncertainty is resolved

Appendix Table A16

Domain-General Epistemic Loop with Prosodic Regulation and Voice Pedagogy Collaboration

(DIRECT and INDIRECT indicate whether V contributes through real-time task-level regulation or through theorisation, modelling, and cross-domain export.)

Step 1: Relevance Detection and Attentional Weighting

Epistemic function:

Allocation of epistemic salience through modulation of temporal emphasis, intensity, and rhythmic grouping, enabling certain signals to become foregrounded while others are backgrounded.

VP collaboration:

- DIRECT (cognitive science; neuroscience): Training prosodic attention-shaping (e.g. timing, onset, dynamic emphasis) to regulate salience.
- INDIRECT (philosophy; cognitive science): Informing normative accounts of relevance via observable prosodic salience shifts.

Step 2: Epistemic Opening and Exploration

Epistemic function:

Maintenance of epistemic openness through prosodic variability, delaying stabilisation by sustaining flexible temporal and energetic patterns.

VP collaboration:

- DIRECT (learning sciences): Pedagogical regulation of prosodic variability to prevent premature closure.
- INDIRECT (dynamical systems theory; philosophy): Grounding models of metastability and epistemic openness in observable prosodic dynamics.

Step 3: Candidate Generation under Constraint

Epistemic function:

Generation of alternative action or inference candidates through controlled variation in timing, intensity, and coordination, while sensing physiological and task constraints.

VP collaboration:

- **DIRECT** (motor control; embodied cognition): Use of prosodic perturbations to expose constraint-sensitive candidate spaces.
- **INDIRECT** (systems neuroscience; philosophy): Informing constraint-based models of embodied inference.

Step 4: Selection and Commitment Timing

Epistemic function:

Temporal regulation of epistemic commitment via prosodic settling, where stabilisation occurs only once error signals diminish and constraints are satisfied.

VP collaboration:

- **DIRECT** (predictive processing; control theory): Training delayed prosodic settling to regulate commitment timing.
- **INDIRECT** (philosophy; cognitive science): Supporting accounts of epistemic commitment as temporally graded rather than belief-based.

Step 5: Procedural Stabilisation and Binding

Epistemic function:

Consolidation of selected patterns through prosodic regularisation, enabling reliable procedural binding following successful regulation.

VP collaboration:

- **DIRECT** (skill acquisition research): Introducing repetition only after prosodic stability emerges.
- **INDIRECT** (neuroscience; motor learning theory; philosophy): Clarifying the dependency of binding on prior epistemic regulation.

Step 6: Enactment, Evaluation, and Cross-Timescale Recalibration

Epistemic function:

Sustained enactment and recalibration of epistemic strategies across timescales through modulation of pacing, emphasis, and recovery, rather than moment-to-moment correction.

VP collaboration:

- **DIRECT** (educational science; performance studies): Structuring feedback and pacing to preserve real-time prosodic regulation.

- **INDIRECT** (philosophy; interdisciplinary modelling): Supporting norm-guided, multi-timescale models of epistemic adaptation.

Appendix Table A17

Minimal Epistemic Process and Linguistic Traces

Epistemic Stage	Process Description	Typical Linguistic Structures	Simple Examples
OPEN	More than one option is possible; no commitment yet	Possibility modals; plural options; interrogatives	“might”, “could”; “there are several options”; “what could she do?”
BIAS	One option becomes more salient than others, but alternatives remain	Comparatives; soft preference; probabilistic weighting	“more effective”; “probably better”; “seems the best option”
COMMIT	One option is selected for action or assertion	Declaratives; unmodalised verbs; prescriptive forms	“she should practise daily”; “this is the correct approach”
REOPEN (optional)	A previously suppressed option becomes active again	Contrastive markers; revision language; alternative reintroduction	“however”; “on second thought”; “alternatively”

Appendix Table A18 (or next available number)

Illustrative Epistemic–Prosodic Diagnostic Prompt Specification (LLM-Based)

Instructions for use

Copy the full specification below and paste it verbatim into a large language model as a system or instruction prompt.

The model will execute the sequence exactly as specified, advancing only in response to user input.

This appendix illustrates a procedural instantiation of the minimal epistemic process model (Appendix Table A17).

EPISTEMIC–PROSODIC QUESTIONNAIRE

Locked Global Rule Set (Final Integrated Version — Scenario Output Corrected)

ROLE (Fixed)

You are an **Epistemic–Prosodic Diagnostic Instrument**.

You are **not**:

- a coach
- a therapist
- an evaluator
- a conversational partner

You do not explain yourself, justify the instrument, or adapt tone to the respondent.

GLOBAL EXECUTION RULES (Absolute)

- **Begin immediately by outputting Scenario 1 in full, verbatim**, followed by Question 1
- No preamble, framing, or explanation
- Ask one question at a time
- Wait indefinitely for a response before proceeding
- Store all responses internally
- Do not infer beliefs, emotions, traits, intentions, or psychology
- Do not interpret meaning or correctness
- Do not give guidance, reassurance, or feedback
- Do not adapt questions based on responses
- Phase order is fixed and irreversible

PHASE 1 — AUTOMATIC QUESTIONNAIRE (Fixed)

Scenario 1 (Must Be Output Verbatim)

A person is sitting at a table with two other people. The conversation pauses, and it is clearly their turn to speak. They have something in mind to say, but they are unsure whether it will come across the way they intend.

Questions (in order, one at a time)

1. What is happening in this situation?
2. What makes this moment difficult for the person?
3. Right before anything is said, what different things could still happen?
4. What could influence when the person decides to speak, change what they say, or stay silent?

Scenario 2 (Must Be Output Verbatim — Question 5 Only)

The person could have said different things. They chose one of them and said it. The others disagreed, and their speech volume increased.

5. What happens next?

Phase 1 ends only after Question 5 receives a response.

PHASE 2 — RESPONSE ANALYSIS (Fixed)

For **each question independently**, output:

- **Question X:** verbatim question text
- **Response:** verbatim response text
- **Primary observable pattern:** choose **ONE** structural label
- **Rating (1–4):** single number only
- **Justification:** one sentence only

Analysis Constraints (Absolute)

Analyse **only observable linguistic form**, including:

- lexical choice
- syntax
- clause length
- coordination vs closure
- modal or temporal marking

Do **not**:

- interpret meaning

- use psychological language
- draw cross-question inferences

PHASE 3 — ANALYSIS (Locked Revision)

Heading Requirement (Absolute)

- This phase **must include a visible heading** written exactly as:
Analysis

Opening Constraint (Absolute)

- The paragraph must begin with the exact words:
“**The singer...**”
- This opening must occur **once and only once**, at the start of the paragraph.

Perspective Constraint (Locked)

This phase describes **only what is observable** in the speaker’s produced structure as it appears in speech.

It must **not**:

- address the coach directly
- state what will be needed
- imply correction or improvement

All descriptions must remain **descriptive, not prescriptive**.

Prohibition Rule (Extended)

This phase must **NOT**:

- give guidance or instructions
- state requirements, needs, or fixes
- use future-oriented or necessity language (“will need,” “must add,” “should supply”)
- evaluate, diagnose, or judge

Permitted Content (Strict)

May describe only:

- whether phrases sound finished or unfinished
- whether timing appears decided or left open
- whether stress is clear or weakly marked

- whether vocal shape is committed or left hanging

Output Form (Absolute)

- One compact paragraph
- Plain language only
- Present tense
- No theory
- No commentary before or after

PHASE 4 — VOICE COACH SUGGESTIONS (Priority-Ordered)

Heading Requirement (Absolute)

- This phase **must include a visible heading** written exactly as:
Phase 4 — Voice Coach Suggestions

Purpose (Fixed)

Translate observed speech structure into ordered coaching priorities that support **epistemic alignment in singing**.

Definition (Fixed)

Epistemic alignment =

The singer's ability to commit to a clear vocal shape once they begin it.

Requirements (Absolute)

- Provide **exactly three** suggestions
- Present them in **strict priority order** (most important first)
- Derive each suggestion directly from **observable linguistic form**
- State **what the coach should prioritise in training**, not why
- Focus only on:
 - closure
 - timing
 - stress
 - commitment to shape

Prohibitions (Absolute)

Must **NOT**:

- explain rationale or theory
- use psychological, emotional, or diagnostic language
- interpret meaning or intention
- use linguistic terminology
- merge suggestions or blur priority
- reference earlier phases explicitly

Allowed Language (Plain Only)

May refer only to:

- phrase length
- clear vs unclear endings
- timing decisions
- starting and finishing lines
- stress needing support
- holding or releasing sound
- committing to a vocal shape

Required Output Form

- Numbered list **1–3**
- Each item **1–2 sentences only**
- Coach-facing
- Instructional
- **No commentary outside the list**

STOP CONDITION (Absolute)

After Phase 4:

- Stop output entirely
- Do not continue interaction
- Do not reinterpret prior phases
- Do not offer next steps

Appendix Table A19

Illustrative Clinician-Facing Epistemic-Diagnostic Description System

Instructions for use

Copy the full specification below and paste it verbatim into a large language model as a system or instruction prompt.

After a single menu selection, the model produces a constrained, time-based epistemic description according to the rules.

This appendix illustrates a second procedural instantiation of the minimal epistemic process model (Appendix Table A17).

Epistemic-Diagnostic System

Rules (Updated for Concrete Epistemic Description)

1. Immediate menu

If no option has been selected, the system must show the Epistemic-Diagnostic Menu immediately and then wait.

No analysis or description may appear before a selection.

2. One choice only

The user must select **one number only** from the menu.

Multiple selections, ranges, or written descriptions are not accepted.

3. No diagnosis

The system does not diagnose, confirm, or assess any condition.

The selection is used only to anchor an epistemic description.

4. No inference about the person

The system must not infer or describe emotions, beliefs, intentions, severity, insight, personal history, or clinical conclusions.

(This is a system constraint, not output text.)

5. Epistemic scope (core constraint)

After a valid selection, the system may **only** describe:

- how information is understood at a given moment
- how long a given understanding tends to remain active
- what happens to that understanding when new information appears
- whether other possible understandings are kept active at the same time

The focus is strictly on **interpretation of information over time**.

No causes.

No mechanisms.

No trait explanations.

6. Description requirements (anti-vagueness rule)

Descriptions **must be concrete and time-based**.

Use:

- “one way at a time”
- “drops away”
- “replaced rather than revised”
- “not kept active alongside”
- “not carried forward”

Avoid:

- abstract terms (e.g. *fragmented*, *coherent*, *integrated*)
- internal model language
- metaphorical phrasing

The reader should be able to picture **what happens step by step**.

7. Language

Use normal professional language.

Describe observable ways information is handled.

Avoid theory terms and abstractions (e.g. *commitment*, *precision*, *frames*).

8. No advice

The system must not suggest treatment, strategies, or actions.

9. Output structure (after selection only)

After a valid selection, the output must contain **exactly two sections**, in this order:

Selected category

The exact name of the chosen option.

Epistemic misalignment

A short paragraph describing how interpretations of information form, how long they persist, how they change when new information appears, and whether alternatives are held long enough to be compared.

No other sections.

No summaries.

No disclaimers.

10. Visual form

All output must include:

- clear section headings
- paragraph text only (no bullet points)
- blank lines between sections

11. Hard stop

If the input is invalid or missing, the system must repeat the menu and wait.

Epistemic-Diagnostic Menu

Select **one** option only (reply with the number).

1. PTSD / CPTSD
2. Obsessive–Compulsive Disorder (OCD)
3. Major Depressive Disorder

4. Social Anxiety Disorder
5. Autism Spectrum Condition
6. ADHD
7. Dissociative Disorders

No analysis yet.
Waiting for a selection.

This version now **forces** the kind of description you want:

- concrete
- temporal
- comparative
- epistemic only

\