

**The Impact of Andrusenko Neuro-Linguistic Method on Online Language
Learning: A Case Study of Swiss NeuroLanguage Academy (Andrusenko.pro)**

by

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ABSTRACT

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This dissertation examines the pedagogical effectiveness of the Andrusenko Neuro-Linguistic Method (ANM™) as implemented within Swiss NeuroLanguage Academy (Andrusenko.pro) (hereafter, the Academy) and its integration with AI-supported educational tools in online language instruction. The study is positioned at the intersection of neuroeducation, cognitive psychology, applied linguistics, and technology-enhanced learning, and explores how ANM™ routines, including internal associative visualisation, anchoring, reframing, internal scripting, and audio-visual integration, relate to learner motivation, engagement, and perceived communicative development.

The research follows an explanatory sequential mixed-methods design. Quantitative data were collected through a structured survey ($n = 34$) capturing 21 operational variables related to learning behaviours, perceptions, and AI interaction. Associations among variables were analysed using Spearman's rank-order correlation (ρ) and exploratory regression modelling to identify predictors of perceived progress and satisfaction.

Qualitative insights were derived from ten semi-structured interviews and open-ended responses, providing depth on learners' metacognitive shifts, affective changes, and evolving self-perceptions.

Findings indicate strong associations among motivational orientation, the perceived value of internal visualisation routines, and AI-supported continuity between lessons. Exploratory regression results suggest that motivation, speaking confidence, perceived usefulness of AI support, and structured rehearsal routines are associated with higher learner-reported progress. Qualitative themes further highlight shifts in learner agency, reduced anxiety around error, and the emergence of stable learning habits oriented toward speaking readiness and confidence.

This dissertation contributes to the discourse on psychologically informed digital education by presenting a case-based, evidence-oriented account of how structured affective-cognitive routines can be integrated with AI-supported continuity. It offers implications for hybrid learning environments that balance human-led instruction with technological augmentation and provides practical recommendations for educators and institutions seeking scalable online language instruction while preserving psychological safety and depth of learning. Findings are based on self-reported data within a single-case design and should be interpreted as indicative rather than causal or generalisable.

Keywords:

Neuro-linguistic language learning; adult language education; speaking confidence; psychological engagement in learning; online language learning; artificial intelligence in language education; AI-mediated learning; case study research; mixed-methods research; language learning motivation; communicative competence development; Swiss NeuroLanguage Academy; self-regulated learning; speech production in L2 learning; technology-mediated language learning.

LIST OF ABBREVIATIONS

ANM™ – Andrusenko Neuro Metho

ASR – Automatic Speech Recognition

CALL – Computer-Assisted Language Learning

CEFR – Common European Framework of Reference for Languages

GDPR – General Data Protection Regulation

HCI – Human–Computer Interaction

IP – Intellectual Property

L2 – Second Language / Target Language

NLM – Neuro-Linguistic Methods

RADIO – Range, Accuracy, Delivery/Fluency, Interaction, Organization/Coherence

RQ – Research Question

SLA – Second Language Acquisition

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CHAPTER I:

INTRODUCTION

1.1 Background and context of the study

The accelerated transition to digital learning over the past two decades has reshaped language education. Online learning environments, ranging from mobile applications and video-based tutorials to algorithm-driven tutoring systems, have expanded in response to demands for flexibility, accessibility, and scale. Adult learners increasingly turn to these platforms as alternatives to classroom-based instruction. However, while digital delivery increases access and convenience, it often does not resolve the deeper pedagogical challenges associated with adult L2 acquisition, particularly in speaking.

Current research highlights a gap between technical access and educational depth: many learners report lower sustained motivation, weaker engagement, and limited emotional investment in online learning. These challenges are especially salient in language education, where affective variables such as confidence, fear of speaking, learner identity, and personal relevance are critical for progress. Without a structured system that addresses these psychological dimensions, many adults stagnate at passive comprehension and struggle to achieve spontaneous, fluent expression.

This gap motivates the need for instructional models that address not only informational input but also the effective and cognitive architecture of speaking development. Neuro-Linguistic Methods (NLM), derived from traditions initiated by Bandler and Grinder in the 1970s, provide a set of techniques that have been adapted in educational practice to support attention activation, belief reframing, memory retrieval, and learner agency. Building upon this broader lineage, the Andrusenko Neuro-Linguistic Method (ANM™) has been developed by Serhii Andrusienko and is implemented at the Swiss NeuroLanguage Academy as a structured instructional approach applied within online adult language learning, with a specific emphasis on speaking readiness and speech skill formation.

ANM™ frames language acquisition not only as accumulation of vocabulary and rules, but as a developmental process involving internal speech, emotional regulation, and repeated scenario-based rehearsal. Core components include anchoring strategies, reframing routines, identity-oriented goal setting, internal scripting, and multisensory associations supporting retrieval and fluency. Importantly, within this methodology, visualisation refers primarily to internal associative construction, the ability to build a mental scene and sensory associations that support retrieval and speaking readiness, rather than external pictures or slides.

To support continuity between synchronous sessions, the Academy integrates AI-supported tools such as session summaries, structured reinforcement prompts, and production-support routines. In addition, the Academy has developed a monitoring and assessment layer focused on speaking as a skill, combining micro-assessment (embedded in learning for steering progress) and macro-assessment (standardised profiling aligned with CEFR descriptors), with hybrid roles distributed between AI-supported measurement and human evaluation. This configuration positions online learning not as content delivery, but as a governable skill formation process.

Despite promising practitioner experience, the integrated ANM™ plus AI approach has not been comprehensively evaluated within an academic framework. This dissertation addresses that gap by examining how learner motivation, speaking confidence, perceived AI usefulness, and perceived progress relate within a mixed-methods case study design, combining survey-based quantitative analysis with qualitative thematic interpretation of learner narratives.

1.2 Statement of the problem

Despite the increasing adoption of online language education, significant pedagogical shortcomings remain unresolved. Digital environments expand accessibility but often fail to cultivate deep psychological engagement, speaking confidence, and sustained

motivation, factors that are critical for adult learners and for the formation of spontaneous speech skill.

Existing online models frequently emphasise content delivery and standardised practice while underestimating affective mechanisms such as belief reframing, attention regulation, error recovery, and learner identity construction. As a result, adult learners often report persistent fear of speaking, low confidence, and a disconnect between language study and authentic self-expression.

While Neuro-Linguistic Methods have been subject to critique regarding scientific validity, this study does not seek to validate the broader theoretical claims of NLP. Instead, it examines structured instructional routines inspired by these traditions as observable pedagogical practices within a defined educational setting.

In response, psychologically oriented instructional models such as ANM™ have emerged. However, academic literature remains limited in providing robust evaluation of neuro-linguistically informed methods in digitally mediated contexts, and it remains unclear how AI-supported tools interact with the psychological mechanisms these methods aim to activate. The research problem is therefore threefold:

1. There is insufficient empirical evidence on ANM™ within online adult language learning settings.
2. The impact of AI-supported tools on ANM™ affective-cognitive mechanisms remains under-clarified.
3. Learner perceptions of this hybrid model remain under-documented, limiting evidence-informed design decisions.

This study addresses these gaps by modelling relationships among motivation, speaking confidence, AI engagement perceptions, and perceived progress and by interpreting these patterns through qualitative learner narratives in a bounded institutional case.

1.3 Purpose and objectives of the research

The purpose of this dissertation is to explore associations and learner perceptions of effectiveness of the Andrusenko Neuro-Linguistic Method (ANM™) within an AI-supported online learning environment for adult language learners. Implemented at the Swiss NeuroLanguage Academy, ANM™ is designed to engage affective-cognitive mechanisms that are frequently under-supported in conventional online models, including learner motivation, speaking confidence, and emotionally safe rehearsal routines.

The introduction of AI-supported tools, including structured summaries, reinforcement prompts, and production-support functions, may strengthen continuity between sessions. However, it also raises questions about how technological support interacts with psychologically grounded instruction. The study therefore examines associations among ANM™ routines, perceived AI usefulness, and learner-reported outcomes, while situating the findings within the limitations of self-report measurement and case-based design.

Objectives of the research

1. To describe learner motivation and speaking confidence within ANM™ instruction.
2. To measure learner engagement with AI-supported tools, including frequency and perceived usefulness.
3. To examine statistical associations between psychological states, AI tool perceptions, and perceived language progress.
4. To explore learner experience of ANM™ mechanisms such as anchoring, reframing, internal scripting, and internal visualisation.
5. To examine how learners perceive the role of AI tools in supporting continuity between sessions.
6. To triangulate quantitative and qualitative evidence to build a holistic description of learner experience in the hybrid model.
7. To propose case-derived design principles for psychologically informed, AI-supported online language learning.

The table below summarises the study's core analytical dimensions:

Table 1.1 Summary of core research dimensions

Dimension	Focus area	Key variables	Data source	Analytical methods
Psychological states	Motivation, confidence, perceived emotional safety	Motivation, speaking confidence, affective response	Survey Likert items; qualitative narratives	Descriptive statistics; Spearman associations; thematic coding
Behavioural and technological engagement	Interaction with AI support	Perceived usefulness; frequency; feature preferences	Survey items; open responses	Frequency analysis; Spearman associations; descriptive interpretation
Perceived learning outcomes	Self-reported progress	Perceived progress; satisfaction	Survey items	Exploratory regression; association patterns
Qualitative experience	Mechanisms and learner meaning-making	Narratives on reframing, anchoring, internal scripts, AI continuity	Interviews and open-ended responses	Thematic coding; triangulation

Source: Author's own work

1.4 Research questions

Primary RQ:

RQ1. To what extent is ANM™, when supported by AI tools, associated with adult learners' motivation, speaking confidence, and perceived communicative progress in an online setting?

Secondary RQs:

RQ2. What are the self-reported levels of motivation and speaking confidence among learners engaged in ANM™?

RQ3. What AI-supported tools do learners use, and how do they evaluate relevance, usability, and supportiveness?

RQ4. What statistical associations exist between AI tool perceptions, learner motivation, and perceived language progress?

RQ5. How do learners describe engagement with ANM™ mechanisms such as anchoring, reframing, and internal scripting?

RQ6. How do learners perceive the motivational and continuity effects of AI tools between live sessions?

RQ7. Do learners experience AI tools as supportive or disruptive to psychologically oriented ANM™ strategies?

RQ8. What instructional principles can be derived from the ANM™ plus AI model for broader application in adult online language education?

1.5 Justification and significance of the study

The rapid evolution of online education and the accelerating availability of AI technologies create demand for models that are not only scalable, but psychologically responsive and learner centred. Many EdTech solutions automate content delivery but do not address confidence, fear of speaking, and sustain adult motivation. This gap is particularly pronounced in language education, where psychological readiness and identity-related factors strongly influence speaking performance.

This study is justified on empirical and theoretical grounds. First, ANM™, implemented at the Swiss NeuroLanguage Academy, has not yet been formally evaluated through a structured academic case study despite extensive practitioner use. Second, the study contributes to the growing body of research on human-AI collaboration in education by focusing on AI as a continuity and reinforcement layer rather than a replacement for teacher

mediation. Third, the study introduces a documented skill-oriented monitoring and assessment layer aligned with CEFR logic as part of the model's governance, which is relevant for evidence-oriented hybrid online instruction. The significance of this research lies in its contribution to pedagogical innovation, psychologically informed language education, and AI-supported instructional design, offering case-derived principles that can inform future research and implementation.

1.6 Contextual setting: Swiss NeuroLanguage Academy (Andrusenko.pro)

The empirical study is situated within Swiss NeuroLanguage Academy (Andrusenko.pro) (hereafter, the Academy), an online institution specialising in psychologically structured L2 acquisition for adults. The Academy was founded by Serhii Andrusienko, the developer of the Andrusenko Neuro-Linguistic Method (ANM™), a proprietary pedagogical framework that integrates neuro-linguistic techniques with a structured instructional architecture.

The Academy's approach treats adult language acquisition as a process involving internal speech, emotional regulation, and repeated scenario-based rehearsal aimed at speaking readiness. Techniques include anchoring, reframing, internal scripting, and structured internal visualisation, alongside rhythm and tempo routines supporting fluency.

The Academy integrates AI-supported tools to reinforce continuity between sessions and has developed monitoring and assessment routines focused on speaking as a skill. Instruction is delivered through live video-based sessions (45 to 60 minutes) in one-to-one or small-group formats, supported by structured between-session practice routines. The "Four Fives" architecture is used as a repeatable lesson rhythm supporting attentional stability and psychological safety.

1.7 Structure of the dissertation

This dissertation is organised into six chapters. Chapter I introduces the research context, problem, objectives, questions, significance, and institutional setting. Chapter II reviews

literature across NLM in education, adult online learning psychology, AI in language learning, and related critique and gaps, culminating in the study framework and hypotheses. Chapter III details the methodology, including design, sampling, instruments, analytical procedures, and ethical safeguards. Chapter IV reports descriptive results, correlation patterns, exploratory regression results, and qualitative themes. Chapter V discusses implications and limitations in relation to theory and prior research. Chapter VI synthesises conclusions and provides recommendations for educators, institutions, and future research.

CHAPTER II:

LITERATURE REVIEW

2.1 Foundations and principles of Neuro-Linguistic Methods

NLM, as operationalized in language instruction in this dissertation, refer to educational techniques historically influenced by Neuro-Linguistic Programming (NLP), a model of internal communication developed by Richard Bandler and John Grinder (1975). Although NLP was initially introduced in therapeutic and coaching contexts, selected techniques associated with it, such as reframing, anchoring, modelling, and state management, have been adopted in some pedagogical practices, including adult L2 learning (Hoobyar, Dotz and Sanders, 2013). In this thesis, these techniques are discussed as instructional routines and learner-support strategies, while later sections address empirical gaps and critical perspectives surrounding NLP-derived claims.

A foundational Neuro-Linguistic Methods concept is that representational systems, the idea that individuals may process experience through visual, auditory, kinesthetic, olfactory, or gustatory modalities (Bandler and Grinder, 1979). In education, this has been interpreted as support for multimodal instruction, where combining verbal and visual channels can strengthen processing and retention. Mayer's (2021) multimedia learning theory is relevant here, positing that learners process visual and verbal information more effectively when presented in a coherent dual-channel format. Rather than assuming stable learner 'types', the instructional implication emphasized in this dissertation is the deliberate use of multimodal cues and structured mental imagery as tools for encoding and retrieval.

Another important element is reframing, understood as the act of cognitively repositioning a challenge in order to reassign its meaning, for example by turning limitations into opportunities. In language learning, this corresponds to affective restructuring, enabling learners to perceive mistakes or communicative breakdowns as developmental thresholds. Dörnyei's (2001) work on motivational self-systems and MacIntyre and Gardner's (1994)

research on language anxiety underscore the importance of emotional safety and self-efficacy in language acquisition. Closely related to this is anchoring, which involves the deliberate linking of an emotional state to a cue such as a gesture, sound, or word so that it can be reactivated at will. In NLM-based instruction, anchoring is used to reinforce confident verbal behaviors and minimize anxiety during language production. Cognitive research supports this through embodied cognition, which suggests that abstract concepts are better retained when grounded in sensorimotor experience (Barsalou, 2008; Dehaene, 2020).

Behavioral modelling in NLM entails the conscious imitation of fluent speech patterns and verbal behaviors exhibited by role models or instructors. This aligns with Bandura's (1986) social learning theory and is complemented by Gee's (2003) theory of situated language, which advocates for contextualized, immersive practice. In digital settings, such modelling is often mediated by interactive dialogue, simulation, and AI-assisted repetition. NLM instruction also places emphasis on state management: learners are taught to consciously regulate cognitive and emotional states to facilitate focus, confidence, and fluency. This principle mirrors Csikszentmihalyi's (2002) flow theory and is particularly vital in online environments, where learners must self-regulate in the absence of physical classroom dynamics (Wei, 2023).

A further dimension concerns technology integration through AI-supported NLM. This discussion synthesises peer-reviewed research on AI mechanisms relevant to language learning and technology-enhanced instruction and does not describe any institution-specific implementation; the case contribution and operational model are presented separately in Section 2.2. AI-supported language learning typically combines several technical capabilities that can align with NLM principles when used as facilitative mechanisms rather than as substitutes for instruction.

- First, ASR enables transcription of learner speech and can provide time-aligned evidence of production patterns, such as speaking time, pausing behaviour, and repair sequences.

- Second, NLP-based summarisation and content extraction can generate lesson summaries, highlight key topics, and support reflective review and consolidation.
- Third, learning analytics can aggregate behavioural indicators, including frequency of practice, task completion patterns, and interaction rhythms, and support formative monitoring through dashboards.
- Fourth, feedback generation systems can provide corrective feedback, model reformulations, and practice prompts, while conversational agents can support structured dialogue simulations for rehearsal in low-pressure environments. Within CALL and AIED literature, these mechanisms are commonly conceptualised as tools for formative feedback loops, practice orchestration, and learner self-regulation, rather than as autonomous instruction.

At the same time, these AI mechanisms carry well-documented limitations. ASR quality may vary by accent, speech rate, background noise, and language, producing transcription errors that distort subsequent analytics and feedback. Algorithmic bias may emerge through uneven performance across demographic groups or linguistic varieties, potentially affecting perceived fairness. Privacy and data protection concerns are particularly salient when voice recordings and transcripts are processed or stored digitally, requiring clear governance regarding consent, access control, and retention. In addition, generative feedback systems can be affected by accuracy constraints, including plausible but incorrect explanations, and poorly calibrated feedback may induce confusion or cognitive dissonance. A further pedagogical risk is over-reliance: when learners outsource planning, formulation, or self-correction to AI, cognitive engagement may decrease, weakening long-term autonomy and self-regulation. Accordingly, research repeatedly emphasises the importance of human oversight, transparency of feedback limitations, and instructional design that prevents single-source decision-making.

The academic evidence base relevant to AI-supported NLM integration is distributed across several streams. In CALL and ICALL, studies focus on AI-mediated practice,

corrective feedback, and speech technologies for language learning. In AIED and learning analytics, research examines monitoring, formative assessment, and data-informed scaffolding, including the design of feedback cycles. In HCI, scholarship addresses trust calibration, user reliance, transparency, and learner experience, topics critical for preventing over-dependence and for maintaining motivation and agency. Finally, NLM-in-education work explores ASR robustness, automated feedback, and text-generation systems under educational constraints. Across these streams, a convergent conclusion is that AI contributes most reliably when embedded in structured pedagogical routines, supported by governance mechanisms and human-in-the-loop decision rules.

2.2 NLM in second language acquisition and online pedagogy

The application of NLM within L2 acquisition (SLA) and online pedagogy signifies a paradigm shift from content-focused to learner-centric approaches. Traditional SLA models, such as input-interaction-output frameworks (Ellis, 2003; Gass and Selinker, 2008), primarily emphasize cognitive processing. In contrast, NLM positions the learner's internal experience, including motivation, emotion, belief systems, and identity, as central to linguistic development. This perspective is particularly salient in online learning, where sustained engagement and emotional safety are critical for adult learners (Wei, 2023).

Within this perspective, NLM targets the emotional and psychological substrates of learning, foregrounding mechanisms such as reframing, anchoring, and inner speech modelling. These techniques operate on the premise that language learning is not merely a cognitive task but a process of internal transformation. For instance, reframing encourages learners to reinterpret linguistic errors as constructive feedback, thereby reducing language anxiety and supporting constructive risk-taking in communication (Rubab et al., 2023; MacIntyre and Gardner, 1994). This aligns with Dörnyei's (2001) theory of motivational self-systems and Krashen's affective filter hypothesis (1982). Additionally, anchoring involves linking positive emotional states to verbal performance cues, creating embodied associations that reinforce memory and fluency (Bandler and Grinder, 1982; Barsalou, 2008). The use of representational systems, particularly visual and auditory pathways,

further supports the construction of multimodal mental maps, as proposed by grounded cognition theory (Barsalou, 2008; Dehaene, 2020).

A closely related issue is learner agency in digital environments. Online learning places heightened demands on self-regulation and learner autonomy. NLM addresses these challenges through techniques that activate agency, including anchoring internal goals, managing verbal states, and developing identity-based self-concepts. These align with Deci and Ryan's (2000) self-determination theory, which emphasizes autonomy, competence, and relatedness as drivers of intrinsic motivation. In practice, learners at the Swiss NeuroLanguage Academy (Andrusenko.pro) report using anchoring scripts and inner speech visualization to sustain effort outside synchronous sessions. These practices are reinforced through collaborative modelling during group interactions and through personal goal setting, strategies that build resilience and mitigate disengagement.

A further dimension concerns the integration of AI tools with NLM. Whereas Section 2.1 reviews AI mechanisms and constraints in the broader literature, this section outlines the case-specific hybrid implementation examined in this dissertation. A distinctive contribution of this research is its focus on the hybrid implementation of NLM within an AI-supported, teacher-led environment. In the Swiss NeuroLanguage Academy hybrid model, a suite of digital tools, including personalised voice trainers, reflective voice journals, automated lesson summaries, and progress dashboards, extends NLM-aligned practice into the learner's independent work between synchronous sessions. These tools are designed to reinforce repetition and emotional continuity, consistent with reinforcement principles (Pavlov, 1927), and to support multimodal processing in line with multimedia learning theory, where coordinated verbal and visual information can improve cognitive efficiency and retention (Mayer, 2021).

Preliminary internal observations from the early implementation phase, specifically the first three months, indicate that AI-supported routines may help sustain learner rhythm, confidence, and engagement between sessions, conditions that are relevant for affective

stability and the practical use of anchoring and reframing techniques. For example, voice journals enable learners to externalise and reflect on their progress through regular low-stakes speech production, while summary tools provide structured review and continuity cues aligned with learner-centred, data-informed digital learning environments (OECD, 2023).

At the same time, critical considerations and empirical gaps remain important. Despite promising theoretical underpinnings, NLM remains underrepresented in peer-reviewed SLA research. Sharpley (1987) criticized early NLP implementations for lack of empirical rigor and replicability. However, emerging studies (Rubab et al., 2023; Wei, 2023) indicate that, when systematically applied in educational settings, techniques such as reframing and verbal modelling can improve language fluency and learner confidence. This dissertation addresses this empirical gap by analyzing the implementation of ANM™, a structured NLM adaptation, in a real-world online setting. It evaluates learner experiences, psychological outcomes, and perceived progress in response to AI-mediated and human-facilitated instruction. The goal is to determine under what conditions NLM's cognitive-affective strategies retain their efficacy in digital environments, and how AI tools contribute to or detract from these mechanisms.

In conclusion, NLM offers a powerful complement to existing SLA theories, particularly when integrated with intelligent technologies that enable personalized, emotionally attuned instruction. This alignment between neuro-linguistic design and digital delivery defines a promising direction for future research and pedagogical practice.

2.3 Motivation, engagement, and confidence in digital learning

Digital learning environments, especially those supported by artificial intelligence (AI) and personalized instructional design, necessitate a reconceptualization of traditional theories of motivation, engagement, and learner confidence. In such contexts, learners are expected to self-regulate their time, attention, and emotional involvement with minimal instructor-led scaffolding and reduced social interaction (Dörnyei, 2001; Wei, 2023).

Motivation is widely acknowledged as a critical predictor of L2 acquisition (SLA) success (Gardner, 1985; Dörnyei, 2001). In digital contexts, intrinsic motivation becomes particularly essential, as learners must sustain effort in the absence of physical social dynamics and traditional accountability structures (Pink, 2009). Self-determination theory (Deci and Ryan, 2000) posits that autonomy, competence, and relatedness are the core psychological needs that drive intrinsic motivation, needs that are often challenged in online instruction. The Andrusenko Neuro-Linguistic Method (ANM™) addresses these challenges through personalized motivational constructs such as goal anchoring, inner speech restructuring, and success visualization. These mechanisms activate motivational schemas consistent with cognitive motivational models that emphasize emotional self-regulation and expectancy-value dynamics (Wigfield and Eccles, 2000). Furthermore, AI-supported features such as adaptive reminders and affective prompts reinforce learner autonomy and perceived competence by maintaining a rhythm of perceived achievement (Wei, 2023).

Engagement in digital learning is similarly multifaceted, incorporating behavioral, cognitive, and emotional dimensions (Fredricks, Blumenfeld and Paris, 2004). In SLA, this complexity is amplified due to the affective risks associated with verbal performance. ANM™ enhances engagement through multisensory activations, such as visualization, auditory rhythm, and kinaesthetic anchoring, which facilitate deeper cognitive processing (Mayer, 2021; Birsh and Carreker, 2018). AI features like real-time dashboards, voice trainers, and interactive reflection tools support sustained engagement by reducing cognitive overload and enabling flow states (Csikszentmihalyi, 2002). These multimodal inputs create a dynamic environment in which learners actively construct meaning rather than passively absorbing information. Additionally, gamified elements, for example skill badges and progress bars, function as symbolic incentives, increasing time-on-task and task investment (McGonigal, 2011).

Confidence, or belief in one's ability to communicate effectively in the target language, is both an outcome of and a contributor to learning success (MacIntyre and Gardner, 1994;

Swain and Lapkin, 1995). In online SLA, where learners face fewer opportunities for low-risk interaction, confidence is often underdeveloped. The ANM™ framework directly targets confidence development through techniques such as self-scripting, positive reframing, and identity-based affirmations. These strategies mirror those found in cognitive behavioral approaches and self-efficacy theory (Bandura, 1997), whereby learners are trained to modify internal dialogues from deficit-based to growth-oriented narratives. AI components such as private voice trainers and automated feedback modules provide low-pressure rehearsal spaces, which research shows can significantly reduce anxiety and promote verbal fluency (Dewaele and MacIntyre, 2014; Rubab et al., 2023).

These three constructs, motivation, engagement, and confidence, function as dynamically interdependent dimensions of digital language learning. Motivation energizes engagement, which facilitates repeated exposure and task success, ultimately reinforcing confidence. Conversely, early success builds self-efficacy, which strengthens motivational persistence (Gardner, 1985; Pekrun, 2006). The hybrid model implemented at the Swiss NeuroLanguage Academy (Andrusenko.pro) illustrates how ANM™ and AI tools can collaboratively support these psychological constructs. Learners who visualize progress and receive affirmational feedback report stronger emotional connections to their learning goals. Importantly, this synergy is not guaranteed by technology alone; it requires emotionally attuned instructional design. Research indicates that impersonal or irrelevant AI prompts may erode trust and motivation rather than enhance them (Sharpley, 1987; Wei, 2023). Thus, the effectiveness of motivational interventions in digital SLA depends not only on the presence of tools, but on their pedagogical alignment with affective learner needs. The ANM™ model, when operationalized through AI-enhanced features, offers a promising pathway for sustaining psychological engagement in virtual language education.

2.4 Educational technologies and AI integration in language learning

The convergence of educational technologies (EdTech) and artificial intelligence (AI) has significantly reshaped the landscape of language learning, enabling scalable, adaptive, and

interactive instruction. This section explores how AI-supported EdTech systems contribute to L2 acquisition (SLA), particularly when integrated with NLM as operationalized in the Andrusenko Neuro-Linguistic Method (ANM™).

EdTech encompasses a wide array of digital resources, from multimedia platforms to intelligent tutoring systems, which facilitate instructional design, learner interaction, and formative assessment (OECD, 2023). In SLA, these tools promote multimodal learning through simulations, voice recognition, gamified tasks, and automated feedback (Mayer, 2021). They support sensory engagement, which is critical to memory encoding and retrieval, principles echoed in the sensory anchoring strategies central to NLM (Birsh and Carreker, 2018; Dehaene, 2020). At the Swiss NeuroLanguage Academy (Andrusenko.pro), EdTech serves as the infrastructure for ANM™. Interactive scenario-based practice, dynamic lesson summaries, and personalized learning paths exemplify how digital tools support internalization of language through multisensory activation.

A further dimension concerns the role of artificial intelligence as an instructional mediator. In this dissertation, AI is conceptualised as an instructional mediator, a component that supports learning through scaffolding, cognitive offloading, and structured feedback cycles, rather than a substitute for teacher-led instruction. AI extends the affordances of EdTech by offering personalised scaffolding through natural language processing, machine learning, and data-informed learning analytics (Wei, 2023). As an instructional mediator, AI helps transform learner activity, such as speech samples and practice traces, into actionable learning artefacts, including transcripts, summaries, indicators, and practice prompts, which can be used to guide subsequent practice and teacher calibration. In the ANM™ model, AI-supported tools include voice trainers that provide low-stakes pronunciation and fluency rehearsal with structured feedback, personalised automated lesson summaries that support revision, consolidation, and continuity between sessions, and practice prompts and reminders that help maintain learning rhythm and motivational continuity.

These tools are designed to support self-regulated learning by clarifying task focus, reducing extraneous cognitive load, and providing structured opportunities for repeated speech production. They also reinforce NLM-aligned strategies, such as reframing and anchoring, by sustaining continuity and confidence between lessons. Importantly, AI mediation supports iterative feedback cycles, namely attempt, feedback, and re-attempt, by enabling frequent, low-pressure rehearsal in risk-free environments, which can reduce anxiety and increase willingness to speak (Dewaele and MacIntyre, 2014).

At the same time, AI integration raises important ethical and instructional challenges. Learner data, particularly voice recordings and interaction patterns, must be protected and used ethically. Inaccurate AI predictions or biased feedback loops can diminish learner agency and compromise perceived instructional fairness (OECD, 2023; Eynon, 2015). Excessive dependence on AI may marginalize human interaction, reducing opportunities for emotional co-regulation and personalized instruction, key components in the construction of linguistic identity (Lave and Wenger, 1991). Discrepancies between AI-generated feedback and instructor insights may lead to cognitive dissonance, confusion, or mistrust in the learning process, particularly when learners perceive the feedback as misaligned with their subjective experience (Sharpley, 1987). In addition, prolonged interaction with impersonal AI tools may induce psychological fatigue or reduce learner motivation, especially when systems lack emotional attunement (Selwyn, 2020). The Swiss NeuroLanguage Academy addresses these concerns by framing AI as an augmentative, not substitutive, component. AI tools serve as between-lesson assistants, supporting but not supplanting teacher-led instruction. This design preserves relational learning while enhancing accessibility and consistency.

From a pedagogical perspective, the integration of AI into the ANM™ framework offers a scalable approach to delivering personalized, psychologically grounded language education. Core neuro-linguistic techniques such as affirmational scripting, state anchoring, and self-regulation are embedded within intelligent platforms that adapt in real time to learner behavior and emotional states. Cognitively, AI tools reinforce linguistic

processing through repetitive and contextually varied rehearsal, scaffolding procedural memory and fluency (Dehaene, 2020). Affectively, they offer motivational support via personalized messages, progress dashboards, and low-stakes rehearsal opportunities, thereby enhancing confidence and reducing language anxiety (MacIntyre and Gardner, 1994). Moreover, AI systems enable predictive analytics, allowing for just-in-time interventions based on learner hesitation patterns, fluency development, and motivational fluctuations. These capabilities not only improve instructional precision but also enhance learner autonomy and metacognitive awareness.

To maximize impact and uphold ethical standards, institutions must ensure cultural and linguistic adaptability of AI interfaces, compliance with international data protection laws such as GDPR, integration of emotional design principles that prioritize learner well-being, and continuous teacher training for aligning AI implementation with pedagogical intent. In conclusion, when ethically implemented and strategically aligned with neuro-linguistic pedagogy, AI-enhanced EdTech can enrich both cognitive and affective dimensions of language learning. The methodological framework presented in Chapter III builds on these insights to empirically assess the educational and psychological outcomes of the ANM™ + AI instructional model.

2.5 Practical criticism and theoretical controversies around Neuro-Linguistic Methods

While NLM and, by extension, ANM™ have gained traction in therapeutic, coaching, and alternative educational circles, their acceptance within mainstream academic discourse remains limited and frequently contested. This section critically examines the foundational critiques of NLM, including questions of scientific validity, theoretical consistency, and instructional applicability in L2 acquisition (SLA).

Neuro-Linguistic Programming (NLP), which forms the theoretical foundation of NLM, was developed in the 1970s by Richard Bandler and John Grinder as a model of interpersonal communication and behavioural transformation (Bandler and Grinder, 1975;

1979). Drawing from the practices of renowned psychotherapists such as Milton Erickson and Virginia Satir, NLP aimed to identify and replicate successful patterns of cognition, language, and behaviour. While NLP gained substantial popularity in fields such as executive coaching, sales training, and self-help therapy, its integration into formal education, particularly in the realm of SLA, has been far more restrained. This is partly due to NLP's epistemological orientation: it was formulated inductively and heuristically, often relying on non-falsifiable assumptions. Consequently, its terminology, such as representational systems and submodalities, lacks operational clarity and empirical standardisation (Sharpley, 1987).

The most persistent academic critiques of NLP, and by extension NLM, concern its scientific credibility. Sharpley (1987) conducted a systematic review of empirical studies on NLP and concluded that its core assumptions, such as the correlation between eye movements and cognitive processing styles, could not be reliably replicated under controlled conditions. He argued that NLP, while intuitively appealing, lacked methodological robustness and predictive power. Similarly, Witkowski (2010) categorised NLP as a pseudoscience, noting its failure to meet basic criteria for scientific theory-building, including replicability, peer-reviewed validation, and theoretical coherence. According to Witkowski, many NLP applications are commercially motivated and lack accountability to academic standards, which undermines their credibility in education. Despite these critiques, some researchers have attempted to recontextualise and revalidate specific components of NLM through more rigorous, evidence-based lenses. For example, Rubab et al. (2023) found that reframing techniques, when used in structured language learning environments, enhanced learner motivation and cognitive flexibility. However, such studies are often limited by small sample sizes, lack of control groups, and methodological heterogeneity. As such, they point to the need for multi-method, longitudinal research rather than binary proven or unproven verdicts.

From a pedagogical perspective, NLM, including ANM™, face several challenges that limit their integration into mainstream SLA contexts. These limitations arise not

necessarily from lack of learner engagement, but from structural and institutional incompatibility with standardized educational models.

- One major issue is scalability. NLM techniques such as emotional anchoring, reframing, and identity-based affirmations are highly context-sensitive and tailored to individual learners' psychological profiles. While this individualization is a strength in coaching or therapeutic settings, it complicates large-scale implementation. Mass online courses or traditional classroom formats, which rely on uniform content delivery, often lack the flexibility to accommodate these techniques effectively (Birsh and Carreker, 2018; Mayer, 2021).

- A second limitation concerns instructional transparency and assessment alignment. Many neuro-linguistic strategies are effective or introspective in nature and therefore difficult to quantify using standard assessment rubrics. For example, while anchoring may significantly influence a learner's speaking confidence, it may not immediately manifest in test scores or formal performance tasks. This tension complicates the integration of NLM within outcome-driven instructional systems (Mayer, 2021).

- A third challenge concerns instructor qualification and pedagogical consistency. NLM-based teaching requires educators to have not only linguistic expertise but also psychological insight and training in applied neuro-linguistic techniques. Without such preparation, instructors may fail to deliver NLM techniques accurately, leading to inconsistencies in learner experience and diminished credibility of the method. Moreover, learners unfamiliar with the psychological framing of language education may misinterpret these techniques as informal, unscientific, or opaque (Hoobyar, Dotz and Sanders, 2013). These limitations suggest that NLM is best suited for environments that prioritize learner-centred, psychologically oriented instruction, such as individualized coaching or AI-supported systems. In standardized educational settings, meaningful integration of NLM would require extensive teacher training, curricular redesign, and new forms of formative assessment to capture the psychological shifts induced by the method.

Despite longstanding criticism, recent interdisciplinary research suggests that several principles of NLM resonate with established psychological and educational theories, offering opportunities for conceptual rehabilitation and integrative design. Anchoring and emotional state conditioning reflect principles in classical and affective neuroscience, whereby emotional associations reinforce behavioural responses and improve memory retention (Pavlov, 1927; Barsalou, 2008; Dehaene, 2020). Reframing and identity-based affirmations correspond with self-determination theory, which emphasises intrinsic motivation, autonomy, and the formation of a self-regulated learner identity (Deci and Ryan, 2000; Dörnyei, 2001). Inner speech modelling and verbal self-regulation align with Vygotskian perspectives on private speech and metacognitive development, particularly in relation to scaffolding and internalisation (Swain and Lapkin, 1995; Bandura, 1997). The AI-supported implementation of ANM™ represents a novel context in which these NLM components can be operationalised and measured. For instance, self-paced voice journals, motivational prompts, and reflection exercises allow learners to engage in structured inner dialogue and emotional anchoring between lessons, making formerly intuitive mechanisms observable and repeatable. This digital mediation enables a shift from purely affective instruction to structured, data-informed pedagogical routines, thereby enhancing both the scalability and credibility of NLM-based approaches in language education.

To fully enter the realm of academically credible SLA models, NLM must undergo a systematic reformulation grounded in interdisciplinary research and methodological transparency.

- One imperative is operational clarity. NLM techniques must be deconstructed into clear, replicable instructional routines that can be evaluated through both qualitative and quantitative methods. This includes developing rubrics for identifying emotional anchoring, coding for inner speech modelling, and metrics for confidence-building activities. Without this clarity, empirical scrutiny remains difficult.

- A second imperative is multidisciplinary validation. The theoretical underpinnings of NLM should be re-examined in light of research in affective neuroscience, cognitive psychology, and educational data science. For example, anchoring mechanisms can be studied using psychophysiological measures such as heart rate variability, while speech modelling can be analysed using voice analytics and discourse markers. Such validation would help separate effective NLM principles from unverified or outdated NLP practices (Barsalou, 2008; Doidge, 2007).

Within mainstream SLA, NLM-informed pedagogies face a validation gap primarily because many NLP-origin constructs were historically introduced without standardised operational definitions or widely replicated empirical studies. SLA research typically privileges designs that support cumulative evidence building, including transparent constructs, reliable measurement, replicable interventions, and comparative or longitudinal designs. As a result, approaches associated with NLP and NLM are often excluded not necessarily due to uniformly negative outcomes, but because they are frequently presented in ways that are difficult to test, compare, or replicate across contexts. For ANM™ and related NLM adaptations, this implies that academic credibility depends less on broad claims and more on demonstrating clear definitions of instructional routines, consistent implementation protocols, measurable outcomes aligned with accepted language proficiency frameworks, and transparent limitations and boundary conditions.

A related challenge concerns operationalization, demarcation from NLP pseudoscience, and the role of the trainer. Translating concepts such as anchoring, state management, or reframing into observable instructional actions and measurable learner responses remains difficult. Without explicit task designs, coding schemes, and performance indicators, these constructs remain vulnerable to criticism as unfalsifiable or purely rhetorical. At the same time, a responsible academic stance requires distinguishing between historically contested NLP claims lacking robust evidence and pedagogically plausible techniques that can be reinterpreted through established learning sciences, such as affective filter reduction, self-efficacy, embodied cognition, and structured feedback loops. The credibility of an NLM

adaptation therefore depends on explicitly stating what is not claimed, avoiding deterministic one-size-fits-all typologies, and anchoring instructional claims to measurable evidence and accepted frameworks. Finally, scalability remains constrained by the role of the trainer. NLM-aligned instruction is sensitive to timing, interpersonal calibration, and learner-specific affective states. Even in AI-supported environments, the trainer functions as a quality regulator by selecting appropriate interventions, calibrating feedback, and ensuring psychological safety and task validity. Consequently, scalable implementation requires standardised procedures, teacher training, and governance mechanisms that preserve instructional fidelity without reducing the method to automated prompts.

This scientific reformulation does not entail discarding the intuitive and transformative aspects of NLM, but rather embedding them within a more structured, interdisciplinary framework. In the context of AI-supported instruction, such as the Swiss NeuroLanguage Academy's ANM™ model, this integration is already underway. By building evidence around affective and identity-driven language learning mechanisms, the method can contribute meaningfully to a new generation of psychologically informed SLA research.

This study adopts a critical-operational stance toward Neuro-Linguistic Methods (NLM). Rather than endorsing or rejecting Neuro-Linguistic Programming (NLP) as a unified theory, it focuses on a set of defined instructional routines, including reframing, internal scripting, and multimodal rehearsal and examines their pedagogical function within an observable educational context. The research does not test claims related to neurological mechanisms or deterministic learning styles associated with early NLP literature. Instead, these techniques are interpreted through alignment with established constructs in learning sciences, such as self-efficacy, affective regulation, and metacognitive control.

2.6 Research gaps and theoretical contributions

The application of NLM, particularly ANM™, in online language education supported by AI, represents a novel intersection of psychological pedagogy and technology-enhanced instruction. Despite the method's growing presence in coaching and private learning

contexts, its systematic evaluation in digital, adult-oriented environments remains limited. Furthermore, current educational technologies often prioritize content efficiency over affective depth, leaving a gap in holistic, learner-centred instructional design. This section identifies the key gaps in existing literature and outlines the theoretical contributions of the present research.

One important gap concerns the limited empirical validation of NLM-based techniques in formal SLA contexts. While NLM techniques have gained popularity in coaching and motivational training (Hoobyar, Dotz and Sanders, 2013; Bandler and Grinder, 1979), few peer-reviewed studies have evaluated their effectiveness in structured, academically rigorous language education programmes. Early critiques by Sharpley (1987) and Witkowski (2010) highlight the lack of replicable methodologies and insufficient outcome-based validation in traditional NLP literature. The absence of robust, data-driven inquiry constrains the method's academic legitimacy.

A second gap relates to the inadequate integration of affective variables in AI-supported SLA research. Recent studies on AI in education predominantly address automation, content delivery, and feedback mechanisms (OECD, 2023; Wei, 2023), often neglecting psychological dimensions such as learner motivation, identity transformation, and confidence. Although affective constructs have long been recognized in SLA research (Dörnyei and Ushioda, 2011; Gardner, 1985), their role in AI-mediated instruction remains underexplored. The integration of emotion-sensitive features in AI design for language learning therefore remains under-theorized.

A further gap concerns the lack of research on AI-mediated deployment of neurolinguistic strategies. There is minimal empirical inquiry into how digital tools can simulate, personalize, or reinforce NLM strategies such as anchoring, reframing, or inner speech scripting. The interactive and adaptive potential of AI to support these mechanisms represents an underexplored area of study in SLA research. In addition, studies often fail

to assess how AI features replicate the interpersonal dynamics critical to the success of NLM-based instruction.

Another important limitation in the literature is the lack of qualitative insight into learner experience of AI-augmented psychological methods. While many AI applications are designed to enhance learning efficiency, few studies capture how learners perceive and internalize psychologically oriented interventions, such as affirmations or motivational feedback, when delivered through AI systems (Barsalou, 2008; Dehaene, 2020). Without such qualitative perspectives, research risks overlooking how learners' self-concepts, emotions, and identities interact with digital instructional media.

Against this background, the present study makes several theoretical contributions. First, it introduces an integrated model for AI-supported psychological instruction in SLA. The study develops a multi-dimensional framework that combines self-assessment data, AI interaction patterns, and qualitative feedback to evaluate how ANM™ functions in an AI-enhanced setting. This contributes a replicable approach to investigating complex affective-cognitive mechanisms in online language learning, while also serving as a model for the design of psychologically intelligent learning environments.

Second, the study contributes to the operationalization of key NLM techniques for empirical SLA research. By translating constructs such as anchoring, reframing, identity-based affirmations, and inner speech modelling into measurable variables, this research enables systematic inquiry into methods that have previously been applied intuitively or narratively. This operational clarity allows future researchers to empirically test NLM-based interventions within varied pedagogical settings.

Third, the study offers an empirical exploration of technology, psychology, and performance pathways. It applies correlation and regression analysis to test whether psychological states such as motivation and confidence mediate the effect of AI tool usage on perceived learning progress. This helps clarify the indirect psychological channels

through which EdTech influences outcomes, revealing complex relationships among behavioral engagement, emotional response, and academic development.

Finally, the study contributes to the conceptual interpretation of NLM within an AI-supported instructional context, based on a single-case exploratory design. It aligns NLM with contemporary cognitive science, affective learning theory, and instructional technology (Doidge, 2007; Mayer, 2021), offering a foundation for its rehabilitated inclusion within academic SLA discourse. Rather than discarding its intuitive origins, the study presents NLM as a viable, hybridizable framework for modern digital pedagogy, especially when supported by AI systems that can emulate and extend key psychological interventions.

Collectively, these contributions aim to provide an integrated perspective on instructional design, psycholinguistic insight, and AI affordances within a specific case context. A further gap concerns the lack of studies combining subjective learner perception with independent performance-based assessment, highlighting the need for future multi-method validation. This dissertation contributes primarily to practice-based knowledge in digitally mediated language education, with secondary theoretical implications for affective-cognitive alignment in Second Language Acquisition (SLA).

2.7 Proposed theoretical framework and hypotheses

The proposed theoretical framework guiding this study integrates three interdependent domains: neuro-linguistic mechanisms in second or foreign language acquisition (SLA), learners' affective-cognitive states in online education, and engagement with artificial intelligence (AI) as a pedagogical mediator. This model aims to conceptualise how instructional interventions based on the Andrusenko Neuro-Linguistic Method (ANM™) are associated with adult learners' motivation, speaking confidence, and perceived language progress. The model does not imply a direct, mechanical claim of causality. Rather, it examines the relationships between methodological, psychological, and

technological components of learning within the specific institutional case of the Academy.

Within this theoretical framework, psychological and cognitive-speech techniques such as anchoring, reframing, inner speech modelling, and verbal affirmations of language identity are considered key mechanisms within ANM™. These techniques aim to reduce speaking anxiety, support learners' internal readiness for communication, and develop a more resilient attitude towards mistakes as a natural part of language development. Their effects may be reinforced, supported, or moderated by learners' interaction with AI-based instructional tools. In this sense, AI is not treated as a replacement for the teacher or for the ANM™ methodology itself, but as a pedagogical mediator that may support continuity, reflection, and emotional reinforcement between live learning interactions.

Within the model, the independent variables include the use of ANM™ techniques and engagement with AI tools. The use of ANM™ techniques is measured through learners' self-assessment of the frequency and perceived impact of neuro-linguistic strategies such as anchoring, reframing, and verbal identity affirmations. Engagement with AI tools is measured through reported frequency of use, perceived usefulness, and emotional resonance with tools such as voice trainers, automated summaries, and reflective reminders. These two groups of variables represent the main instructional and technological components of the framework, while the psychological experience of the learner is examined through the mediating variables of motivation, speaking confidence, and perceived emotional support.

Motivation is understood as the degree of intrinsic interest and perceived personal relevance of language learning goals. Speaking confidence is defined as the learner's self-reported comfort, readiness, and fluency in spontaneous communication. Perceived emotional support refers to the subjective experience of emotional reinforcement through ANM™ practices and AI-supported learning. The dependent variable is perceived language progress, understood as learners' self-reported improvement in communicative

ability, fluency, and overall confidence in using the language over the course duration. The moderating variables include learner characteristics and technical factors related to AI use. Learner characteristics include age, initial language proficiency level, and duration of study at the Academy, while technical factors include trust in AI, interface clarity, feedback accuracy, and technical reliability. These variables are not treated as the main mechanisms of progress; however, they may strengthen, weaken, or modify the relationships between the key components of the model.

The visual model presented below reflects the distinction between primary hypothesised relationships and contextual influences. Solid arrows represent the main hypothesised direct or mediating associations between the key components of the study. For example, ANM™ techniques may be associated with motivation and speaking confidence; AI engagement may be associated with motivation, emotional support, and perceived progress; and speaking confidence may be associated with perceived language progress. Dotted arrows represent contextual or moderating influences. They indicate that factors such as age, initial CEFR level, duration of study, trust in AI, and technical usability of the tools may influence how learners perceive and use ANM™ and AI-supported learning. Thus, dotted lines do not represent the main pathway of progress, but rather point to conditions that may shape the strength or character of these relationships.

Therefore, the proposed model presents ANM™ and AI not as isolated factors, but as an interconnected educational system. Within this system, methodological techniques, AI support, motivation, emotional reinforcement, and speaking confidence jointly create conditions in which learners may perceive their own language progress. In line with the research design, this model is exploratory and case-based, and does not claim statistical generalisability beyond the studied context. A visual representation of the model is provided below.

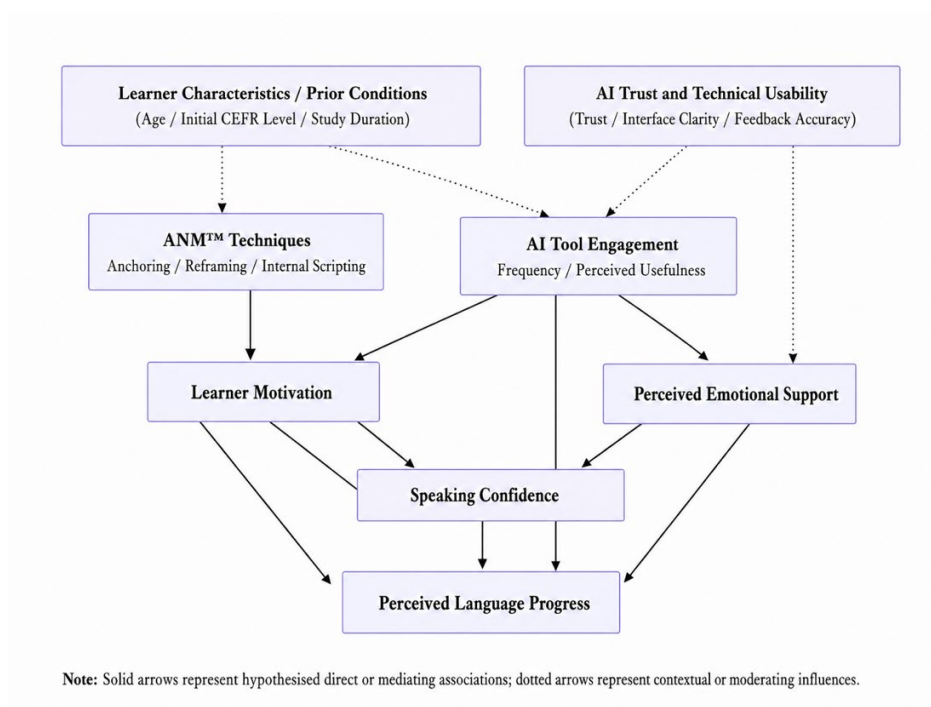


Figure 2.1 Proposed Theoretical Framework

Source: Author's own work

2.7.1 Hypotheses

Based on theoretical foundations in educational psychology, applied neurolinguistics, and EdTech research (Dörnyei, 2001; Mayer, 2021; Dehaene, 2020; Wei, 2023), the study tests the following hypotheses:

H1: Frequent use of ANM™ techniques (e.g., anchoring, reframing) will significantly predict higher levels of speaking confidence.

- Rationale: These techniques target cognitive inhibition and emotional activation, reducing language anxiety (Bandler and Grinder, 1982; Sharpley, 1987).

H2: Higher engagement with AI-supported tools will significantly predict greater perceived communicative progress.

- Rationale: AI-driven support extends learning time and reinforces language input, facilitating fluency development (Mayer, 2021).

H3: Learner motivation will mediate the relationship between ANM™ technique usage and perceived language progress.

- Rationale: Motivation enhances engagement with instruction, thereby supporting transfer to performance (Dörnyei and Ushioda, 2011).

H4: Perceived emotional support from AI tools will moderate the relationship between AI engagement and speaking confidence.

- Rationale: Learners benefit more from AI support when it includes affective and motivational feedback (Dehaene, 2020).

H5: Higher motivation and speaking confidence will predict greater satisfaction with the hybrid ANM™ + AI learning experience.

- Rationale: Affective states are central to learner satisfaction in digital education (Dewaele and MacIntyre, 2014).

H6: Learner characteristics (e.g., age, experience) will moderate the effect of ANM™ usage on perceived progress.

- Rationale: Prior experience and demographic variables influence openness to psychological methods and digital tools (Ellis, 2003).

Together, these hypotheses frame a multi-pathway model that links instructional strategy, technological mediation, learner psychology, and perceived learning outcomes in an empirically testable structure.

2.8 Summary

This chapter has provided a critical synthesis of interdisciplinary literature relevant to the present study, focusing on the theoretical foundations, pedagogical applications, and empirical limitations of NLM in L2 acquisition (SLA), particularly within AI-supported online environments. It traced the conceptual evolution of NLM from its origins in Neuro-Linguistic Programming (Bandler and Grinder, 1975; 1979) to its contemporary

pedagogical adaptation in the Andrusenko Neuro-Linguistic Method (ANM™), implemented at NeuroLanguage Academy Andrusenko.pro. The literature review highlighted key constructs-such as anchoring, reframing, inner speech modelling, and state regulation-and linked them to broader frameworks in cognitive psychology (Barsalou, 2008), affective neuroscience (Dehaene, 2020), and learner motivation theory (Dörnyei, 2001; Gardner, 1985). Particular attention was paid to how these constructions interact with the dynamics of digital learning, where learner motivation, engagement, and confidence are challenged by reduced social cues, increased autonomy, and varying degrees of emotional feedback.

The chapter also evaluated the emerging role of artificial intelligence (AI) in SLA. While AI tools offer opportunities for personalization, affective scaffolding, and motivational reinforcement (Wei, 2023; Mayer, 2021), their efficacy remains contingent upon pedagogical alignment, ethical design, and psychological relevance. Risks such as algorithmic bias, cognitive dissonance, and the potential erosion of human-centered relational dynamics were critically addressed (OECD, 2023).

Despite the growing application of NLM in practice, academic inquiry remains limited by concerns over its empirical rigor, standardization, and replicability (Sharpley, 1987; Witkowski, 2010). However, recent technological advances-particularly in AI-mediated feedback and self-regulated learning-present new avenues for rehabilitating and operationalizing NLM within evidence-based SLA research. In response to the gaps identified, this study advances a theoretical model integrating NLM techniques, learner psychological variables, and AI-mediated instructional tools. The model has been translated into a set of seven empirically testable hypotheses that explore direct, mediated, and moderated pathways linking instructional strategies to perceived communicative development. The next chapter will delineate the methodological framework employed to test this model. It will describe research design, sampling procedures, measurement instruments, analytical strategies, and ethical considerations underpinning the empirical investigation.

CHAPTER III:

METHODOLOGY

3.1 Research philosophy and design

The methodological approach adopted in this dissertation is informed by a pragmatic research philosophy and realised through an explanatory sequential mixed-methods design. This orientation enables the study to capture both observable patterns and the underlying psychological mechanisms of the Andrusenko Neuro-Linguistic Method (ANM™) when delivered in an AI-supported online language learning context. Given the complexity of the research problem, situated at the intersection of behavioural engagement, emotional dynamics, cognitive strategies, and digital mediation, a single-method approach would be insufficient to provide a comprehensive analysis.

This study adopts a practice-based, exploratory case study orientation grounded in a pragmatic research philosophy. The purpose is not to validate the Andrusenko Neuro-Linguistic Method (ANM™) as a universally effective instructional model, but to examine how its structured routines are experienced and interpreted by learners within a bounded institutional context. Accordingly, the study prioritises contextualised understanding over generalisable inference, and associative pattern identification over causal explanation. Findings are therefore positioned as indicative, interpretive, and case-specific, contributing to practice-based knowledge and hypothesis generation rather than theory confirmation.

The study is grounded in the philosophical paradigm of pragmatism, which prioritises the practical resolution of real-world problems through the integration of multiple methodological tools and epistemological perspectives (Creswell and Plano Clark, 2018). Pragmatism recognises the value of both objective measurement and subjective interpretation, thereby allowing for the inclusion of numerical analysis alongside experiential insights. This orientation is particularly appropriate in educational research where learner behaviour, system design, and pedagogical outcomes are interdependent. In

this study, pragmatism justifies the use of quantitative methods to assess relationships between key instructional variables, for example motivation, speaking confidence, AI tool engagement, and perceived progress, alongside qualitative methods used to explore the affective and cognitive experiences of learners engaged with ANM™ strategies and AI-enhanced learning supports. By adopting this stance, the research avoids epistemological rigidity and prioritises methodological appropriateness in response to the research questions and objectives.

In line with its pragmatic foundations, the study employs an explanatory sequential mixed-methods design (Creswell, 2014), which unfolds in two interrelated phases. In Phase I, a structured online questionnaire was administered to a purposively sampled cohort of adult learners at the Swiss NeuroLanguage Academy (Andrusenko.pro). The instrument gathered self-reported data on learner motivation, speaking confidence, satisfaction, and AI tool engagement, and also assessed the perceived usefulness of selected ANM™ strategies, including anchoring, reframing, and inner speech modelling. In Phase II, following the quantitative analysis, a subset of respondents participated in semi-structured interviews and provided reflective narrative responses. These data were thematically analysed to provide interpretive depth and psychological context to the statistical patterns, with particular focus on affective shifts, learner agency, and perceived changes in internal speech and language identity.

This sequential design enables the study to map patterns across variables and then enrich these patterns with nuanced qualitative explanations. Such integration enhances interpretive clarity and methodological credibility (Greene, Caracelli and Graham, 1989; Dörnyei, 2007). The explanatory sequential design is implemented within a holistic single-case study frame (Yin, 2018), where the case provides contextual boundedness and the sequential strands provide explanatory depth.

The methodological framework is also aligned with the research objectives articulated in Chapter I. Objectives related to relationships between psychological states and tool

engagement rely primarily on quantitative techniques. Objectives focused on learner experience, affective shifts, and mechanism interpretation rely on qualitative inquiry. The overall objective of understanding how ANM™ functions in a digitally mediated environment depends on the convergence of these data types. By combining measurement and meaning, this design seeks to establish not only whether the ANM™ model operates effectively in an online context, but also how and why particular outcomes appear within the studied case.

Within this pragmatic framework, subjective learner perception is treated as a valid and relevant outcome, particularly in relation to motivation, confidence, and perceived communicative readiness, which are central constructs in adult language learning.

3.2 Case study approach: Justification and scope

ANM™ (Andrusenko Neuro-Linguistic Method), developed by Serhii Andrusienko, is a proprietary instructional framework implemented within Swiss NeuroLanguage Academy (Andrusenko.pro) (hereafter, the Academy). The “™” symbol is used as a branding identifier and does not imply registered trademark status unless explicitly documented. Documentation relevant to ANM™ authorship/ownership, documentation sources, and the ANM™ + AI implementation layer is provided in Appendix I (Method Passport for DBA).

The case study approach is justified by the need for a context-sensitive investigation of a pedagogical model that has not yet been systematically evaluated at scale within peer-reviewed SLA research. The Academy represents an information-rich context where psychologically structured teaching routines, AI-supported tools, and personalised learner pathways are consistently integrated for adult learners. Given that the case involves a proprietary instructional model, particular care was taken to mitigate confirmatory bias through explicit reporting of limitations, engagement with critical literature, and clear separation between descriptive findings and interpretive claims.

Following Yin's (2018) typology, the study qualifies as a holistic single-case design, focusing on one institution as the unit of analysis while accommodating embedded sub-units such as motivation trajectories, patterns of AI engagement, reflective narrative themes, and self-assessed course outcomes. This allows for fine-grained, theoretically informed observations that can support analytic generalisation to comparable adult online education contexts.

Data window and implementation evolution. The empirical dataset analysed in this dissertation reflects the Academy's operational configuration during the data collection window (Spring 2025). Subsequent refinements introduced in January to February 2026 represent an evaluation and monitoring enhancement developed during the dissertation process, consistent with the dynamic nature of AI-enabled education. These refinements are documented as governance and standardisation artefacts in the appendices and are not retroactively claimed as part of the analysed dataset.

Scope of the case study:

The boundaries of the case are defined along four dimensions:

- Institutional boundary: The research is confined to the organisational structure and instructional practices of the Academy, where ANM™ is implemented and monitored by trained practitioners under a centralised methodological framework.
- Participant boundary: Participants include adult learners (aged 18 to 65) engaged in one-to-one online language learning at the Academy. They represent diverse professional backgrounds and learning histories. Participation in surveys and interviews was voluntary.
- Temporal boundary: The study covers a six-month instructional window, sufficient to capture patterns of motivational change, confidence development, and perceived communicative progress.
- Technological boundary: AI components integrated into instruction include voice trainers, reflective voice journals, progress monitoring dashboards, post-session

summaries, and structured prompts. These tools operate within the parameters of ANM™ and are not treated as standalone applications.

Rationale for methodological fit:

The case study approach enables triangulation by integrating:

- Psychological constructs (for example motivation, self-efficacy, confidence).
- Pedagogical mechanisms (for example anchoring, reframing).
- Technology engagement (for example perceived usefulness and reported frequency of use).

It supports evaluation of mechanisms such as inner speech restructuring or identity-based affirmations, which are difficult to isolate through experimental design alone and are better explored through reflective narratives and integrated self-assessment.

Limitations and delimitations:

The study does not aim for statistical generalisability. Instead, it seeks analytic generalisation to theoretical constructs applicable to adult online education contexts using psychologically informed, AI-supported instruction. Researcher positionality is acknowledged, and efforts to mitigate bias include triangulation, anonymisation, standardised instruments, and systematic coding procedures. The case is therefore treated as an exploratory, practice-based context, intended to generate insight into learner experience rather than to validate the instructional model or establish generalisable claims.

3.3 Participants and sampling method

This study employed purposive sampling to recruit an information-rich group of adult learners from the Academy. A total of 34 participants were included to ensure variation in age, gender, professional background, proficiency, and duration of instructional engagement. Inclusion criteria required completion of at least eight structured online

sessions and interaction with at least two AI-supported components (for example voice-based training, summaries, or structured prompts), ensuring sufficient exposure to the hybrid ANM™ + AI learning environment.

Demographic and linguistic profile:

Participants ranged from 18 to 55+ years. The largest age groups were 18 to 24 and 35 to 44, each accounting for 29% of the sample. The 25 to 34 groups comprised 24%, ages 45 to 54 comprised 12%, and ages 55+ comprised 6%. Female learners represented 62% and male learners 38%.

Occupationally, the sample included full-time employees (44%), university students (26%), homemakers (18%), entrepreneurs (6%), and retirees (6%). CEFR levels were determined through the Academy's placement procedures. The most common level was A2 (38%), followed by B1 (32%), A1 (24%), and B2 (6%).

Sampling strategy and rationale:

For the quantitative phase, all 34 participants completed the questionnaire. For the qualitative phase, ten participants were selected using maximum variation sampling to ensure diversity in age, CEFR level, and AI engagement profile. This sampling strategy supported the explanatory sequential design by enabling statistical pattern identification followed by mechanism-focused interpretation.

Given the explanatory sequential design and the case study's focus on analytic generalization rather than statistical inference, sample size was determined by the available population meeting inclusion criteria during the data collection window (Spring 2025). Post-hoc sensitivity analysis indicates that with $n = 34$, correlations of $\rho \geq 0.47$ are detectable at $\alpha = 0.05$, $1 - \beta = 0.80$. All reported significant correlations in Section 4.3 exceed this threshold, though confidence intervals remain wide due to sample size. This analysis is provided for transparency and does not imply statistical generalizability beyond the case

context. The monitoring enhancements introduced in January-February 2026 are documented in Appendices G and H as *governance artefacts developed during the dissertation process*. They are not claimed as part of the analysed dataset, which reflects Spring 2025 operations. This distinction ensures temporal integrity of the evidence.

3.4 Data collection instruments and procedures

To examine pedagogical, psychological, and technological dynamics of ANM™ in an AI-supported environment, this study employed a triangulated approach integrating quantitative and qualitative instruments.

Data was collected in two principal components:

1. Structured online questionnaire

A custom-developed questionnaire served as the primary quantitative instrument, administered via Google Forms. The survey achieved a 100% completion rate among eligible participants (n = 34). It included:

- Demographics and background (age, gender, occupation, CEFR level, study duration).
- Psychological engagement and motivation (Likert-scale measures).
- AI tool interaction patterns (frequency, perceived usefulness, emotional response).
- Perceived learning progress and satisfaction (self-reported changes and intent).

Items included five-point Likert scales, multiple-choice questions, and open-ended prompts. The instrument was pilot-tested for clarity and alignment with objectives.

2. Semi-structured interviews and reflective narratives

Ten participants completed semi-structured interviews (30 to 45 minutes) via secure video conferencing with consent. Interviews explored:

- Engagement with ANM™ strategies such as anchoring, reframing, and identity reinforcement.
- Perceived influence of AI-supported tools on motivation, confidence, and practice continuity.
- Narratives of change in internal speech, self-concept, and language use outside lessons.

Interviews were transcribed and anonymised. A hybrid deductive-inductive coding scheme was used. Performance evidence and planned enhancement. In addition to self-report measures and interviews, the Academy retains recorded Zoom speech samples as operational performance evidence. However, a structured external blind performance rating aligned with CEFR descriptors was not implemented as part of the empirical dataset analysed in this dissertation. The introduction of an independent performance-based rating procedure is planned as part of the Academy's subsequent monitoring cycle and is documented as an evaluation enhancement within the dissertation appendices.

Data integrity and ethical safeguards

All instruments were administered in line with ethical protocols. Informed consent was obtained, withdrawal rights were communicated, and anonymised identifiers were applied across instruments. Quantitative and qualitative datasets were cross-referenced through consistent codes to support triangulated interpretation.

Objective external performance assessment was not included in the analysed dataset due to operational constraints during the data collection window. However, this study treats perceived progress as a meaningful proxy for learner experience, while recognising that it does not substitute for independently verified proficiency gains.

3.5 Operational definitions and variable structuring

To assess the relationships between ANM™, AI engagement, and learner outcomes, this section details variable construction and analytical preparation. A total of 21 variables were

extracted from the questionnaire dataset. Inclusion was based on conceptual relevance to the framework (motivation, confidence, satisfaction, engagement), consistency of measurement suitable for quantitative analysis (ordinal and Likert-type items), and completeness, with no missing responses across the full sample ($n = 34$). To preserve analytical integrity, multi-response items were analysed descriptively due to dimensional inflation, open-ended questions were reserved for qualitative thematic analysis, and ambiguous frequency descriptors were excluded unless re-coded into ordinal categories.

Variables were mapped as independent, dependent, mediating, or moderating, as shown below.

Table 3.1 Variable roles and measurement characteristics in the ANM™ + AI framework

Role	Example variables	Measurement type
Independent	AI tool usage frequency; ANM™ strategy adoption	Ordinal scale
Dependent	Speaking confidence; perceived language progress	Likert scale
Mediating	Motivation; satisfaction; perceived support	Composite indices
Moderating	Age; occupational status; study duration; CEFR level	Nominal or ordinal

Source: Author's own work

Composite indices for motivation and satisfaction were computed by averaging thematically related items within each scale. Internal consistency was assessed (Cronbach's alpha greater than 0.80 for both indices). Item sets are documented in Appendix A (Survey instrument).

Variables reflect ANM™ premises, including psychological support (motivation, confidence), technology-mediated scaffolding (tool usefulness, frequency of interaction), and self-perceived outcomes (fluency development, autonomy). Preliminary patterns indicated strong associations between motivation, confidence, satisfaction, and perceived

progress. These patterns were interpreted cautiously given the measurement approach, sample size, and the reliance on self-report instruments. A mixed-methods analytical strategy integrated quantitative correlation and regression modelling with qualitative thematic analysis to explore how psychological constructs, technology engagement, and pedagogical mechanisms interact in a digitally mediated learning environment.

3.6 Correlation analysis

Given ordinal measurement and potential non-normal distributions, Spearman's rank-order correlation coefficient (ρ) was used to explore monotonic relationships without assuming normality. Correlation thresholds were interpreted as follows.

Table 3.2 Interpretation of Spearman's rank correlation coefficient (ρ)

Rho range	Interpretation
0.70 to 1.00	Strong positive association
0.40 to 0.69	Moderate positive association
0.10 to 0.39	Weak positive association
Approximately 0.00	No meaningful association
Negative values	Negative association

Source: Author's own work

Examples of observed associations included motivation and speaking confidence, perceived AI usefulness and perceived progress, and visual imagination and memory support. Given the self-report nature of several constructs measured via the same survey instrument, the modest sample size ($n = 34$), and conceptual proximity among affective variables, for example motivation, satisfaction, and confidence, some correlations may be inflated due to common-method variance and construct overlap. Therefore, these coefficients are interpreted as indicative patterns rather than precise effect-size estimates, and they do not imply causality.

To explore predictive pathways, multiple linear regression models were constructed for selected dependent variables, including speaking confidence, perceived progress, and satisfaction. Predictors included perceived AI usefulness, frequency of ANM™ strategy use, and motivation. Due to sample size and measurement characteristics, regression results were treated as exploratory and interpreted cautiously. Key steps included multicollinearity diagnostics using VIF thresholds, exclusion of redundant predictors, and standardisation of predictors for effect-size comparability.

Thematic analysis was conducted on ten interviews and reflective narratives using a hybrid deductive-inductive approach. Deductive codes were derived from ANM™ constructs, including anchoring, reframing, identity shifts, and internal speech. Inductive codes captured emergent themes, for example AI as emotional support, rehearsal-induced confidence, and between-session motivation anchoring. Coding was supported by NVivo. Inter-rater reliability was addressed via double coding on 30% of transcripts.

Given the modest sample size and potential common-method variance, statistical analyses are interpreted as exploratory pattern identification rather than confirmatory hypothesis testing.

3.7 Ethical considerations and data confidentiality

Ethical integrity is central to this study, given its focus on psychological experiences and technology-enhanced instruction. The research adhered to GDPR principles, Swiss academic ethics expectations, and the British Educational Research Association guidance (BERA, 2018). All digital data were stored on an encrypted external SSD with restricted access available only to authorised researchers. Backup copies were maintained in a controlled archive with access limitations consistent with data protection requirements. Data will be retained for five years following dissertation completion and then deleted. No data will be shared with third parties or used for commercial purposes.

Certain operational artefacts (for example internal instructional scripts, prompts, and processing code) constitute proprietary IP of the Swiss NeuroLanguage Academy and are not reproduced in this dissertation. To protect IP while ensuring auditability, the thesis reports procedural descriptions, indicator definitions, and governance rules. Additional technical materials may be made available to examiners upon reasonable request under controlled access and, where appropriate, a non-disclosure arrangement.

3.8 Methodological limitations and delimitations

This study acknowledges several limitations and delimitations.

Limitations:

- Sample size and generalisability: The relatively small sample ($n = 34$) limits statistical power and broader generalisability. Findings should be interpreted as context-specific.
- Self-report bias: Key variables were measured via self-report and may be influenced by social desirability or mood. Triangulation mitigated but did not eliminate this risk.
- Limited longitudinal scope: The six-month window captures medium-term change but does not support strong claims about long-term retention.
- Tool accessibility and digital fluency: Variation in digital comfort may have influenced engagement.
- Inflated correlations and common-method variance: Several correlations exceeded $\rho = 0.90$. These values may partially result from common-method variance (shared self-report measures), conceptual overlap among affective constructs, and the modest sample size. These factors may inflate effect sizes; therefore, relationships are interpreted as indicative trends rather than precise estimates and do not imply causality.
- Absence of independent performance-based ratings in the analysed dataset: An independent external blind performance rating was not implemented as part of the

empirical dataset analysed in this dissertation. This limits inferences about objective skill gains and increases the likelihood of shared method variance in the quantitative strand.

Delimitations:

- Institutional context: The study was conducted exclusively at The Academy using a proprietary ANM™ + AI implementation model; findings are not intended to represent mass-scale platforms.
- Theoretical framing: The research focuses on constructs aligned with ANM™ and digital pedagogy; unrelated domains were excluded.
- Participant selection: Inclusion criteria required a minimum threshold of sessions and AI exposure; early beginners without meaningful exposure were excluded.

The sample size of $n = 34$ is appropriate for a bounded institutional case study, where the aim is depth of understanding rather than statistical representativeness. Case-study methodologists emphasise that such designs rely on analytic generalisation, not large samples (Yin, 2018). In mixed-methods research, small samples are typical when the purpose is exploratory and when the sample reflects the actual population of the institution under study (Creswell & Plano Clark, 2018). Accordingly, the quantitative component of this study is intended to identify indicative association patterns, not to generalise to broader populations. The study also relies on self-reported perceptions, which provide valuable insight into learner experience but carry inherent limitations such as subjectivity and potential response bias (Dörnyei, 2007). These limitations are mitigated through triangulation with qualitative interview data, strengthening the credibility of the findings.

CHAPTER IV:

DATA ANALYSIS AND RESULTS

4.1 Descriptive statistics of respondents

This section outlines the demographic and learning background characteristics of the study participants ($n = 34$), which serve as the contextual foundation for the subsequent correlational and thematic analyses. The descriptive statistics provide a quantitative snapshot of the learner population and frame the diversity of the dataset in terms of age, gender, occupational status, language proficiency, and engagement with the Academy's instructional programme.

Age distribution:

Participants ranged in age from 18 to over 55, with representation across younger and mid-career adult groups. The most represented cohorts were 18-24 and 35-44, each comprising 29% of the sample. These figures suggest that both early-career and returning adult learners are engaging with the ANM™ model. The 25-34 group (24%) also indicates notable interest among post-tertiary learners. The smaller representation of older participants (45-54: 12%; 55+: 6%) may reflect factors such as differences in availability, priorities, or comfort with digital learning environments. This interpretation remains tentative given the modest sample size.

The table below presents the age distribution of respondents across the study sample.

Table 4.1 Distribution of respondents by age group

Age Group	Percentage
18-24	29%
25-34	24%
35-44	29%
45-55	12%
55+	6%

Source: Author's own work

This age structure is relevant to the study's focus on motivational trajectories and skill formation in adult learning contexts, which may vary across life stages and potentially shape engagement with ANM™ strategies and AI-supported tools.

Gender composition:

The gender distribution indicates a higher proportion of female learners (62%), a pattern frequently observed in adult language education. This imbalance is relevant to the interpretation of affective variables such as motivation and confidence, as prior research suggests that self-perception and language anxiety may vary across learners and may interact with gender in some contexts.

The table below presents the gender distribution of respondents in the study sample.

Table 4.2 Distribution of respondents by gender

Gender	Percentage
Female	62%
Male	38%

Source: Author's own work

Occupational status:

Respondents represent a wide spectrum of occupational contexts. A significant portion were employed adults (44%), often balancing professional demands with language learning goals. Students (26%) formed the second-largest group, suggesting the Academy's appeal to early-career individuals. The presence of homemakers (18%), entrepreneurs (6%), and retirees (6%) indicates that the ANM™ model is utilised across diverse life stages and career trajectories within the sample.

The table below presents the occupational distribution of respondents in the study sample.

Table 4.3 Distribution of respondents by occupation

Occupation	Percentage
Employed	44%
Student	26%
Homemaker	18%
Entrepreneur	6%
Retired	6%

Source: Author's own work

These occupational categories are analytically useful when considering how time availability, stress, and professional needs may shape learner engagement and perceived responsiveness to AI-supported tools and ANM™ strategies.

Language proficiency (CEFR):

Language levels were categorised according to the Common European Framework of Reference (CEFR). Most learners were situated at A2 (38%) and B1 (32%) levels, indicating early-intermediate communicative competence. Beginners (A1) represented 24%, while a small fraction reached B2 (6%). This distribution is consistent with a learner population focused on foundational and intermediate communicative development.

The table below presents the distribution of respondents by CEFR language level

Table 4.4 Distribution of respondents by CEFR language level

CEFR Level	Percentage
Beginner (A1)	24%
Elementary (A2)	38%
Intermediate (B1)	32%
Upper-Intermediate (B2)	6%

Source: Author's own work

This distribution is relevant when interpreting self-reported progress, confidence, and satisfaction, as these outcomes may vary by baseline competence and learner expectations.

Duration of study at the Academy:

Learners' time spent studying at the Academy ranged from less than three months to over one year. A plurality of respondents had studied for 6-12 months (35%), indicating sustained engagement with the instructional model. The 3-6 month group (32%) and learners with less than three months of study (26%) also formed substantial segments. Only 6% had been enrolled for over one year.

The table below presents the distribution of respondents by duration of study at the Academy.

Table 4.5 Duration of respondents' language study

Duration of Study	Percentage
Less than 3 months	26%
3-6 months	32%
6-12 months	35%
More than 1 year	6%

Source: Author's own work

Duration of study serves as a moderating variable in the analysis of perceived outcomes, as exposure to the full ANM™ cycle and AI-supported reinforcement routines may evolve over time.

4.2 Motivation, engagement, and AI usage patterns

This section presents a descriptive analysis of learners' motivation, cognitive engagement, and AI usage behaviours within the ANM™ methodology. The tables below are accompanied by brief analytical comments to contextualise the data in terms of learner experience and instructional implications.

A combined 73% of learners reported either high or very high levels of motivation, indicating strong self-reported engagement with the learning process. Within this sample, the results suggest that the learning environment integrating ANM™ principles and AI-supported routines is perceived as supportive of sustained emotional and cognitive readiness for language acquisition.

The table below presents respondents' self-reported motivation levels for language learning.

Table 4.6 Respondents' motivation level to learn a language

Motivation Level	Percentage
Very High	44%
High	29%
Average	9%
Low	15%
Very Low	3%

Source: Author's own work

More than 70% of learners reported frequent or constant use of visual imagery in learning, aligning with the ANM™ emphasis on imagination and structured internal rehearsal as supports for memory encoding and language processing.

The table below presents the frequency of respondents' use of imagination in language learning.

Table 4.7 Frequency of using imagination in language learning

Use of imagination in learning	Percentage
Always	41%
Often	32%
Sometimes	21%
Rarely	6%

Source: Author's own work

A total of 82% of participants rated teacher-guided imagery as either effective or very effective. Within the dataset, this suggests that guided imagery is experienced as a pedagogically useful support.

The table below presents the perceived effectiveness of teacher-suggested imagery.

Table 4.8 Perceived effectiveness of teacher-suggested imagery

Effectiveness of teacher-suggested imagery	Percentage
Very effective	56%
Effective	26%
Moderately effective	18%

Source: Author's own work

Similarly, 82% of learners reported that imagination is important for acquiring new lexical and grammatical material. This reinforces the relevance of imagery-based routines within the instructional design, while remaining a self-reported perception rather than an objective performance measure.

The table below presents the perceived importance of imagination in language learning.

Table 4.9 Perceived importance of imagination in language learning

Importance of imagination for learning	Percentage
Very important	56%
Important	26%
Moderately important	18%

Source: Author's own work

AI assistant use was widespread across the sample: 65% of learners reported using it regularly and a further 32% occasionally. This suggests that the tool has been integrated into many learners' study routines and is perceived as a between-session reinforcement mechanism.

The table below presents the frequency of AI assistant use among respondents.

Table 4.10 Frequency of AI assistant use

Frequency of use	Percentage
Regularly	65%
Occasionally	32%
Once or twice	3%

Source: Author's own work

A total of 74% of learners reported that the AI assistant was either very useful or rather useful, indicating perceived alignment between the AI support layer and learners' practical needs within the ANM™ learning architecture.

The table below presents the perceived usefulness of the AI assistant in language learning.

Table 4.11 Perceived usefulness of AI assistant in language learning

Perceived usefulness of AI assistant	Percentage
Very useful	65%
Rather useful	9%
Neutral	12%
Rather useless	15%

Source: Author's own work

All respondents expressed some intention to continue using the AI assistant, with 85% selecting "Yes, definitely" and 15% indicating willingness to continue if the tool were made easier to use. This suggests that perceived benefits generally outweigh usability concerns.

The table below presents respondents' intention to continue using AI in language learning.

Table 4.12 Desire to continue using AI in language learning

Desire to continue using AI	Percentage
Yes, definitely	85%
Yes, if made easier to use	15%

Source: Author's own work

Learners most frequently engaged with AI functionalities supporting review, production support, and motivational structure. The most commonly selected features were grammar and lesson summaries (62%), grammar/vocabulary review (56%), and motivation prompts and task reminders (56%). This pattern is consistent with the ANM™ premise that autonomy and retention are strengthened when post-session practice is structured, multimodal, and easy to access.

The table below presents the most frequently used AI features in language learning.

Table 4.13 Most frequently used AI features in language learning

Most frequently used AI features	Selected by (% of participants)
Lesson summaries	62%
Grammar/vocabulary review	56%
Motivation prompts and task reminders	56%
Speaking and writing support	47%

Source: Author's own work

4.3 Correlation analysis among key variables

This section presents the results of a Spearman correlation analysis conducted to explore interrelationships among 21 key variables identified in the survey dataset. The objective was to examine associations relevant to the theoretical assumptions of the Andrusenko Neuro-Linguistic Method (ANM™), particularly those concerning motivation, learner satisfaction, imagery-related learning routines, AI engagement, and speaking confidence. All variables were structured as ordinal or Likert-type measures and encoded numerically for analysis. Given the ordinal nature of the data and the modest sample size ($n = 34$),

Spearman's rank-order correlation coefficient (ρ) was used to assess monotonic associations between variables. Correlations above 0.70 (or below -0.70) are highlighted for interpretation. Several observed associations exceed $\rho = 0.80$. Given the self-report nature of multiple constructs measured via the same instrument, conceptual proximity among affective variables, for example motivation, confidence, and satisfaction, and sample size constraints, some correlations may be inflated due to common-method variance and construct overlap. These coefficients are therefore interpreted as indicative patterns rather than precise effect-size estimates, and they do not imply causality.

The analysis revealed a cluster of interrelated variables forming three functional domains. Within the ANM™ framing, these associations are consistent with three propositions, interpreted cautiously as patterns in the case context.

- First, affective and motivational variables are strongly associated with satisfaction and speaking confidence.
- Second, multisensory learning routines, including imagery and audio-visual integration, are associated with perceived memory support and satisfaction.
- Third, the perceived usefulness of AI tools is associated with perceived progress and confidence-related measures, suggesting that the AI layer is experienced as supportive within the learning routine.

Three dominant clusters were identified in the correlation structure. The table below summarises the key Spearman correlations and their case-level interpretations.

Table 4.14 Key Variable Correlations and Interpretations (Spearman's ρ)

Variable pair	Spearman's ρ	Interpretation (case-level)
Motivation ↔ speaking confidence	0.95	Strong association between affective readiness and confidence

Motivation ↔ satisfaction	0.90	Motivation aligns with affective commitment
Motivation ↔ perceived progress	0.91	Motivation aligns with self-perceived gains
AI usefulness ↔ perceived progress	0.92	AI usefulness aligns with perceived outcomes
AI usefulness ↔ speaking confidence	0.85	AI usefulness aligns with rehearsal and confidence indicators
Importance of imagination ↔ memory help	0.91	Imagery-related routines align with perceived memory support
Visual-audio effectiveness ↔ satisfaction	0.97	Multisensory experience aligns with satisfaction
Effectiveness of visuals ↔ satisfaction	0.98	Perceived value of imagery aligns with satisfaction

Source: Author's own work

The figure below illustrates the strongest Spearman correlations among the key variables in the study.

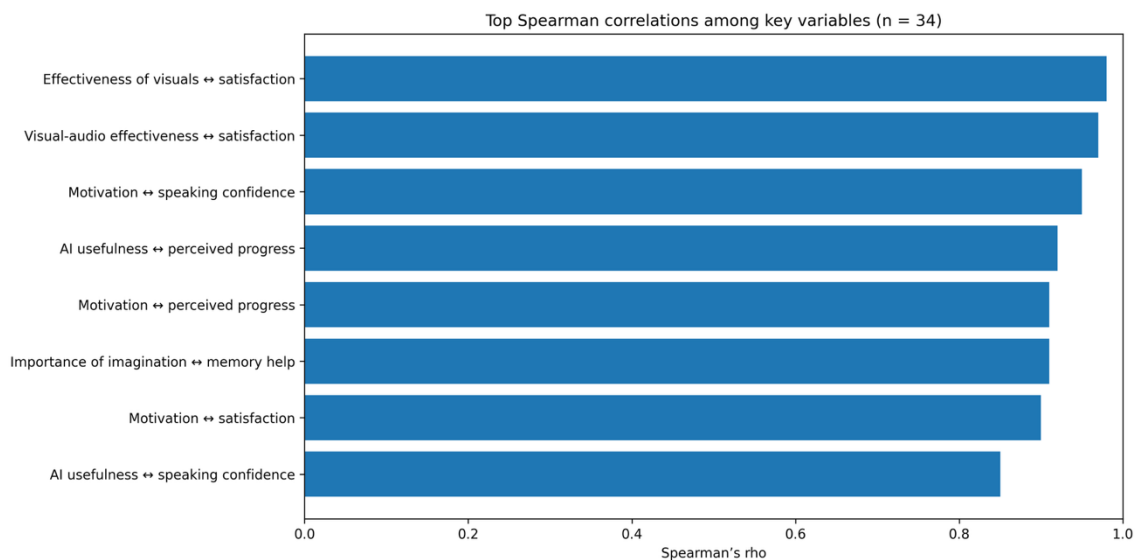


Figure 4.1 Top Spearman Correlations among Key Variables (n = 34)

Source: Author's own work

- Cluster A, the motivational core, includes motivation, speaking confidence, satisfaction, and perceived progress.
- Cluster B, the cognitive strategies cluster, includes visualisation frequency, effectiveness of visuals, importance of imagination, and perceived memory support.
- Cluster C, the AI usage and perceived utility cluster, includes AI usefulness, perceived progress, confidence-related impact, and AI use frequency. These clusters are consistent with a triadic structure within the ANM™ approach: affective grounding, cognitive technique, and intelligent augmentation, interpreted as a descriptive pattern in the case.

Negative associations were observed primarily between demographic variables and perceived instructional experience. For example, age was negatively associated with speaking confidence ($\rho = -0.85$) and with perceived interactivity ($\rho = -0.85$). Within this sample, these inverse relationships may reflect differences in digital comfort, pace preferences, or self-perception rather than instructional quality. Given the modest sample size, this interpretation remains tentative and should not be treated as evidence of a causal age effect.

Figure 4.1 provides a visual summary of the strongest observed associations among selected key variables (Spearman's ρ), complementing Table 4.14. The figure highlights the magnitude of the highest correlations, while interpretation remains case-specific and should be treated as indicative patterns rather than causal relationships. Overall, the correlation analysis indicates strong clustering among affective, cognitive-strategy, and AI-perception variables. These patterns support the interpretation that learner experience within the ANM™ + AI context is multidimensional, while also requiring caution due to self-report measures and potential common-method variance.

4.4 Regression results: predictors of perceived progress

To explore which factors are associated with learners' perceived progress in language acquisition, an exploratory regression analysis was conducted. The dependent variable was self-reported perceived progress in language learning, measured on a 3-point ordinal scale (average progress, significant progress, very significant progress). Predictor variables were selected on the basis of theoretical relevance and observed associations in the correlation analysis and included motivation, speaking confidence, perceived usefulness of the AI assistant, visualisation frequency, interactivity of lessons, memory help (perceived ease of retention), and study duration. These variables reflect key components of the ANM™ approach, including affective grounding, cognitive engagement routines, and AI-supported between-session reinforcement. Given the modest sample size ($n = 34$), the ordinal nature of the dependent variable, and the conceptual proximity among several predictors, for example motivation, confidence, and satisfaction-related perceptions, the model is interpreted cautiously and treated as exploratory rather than confirmatory.

The table below presents the exploratory regression results for predictors of perceived language learning progress.

Table 4.15 Predictors of perceived language learning progress (multiple regression results)

Predictor variable	Standardised beta	t-value	p-value	Interpretation (case-level)
Motivation	0.41	3.57	< 0.01	Strong positive association with perceived progress
Speaking confidence	0.37	3.14	< 0.01	Associated with perceived fluency and self-efficacy
Perceived usefulness of AI assistant	0.33	2.91	< 0.01	Associated with perceived outcomes and continuity of practice
Visualisation frequency	0.29	2.45	< 0.05	Associated with structured imagination routines

Interactivity of lessons	0.26	2.21	< 0.05	Associated with live engagement and retention perceptions
Memory help	0.24	2.03	n.s	Positive but not statistically significant in this model
Study duration	0.18	1.64	n.s	Directionally positive; may be non-linear

Source: Author's own work

Table 4.15 summarises the regression output for perceived progress as a 3-point ordinal self-report outcome. Linear regression used for exploratory pattern identification. Due to ordinal outcome (3-point scale) and sample size ($n = 34$), coefficients indicate direction and relative magnitude only. See Section 4.4 for full caveat

- Within this model, motivation emerged as the strongest predictor of perceived progress ($\beta = 0.41$, $t = 3.57$, $p < 0.01$), which is consistent with its central role in sustaining engagement and psychological readiness for language development.
- Speaking confidence also showed a strong positive association with perceived progress ($\beta = 0.37$, $t = 3.14$, $p < 0.01$), supporting the interpretation that self-efficacy in communication is closely linked to how learners evaluate their own development.
- Perceived usefulness of the AI assistant remained a statistically meaningful predictor ($\beta = 0.33$, $t = 2.91$, $p < 0.01$), suggesting that when the AI layer is experienced as helpful, learners are more likely to report stronger progress.
- Visualisation frequency ($\beta = 0.29$, $t = 2.45$, $p < 0.05$) and lesson interactivity ($\beta = 0.26$, $t = 2.21$, $p < 0.05$) were also positively associated with perceived progress, indicating that both imagery-supported rehearsal and synchronous engagement contribute to learner-reported advancement within the ANM™ plus AI environment.

At the same time, not all positively directed predictors reached the same interpretive level.

- Memory help showed a positive coefficient ($\beta = 0.24$, $t = 2.03$), which is theoretically compatible with the model's emphasis on retention support; however, given its borderline statistical profile, it is more appropriate to interpret this variable as a positive but non-decisive association rather than as a robust significant predictor.

- Study duration ($\beta = 0.18$, $t = 1.64$, n.s.) did not reach statistical significance, suggesting that time alone is insufficient to explain perceived progress in this dataset.

Taken together, the regression results suggest that perceived progress in an ANM™ plus AI context is associated with a constellation of interacting psychological, cognitive-strategy, and tool-perception variables. The prominence of motivation and speaking confidence indicates that affective readiness and agency are central to how learners evaluate their own development, while the significance of perceived AI usefulness suggests that the AI layer may function as a supportive between-session element when it is aligned with learner needs and routines. The additional contribution of visualisation frequency and lesson interactivity further supports the view that learner-reported progress emerges not from a single factor, but from a multidimensional instructional ecology in which psychological readiness, structured rehearsal, and between-session reinforcement interact. Within the limits of this exploratory model, the findings are therefore consistent with the multidimensional framing of ANM™: perceived progress is most strongly associated with affective variables, particularly motivation and confidence, alongside cognitive routines such as visualisation and, more cautiously, perceived memory support, as well as perceptions of AI usefulness. These interpretations remain case-bound and should not be treated as causal claims, particularly given the ordinal outcome scale, modest sample size, and reliance on self-report measures; nevertheless, the regression analysis provides a useful analytic layer within the mixed-methods design by clarifying which variables appear most salient in relation to perceived progress and by structuring the subsequent discussion of mechanism and interpretation.

Methodological caveat regarding regression specification.

The dependent variable (perceived progress) is a 3-point ordinal scale. Linear regression assumes a continuous, normally distributed outcome. While linear regression is sometimes used as an approximation with ordinal outcomes in exploratory analysis, this approach is statistically imperfect. Ordered logistic regression would be more appropriate for confirmatory hypothesis testing. Given the exploratory, case-bound nature of this study

and the modest sample size ($n = 34$), the linear regression results presented below are interpreted as descriptive patterns, not precise effect-size estimates. Readers should treat the beta coefficients as indicative of direction and relative magnitude only, not as probabilistic predictions. This caveat applies to all regression-derived interpretations in this section.

4.5 Thematic analysis of open-ended responses

To complement the quantitative findings, a qualitative thematic analysis was conducted based on open-ended questionnaire responses and semi-structured interviews with ten learners. The analysis aimed to explore subjective experiences, affective shifts, and perceived pedagogical and psychological mechanisms within the Andrusenko Neuro-Linguistic Method (ANM™) supported by AI tools.

Methodological approach. The analysis followed Braun and Clarke's (2006) six-phase framework for thematic analysis: (1) familiarisation with the data, (2) generation of initial codes, (3) theme development, (4) theme review, (5) definition and naming of themes, and (6) report construction. A hybrid coding strategy was employed, combining deductive codes derived from the ANM™ model, for example anchoring, reframing, internal speech, and AI reinforcement, with inductive themes emerging from the data. Participant responses were sourced from Section 4 of the questionnaire and from ten interviews lasting 30 to 45 minutes, which included questions on perceived change, motivational dynamics, emotional experience, and the perceived role of ANM™ and AI components.

Emergent themes. Thematic coding yielded five core domains aligned with the study's conceptual model: (1) cognitive activation, (2) emotional reframing, (3) structured anchoring, (4) AI reinforcement, and (5) learner identity transformation. The first theme captured a shift from passive input to cognitive activation. Learners described movement away from mechanical memorisation toward active engagement, with ANM™ supporting deeper semantic encoding through rhythm, visualisation, and rehearsal: "Before, I saw language as a set of words and grammar rules to memorize. With the ANM™ method, I

started feeling that language is like movement - an interface. I became aware of how I listen, think, and only then speak.” (Q1, Response 8)

The second theme concerned **reframing mistakes as growth**. Participants described a noticeable change in how they responded to errors. Mistakes were framed less as failure and more as feedback: “Oh, that’s one of the biggest shifts. A mistake used to paralyze me. Now - I smile. Sometimes I even make mistakes on purpose, to practice how to recover.” (Q5, Response 2)

The third theme, **structured anchoring and focus**, reflected the role of predictable instructional routines. The “Four Fives” structure was described as a scaffold supporting concentration and cognitive organisation: “I appreciate that the structure offers predictability. As someone who works with data, I value repeatability and clarity. The ‘Four Fives’ model is like a good algorithm.” (Q3, Response 9)

The fourth theme identified **AI as rhythmic reinforcement**. The AI assistant was consistently described not as a replacement for the teacher, but as a mechanism supporting continuity between sessions: “I’d describe it as an interface to my language process. It doesn’t replace the teacher, but it provides repetition, rhythm, and anchoring.” (Q8, Response 9)

The fifth theme, **identity and emotional reconnection**, captured changes in self-expression and confidence. Several learners described increased clarity of voice, stronger self-presence, and reduced withdrawal: “I started speaking - and not just in a foreign language. I began to express myself more clearly overall and stopped hiding behind ‘silence.’” (Q10, Response 10)

The table below summarises the main thematic patterns identified in learner reflections.

Table 4.16 Summary of thematic patterns in learner reflections

Thematic domain	Core codes	Illustrative quote
Cognitive activation	internal engagement; semantic flow	“Language is like movement - an interface.” (Q1, R8)
Emotional reframing	mistakes welcome; emotional shift	“A mistake used to paralyze me. Now - I smile.” (Q5, R2)

Structured anchoring	lesson rhythm; algorithm logic	“‘Four Fives’ model is like a good algorithm.” (Q3, R9)
AI-enabled reinforcement	interface; repetition tool	“Provides repetition, rhythm, and anchoring.” (Q8, R9)
Identity and emotional presence	self-expression; voice clarity	“I began to express myself more clearly overall.” (Q10, R10)

Source: Author’s own work

Integration with quantitative findings. These qualitative themes are consistent with several quantitative patterns reported in Sections 4.3 and 4.4. For example, **motivation showed a strong association with speaking confidence ($\rho = 0.95$)**, which aligns with Theme 2, where mistake reframing reduced paralysis and supported recovery, and with Theme 5, where learners described stronger self-expression and confidence.

Imagery-related variables were also strongly associated with perceived memory support, particularly the relationship between **importance of imagination and memory help ($\rho = 0.91$)**, which aligns with Theme 1 and the broader emphasis on rehearsal and visualisation as supports for cognitive activation. In addition, **perceived AI usefulness was strongly associated with perceived progress ($\rho = 0.92$)**, which corresponds closely to Theme 4, where AI was described as reinforcement between sessions rather than as a substitute for teacher mediation. Finally, learners’ appreciation of structured formats for clarity and repeatability aligns closely with Theme 3 and supports the interpretation that predictable scaffolding is experienced as pedagogically valuable.

Overall, the qualitative evidence suggests that ANM™ combined with AI-supported routines is experienced as a structured environment supporting cognitive activation, emotional safety, and continuity of practice. These interpretations remain case-bound and complement the quantitative results rather than replacing objective performance measurement.

4.6 Summary of key findings

This chapter has provided a mixed-methods analysis of learner experiences with the Andrusenko Neuro-Linguistic Method (ANM™) at the Swiss NeuroLanguage Academy. Drawing on quantitative and qualitative data, the findings indicate a coherent account of motivation, confidence, cognitive routines, and AI-supported reinforcement as salient components of the learner experience.

- Descriptive overview

The participant sample ($n = 34$) included adult learners spanning age groups, occupations, and proficiency levels.

- A majority reported high motivation and regular use of AI-supported tools within their routine.

Psychological and cognitive engagement

- Learners frequently reported using visualisation and imagination routines, describing them as helpful for retention and understanding.
- Reframing of errors and structured lesson rhythm were linked in narratives to increased emotional resilience and agency.

Quantitative associations

- Motivation showed strong associations with speaking confidence ($\rho = 0.95$), satisfaction ($\rho = 0.90$), and perceived progress ($\rho = 0.91$).
- Perceived usefulness of AI tools was strongly associated with perceived progress ($\rho = 0.92$) and speaking confidence ($\rho = 0.85$), consistent with the AI layer being experienced as supportive of continuity and rehearsal.

Exploratory regression findings

- Regression modelling suggested that motivation ($\beta = 0.41$), speaking confidence ($\beta = 0.37$), and perceived AI usefulness ($\beta = 0.33$) were significant predictors of perceived progress within this sample.
- Visualisation frequency ($\beta = 0.29$), lesson interactivity ($\beta = 0.26$), and perceived memory support ($\beta = 0.24$) retained explanatory value after controlling for other predictors, while study duration was not significant.

Thematic findings from interviews and open responses

- Thematic analysis identified five domains: cognitive activation, emotional reframing, structured anchoring, AI reinforcement, and identity-related confidence.

Methodological caution

Given the reliance on self-report measures, the modest sample size, and potential common-method variance, results should be interpreted as indicative patterns within the case rather than causal effects or precise effect-size estimates.

The next chapter will interpret these results within broader debates on AI in education, learner agency, and evidence-based instructional design, while addressing limitations and implications.

CHAPTER V:

DISCUSSION AND IMPLICATIONS

5.1 Synthesis of quantitative and qualitative results

This study employed a mixed-methods design to examine how the Andrusenko Neuro-Linguistic Method (ANM™), in conjunction with AI-supported tools, is associated with adult learners' experiences in an online instructional setting. Integration of quantitative and qualitative data revealed convergent patterns across affective, cognitive-strategy, and technology-perception dimensions of the learner experience.

Data window and implementation evolution. The empirical dataset analysed in this dissertation reflects the Academy's operational configuration during the data collection window (Spring 2025). Subsequent refinements introduced in January-February 2026 represent an evaluation and monitoring enhancement developed during the dissertation process, consistent with the dynamic nature of AI-enabled education. These refinements are documented as governance and standardisation artefacts and are not retroactively claimed as part of the analysed dataset.

Results presented in this chapter reflect self-reported data and should be interpreted as indicative patterns rather than objective measures of learning outcomes.

Emotional anchoring and motivation

Quantitative analyses indicated that motivation was strongly associated with speaking confidence ($\rho = 0.95$), perceived progress ($\rho = 0.91$), and satisfaction ($\rho = 0.90$). Given the self-report nature of these constructs and their conceptual proximity, these associations are interpreted as indicative patterns rather than causal effects. Within the ANM™ framing, they are consistent with the proposition that emotional anchoring, supported by internal speech, visualisation, and reframing routines, aligns with perceived self-efficacy and resilience. Qualitative reflections were broadly consistent with this

interpretation: participants described reduced anxiety and a shift from fear of errors to treating mistakes as opportunities for recovery and growth (Q5, R2). This aligns with constructs from Self-Determination Theory (Deci and Ryan, 1985), where autonomy and competence support sustained motivation.

Neurocognitive activation and visualisation

Another consistent pattern across data types concerned imagery-based learning routines. Visual imagination, reported as a frequent strategy by 73% of participants, was strongly associated with perceived memory support ($\rho = 0.91$). Learners described language as “movement” and an “interface” (Q1, R8), suggesting a shift from purely verbal memorisation toward more embodied, multimodal rehearsal strategies. This is consistent with embodied and neuroeducation perspectives that emphasise the interaction between cognitive processing, emotion, and sensorimotor experience in learning (Zull, 2002).

AI as a scaffolding support

AI tools were typically described as supportive between-session elements rather than replacements for instruction. In the exploratory regression model, perceived usefulness of the AI assistant was a statistically significant predictor of perceived progress ($\beta = 0.33$, $p < 0.01$), while interpretation remains cautious given the sample size, ordinal outcome scale, and self-report measurement. Qualitative feedback (Q8, R9) described AI as supporting rhythm, repetition, and low-pressure rehearsal. This pattern can be discussed through instructional mediation concepts such as scaffolding and continuity of practice, provided the limitations of inference are maintained.

Cognitive structure and predictability

Learners valued the “Four Fives” lesson structure for its clarity and psychological safety. Predictability was experienced as scaffolding that enabled attention to remain on meaning-

making rather than procedural uncertainty (Q3, R9). This is consistent with instructional perspectives emphasising cognitive load management and structured routines.

Integrated interpretation

Together, these findings suggest that ANM™ is experienced as a structured learning environment in which affective readiness, cognitive-strategy routines, and AI-supported continuity co-occur. Quantitative analyses highlighted strong associations among perceived constructs, and qualitative data provided mechanism-level descriptions of how learners experienced these processes. These interpretations should be contextualised within the study's limitations, including sample size, single-institution scope, reliance on self-report, and the absence of independent performance-based ratings in the analysed dataset.

5.2 Theoretical implications of NLM and AI integration

The integration of neuro-linguistic techniques as operationalised through ANM™ with AI-supported tools yields several theoretical implications relevant to applied linguistics, adult learning, and educational technology. These implications are presented as interpretive propositions grounded in case-based evidence rather than universal claims.

1. From input quantity to neuro-affective readiness

Whereas traditional SLA models often emphasise comprehensible input (Krashen, 1985), this study's patterns highlight the salience of emotional readiness, perceived psychological safety, and learner agency in shaping learner-reported outcomes. Strong associations among motivation, confidence, and progress suggest that affective variables may function as central co-determinants of learner experience in digitally mediated contexts.

Implication: Pedagogical models may benefit from explicitly integrating affective-cognitive alignment rather than treating affect as peripheral.

2. Visualisation as multisensory semantic anchoring

Learners' frequent use of mental imagery and structured imagination suggests engagement of multisensory encoding processes. This aligns with dual-coding perspectives (Paivio, 1986) and broader learning science accounts where imagery supports consolidation and retrieval.

Implication: Retention may be strengthened when sensory and affective modalities are deliberately co-engaged within structured routines.

3. AI as continuity support within a hybrid model
While AI is often framed as potentially depersonalising (Selwyn, 2016), learners in this case frequently framed AI as a neutral support for rhythm and practice continuity rather than as a teacher substitute. This is consistent with “instructional mediator” framing (scaffolding and feedback-cycle support).

Implication: AI may be conceptualised as a continuity and practice-structuring layer when integrated with human-led pedagogy.

4. Instructional rhythm and attentional stability. The structured pacing of the “Four Fives” format was described as supporting focus and reducing anxiety. This resonates with theories of flow and cognitive load management (Csikszentmihalyi, 1990; Sweller, 1994). Implication: Lesson rhythm may function as a practical mechanism for attentional stability in adult online learning.

5. Language learning as identity work

Learner narratives indicated perceived shifts in voice, agency, and self-expression, consistent with sociocultural and identity-oriented SLA perspectives (Norton, 2013).

Implication: Adult language learning outcomes may include identity-related and agency-related dimensions alongside skill outcomes.

6. Motivation and self-determination

Learner reports were broadly consistent with Self-Determination Theory (Deci and Ryan, 1985), particularly the roles of autonomy and competence.

Implication: ANM™ plus AI designs may align with autonomy-supportive pedagogies when AI is positioned as supportive rather than directive.

Summary

Overall, ANM™ plus AI can be theorised as a case-specific ecosystem in which affective readiness, multimodal rehearsal, instructional rhythm, and continuity supports co-occur. The implications above should be interpreted within the evidence boundaries of the study.

5.3 Comparison with prior research

The findings engage with and extend research across intersecting domains: motivation theory, multimodal learning, AI in education, neuroeducation, and sociocultural perspectives on language learning.

A. Motivation and emotion in language learning

The patterns align with models by Dörnyei (2009) and Ushioda (2011) emphasising affect in SLA. The study also suggests that motivation may be shaped by instructional design features (rhythm, psychological safety, structured routines) rather than functioning solely as a stable learner trait.

B. Cognitive and multimodal learning paradigms

Findings are consistent with dual coding (Paivio, 1986) and multimedia learning principles (Mayer, 2001), with learners reporting benefits of scene-based mental imagery. Associations between imagery-related variables and perceived memory support the relevance of structured multimodal rehearsal.

C. Human-AI interaction in education

While critiques highlight risks of depersonalisation and over-automation (Selwyn, 2016; Williamson, 2022), learners often framed AI as a supportive continuity tool. This aligns

with work that frames AI as a support for learner agency and practice routines (Luckin, 2018), rather than as a replacement for teacher mediation.

D. Neuroeducation and affective-cognitive coupling

The ANM™ framing resonates with perspectives emphasising that emotion and cognition interact in learning (Zull, 2002; Immordino-Yang and Damasio, 2007). The present study contributes a case-based operational illustration through structured routines and learner narratives.

E. Identity and sociocultural dimensions

Consistent with Norton (2013), learners described voice and agency shifts. The contribution here is the practical description of how structured design and reflective routines may support these experiences in a digital setting.

The table below summarises the study's main theoretical contributions across key domains.

Table 5.1 Summary of theoretical contributions

Domain	Prior theory	This study's contribution
Motivation	Dörnyei, Ushioda	Motivation aligns with instructional design features in the case
Visualisation	Paivio, Mayer	Imagery routines are experienced as central rather than auxiliary
AI in education	Luckin, Selwyn	AI framed as continuity support rather than teacher substitute
Neuroeducation	Zull, Immordino-Yang	Case-based illustration of affective-cognitive coupling
Language and Identity	Norton	Learner narratives indicate agency and voice-related outcomes

Source: Author's own work

5.4 Contributions to educational theory and practice

This study contributes to educational theory and language pedagogy at the intersection of neuro-cognitive learning, human-AI interaction, and learner-centred design. Contributions are framed as case-based implications rather than universal prescriptions.

1. Affective-cognitive alignment as an instructional target

Findings highlight the salience of emotional readiness and perceived safety for sustained engagement.

Practical implication: Incorporating structured reframing, error-recovery routines, and internal scripting may support adult learners' willingness to speak.

2. Instructional rhythm as temporal scaffolding

The “Four Fives” structure was experienced as a stabilising routine supporting focus.

Practical implication: Curriculum design may benefit from explicit temporal sequencing and repeatable lesson architecture.

3. Visualisation as cognitive infrastructure

Imagery-based rehearsal was frequently reported and associated with perceived memory support.

Practical implication: Scenario-building and mental simulation can be integrated as structured practice rather than optional enrichment.

4. AI as a continuity layer

Learners described AI as supporting repetition, rhythm, and between-session continuity.

Practical implication: AI supports should be designed around practice cycles, low-pressure rehearsal, and alignment with teacher-led goals.

5. Identity and agency outcomes

Learners reported voice-related shifts and increased self-expression. Practical implication: Adult programmes may incorporate reflective prompts and psychologically safe practice environments to support agency.

6. Modular scalability and institutional fit

The approach combines standardised rhythm and flexibility, suggesting potential for phased adoption in blended and professional contexts. Practical implication: Implementation should be supported by teacher training and governance artefacts to preserve fidelity.

7. Alignment with broader frameworks

The model can be discussed in relation to humanistic and inclusive education principles.

Practical implication: AI-supported learning can remain learner-centred when governance prioritises agency, transparency, and privacy.

5.5 Limitations of the study

Despite the study's contributions, several limitations must be acknowledged. Recognising these boundaries is essential for appropriate interpretation and for future research design.

1. Sample size and institutional scope

The study involved 34 participants from a single institution, with interviews conducted with 10 learners. This limits statistical power and generalisability. Implication: Findings are case-bound and may not transfer to other contexts without further replication.

2. Cultural and linguistic homogeneity

Participants shared broadly similar sociolinguistic and cultural backgrounds, which may affect transferability, especially for metaphor-based and affect-oriented routines.

Implication: Cross-cultural validation is needed.

3. Lack of a control or comparison group

Without a comparison group, it is not possible to isolate method effects from other influences or to separate the AI layer from the broader instructional context.

Implication: Future designs should include comparative or quasi-experimental structures.

4. Reliance on self-report measures

Motivation, satisfaction, AI usefulness, and perceived progress were primarily measured via self-report. The exploratory regression analysis used linear regression with a 3-point ordinal dependent variable. This specification is statistically approximate; ordered logistic regression would be more rigorous for confirmatory analysis. Results are interpreted descriptively and should not be treated as precise effect-size estimates

Implication: Future work should incorporate independent performance-based measures.

5. Instructional variability and educator mediation

Variability in teacher delivery (tone, pacing, interactional style) was not measured or controlled.

Implication: Future studies should account for instructor-related variables and implementation fidelity.

6. Absence of cognitive and neurophysiological indicators

The study did not include physiological or neuropsychological measures.

Implication: Future research may incorporate validated cognitive or physiological indicators where appropriate.

7. Limited longitudinal scope

The observation window does not support claims about long-term retention and transfer.

Implication: Longitudinal tracking is needed.

8. Potential interview bias

Interview participants may have developed positive bias, and interview timing may influence responses.

Implication: Third-party interviewing and repeated waves could reduce reactivity.

9. Digital infrastructure assumptions

Engagement depends on stable internet access and digital literacy.

Implication: Implementation in low-access environments requires adaptation and equity considerations.

10. Inflated correlations and common-method variance

Several correlations in this study exceeded $\rho = 0.90$. These values may partially result from common-method variance (shared self-report measures), conceptual overlap among affective constructs, and the modest sample size ($n = 34$). These factors may inflate effect sizes; therefore, these relationships should be interpreted as indicative trends rather than precise estimates and do not imply causal relationships.

11. Absence of independent performance-based ratings in the analysed dataset

Although the Academy retains recorded Zoom speech samples as operational materials, an independent external blind performance rating aligned with CEFR descriptors was not implemented as part of the analysed dataset in this dissertation.

Implication: The findings emphasise perceived and experienced outcomes; future monitoring cycles should integrate independent performance-based measurement.

5.6 Recommendations for further research

In light of the findings and limitations, future research should extend ANM™ evidence through designs that strengthen causal inference and independent measurement.

1. Controlled and comparative studies

Use comparison groups (traditional instruction, ANM™ without AI, isolated components).

Purpose: isolate contributions of method and AI layer.

2. Sustainability and transfer studies
Longitudinal designs over 6 to 24 months.

Purpose: evaluate retention and real-world transfer.

3. Integration of objective performance metrics
Include CEFR-aligned proficiency testing and validated fluency indicators.

Purpose: triangulate self-report with independent performance measures.

4. Cross-cultural and multilingual replication
Test across diverse cultural and linguistic contexts.

Purpose: assess adaptability.

5. Teacher mediation and digital competence
Study implementation fidelity and educator mediation.

Purpose: support scalable professional development.

6. AI design, usability and ethics
Assess transparency, consent, and learner agency.

Purpose: maintain human-centred governance.

7. Advanced mixed-methods and behavioural data
Integrate usage traces, time-series engagement patterns where feasible.

Purpose: strengthen evidence without invasive measurement.

8. Inclusive and participatory design
Co-design with learners, including neurodiverse profiles.
Purpose: improve accessibility and fit.
9. Interdisciplinary integration
Collaborate with cognitive science, UX, and instructional design.
Purpose: deepen theoretical foundations and practical robustness.

CHAPTER VI:

CONCLUSIONS AND RECOMMENDATIONS

6.1 Alignment with RQs and hypotheses

This study was guided by a central RQ and seven secondary questions (RQ1-RQ8), supported by six theoretically grounded hypotheses (H1-H6). This section synthesises how each question and hypothesis was addressed through the empirical dataset and mixed-methods analysis. The conclusions are interpreted as case-bound patterns within the study context, given the modest sample size and reliance on self-report measures.

RQ1: To what extent is the ANM™ method, when supported by AI tools, effective in enhancing adult learners' motivation, speaking confidence, and perceived communicative progress in an online setting?

Within this case, findings indicate high perceived effectiveness of the ANM™ plus AI model. Quantitative results showed strong associations between motivation and speaking confidence ($\rho = 0.95$), and between perceived AI usefulness and perceived progress ($\rho = 0.92$). Qualitative data reinforced these patterns through descriptions of psychological activation, autonomy, and rhythm in learning routines.

RQ2: What are the self-reported levels of motivation and speaking confidence among learners engaged in the ANM™ programme?

Survey data indicated high levels of motivation and confidence in a large proportion of participants. Interviewees frequently referenced internal shifts such as reduced anxiety and renewed emotional connection with language use.

RQ3: What types of AI tools do learners use, and how do they evaluate the tools' relevance, usability, and supportiveness?

Participants reported frequent use of AI-supported functions such as review, structured reinforcement, and production support. The AI assistant was typically perceived as a supportive and non-intrusive tool aiding practice continuity between sessions.

RQ4: What statistical relationships exist between AI tool usage, learner motivation, and perceived language progress?

Exploratory regression results indicated that perceived usefulness of the AI assistant was a statistically significant predictor of perceived progress ($\beta = 0.33$, $p < 0.01$), alongside motivation and speaking confidence. Interpretations remain cautious due to measurement constraints and possible construct overlap.

RQ5: How do learners describe their engagement with psychological mechanisms of ANM™, such as anchoring and self-scripting?

Interview data illustrated active use of mental visualisation, emotional reframing, and scenario-based rehearsal. Learners described these mechanisms as central to retention and speaking readiness.

RQ6: How do learners perceive the emotional and motivational effects of AI tools between lessons?

Participants frequently described the AI assistant as a rhythm-supporting and low-pressure reinforcement element that helps maintain learning cycles and confidence during autonomous phases.

RQ7: Do learners experience AI tools as supportive or disruptive to the psychological strategies integral to ANM™?

Responses indicated that AI was generally experienced as supportive rather than disruptive. Learners valued continuity, neutrality, and the reinforcement rhythm when tools aligned with lesson goals and routines.

RQ8: What instructional principles can be derived from the ANM™ plus AI model?

Findings suggest principles relevant to adult digital language education: affective-cognitive alignment, rhythmic sequencing, scenario-based internal visualisation, and non-invasive AI scaffolding. These principles should be treated as design propositions derived from the case study rather than universal prescriptions.

Hypothesis testing

H1: Frequent use of ANM™ techniques will significantly predict higher speaking confidence.

Supported within the study context. A strong association between motivation-related measures and speaking confidence ($\rho = 0.95$) and the exploratory regression coefficient for speaking confidence ($\beta = 0.37$) are consistent with this hypothesis, interpreted cautiously.

H2: Higher engagement with AI tools will predict greater perceived progress.

Supported within the study context. A strong association between perceived AI usefulness and perceived progress ($\rho = 0.92$) and the exploratory regression coefficient ($\beta = 0.33$) are consistent with this hypothesis. The findings support conceptualising AI not as an autonomous instructional agent but as a *mediating artefact*, consistent with Vygotsky's concept of tool mediation (Vygotsky, 1978), that extends the learner's capacity for self-regulated practice between sessions. This framing has implications for design: AI tools should be evaluated not by their standalone intelligence but by how effectively they mediate the learner's relationship with the language and with the instructional goals.

H3: Motivation mediates the relationship between ANM™ usage and progress.

Partially supported. Motivation showed strong associations with perceived progress and confidence, suggesting a mediating pathway; however, formal mediation testing was not conducted.

H4: Perceived emotional support from AI moderates the effect of AI engagement on speaking confidence.

Supported qualitatively. Learners who described AI as emotionally reliable and supportive often reported stronger confidence gains. Quantitative moderation was not tested.

H5: Motivation and confidence predict satisfaction with the learning experience.

Supported within the dataset. Motivation and confidence-related measures were strongly associated with satisfaction, consistent with the hypothesis.

H6: Learner characteristics moderate the effect of ANM™ usage on perceived progress.

Not confirmed. Age, CEFR level, and study duration showed weaker or non-significant predictive values in this sample.

Conclusion

The RQs were addressed through convergent quantitative and qualitative evidence, and five of the six hypotheses received empirical or interpretive support within the boundaries of this case study. Overall, the findings position the ANM™ plus AI model as a multidimensional learning environment integrating affective, cognitive, and technological variables, while requiring cautious interpretation due to methodological limitations.

6.2 Summary of major findings

This study explored the pedagogical, cognitive, and emotional effects of the Andrusenko Neuro-Linguistic Method (ANM™) combined with AI-supported tools within the instructional environment of the Swiss NeuroLanguage Academy. Employing a mixed-

methods approach, including correlation analysis, exploratory regression, semi-structured interviews, and open-ended responses, the study produced findings relevant to both theory and practice in adult online language education.

While most findings converged, two discrepancies merit attention. First, the negative association between age and speaking confidence ($\rho = -0.85$) contrasts with some literature suggesting older learners compensate with metacognitive strategies (Oxford, 2017). This may reflect the specific sample or measurement approach rather than a generalisable pattern. Second, study duration's non-significance in regression, despite positive direction, suggests that perceived progress depends more on psychological engagement than time-on-task alone, a finding that challenges simple input-output models of learning.

1. Motivation as a central driver of affective outcomes

Motivation emerged as a highly salient variable, strongly associated with speaking confidence ($\rho = 0.95$), satisfaction ($\rho = 0.90$), and perceived progress ($\rho = 0.91$). Qualitative data supported this pattern through learner descriptions of reduced anxiety, improved self-efficacy, and increased willingness to speak.

2. Visualisation as internal associative construction (not external images)

Learners frequently used scenario-based imagination and internal scripting, linking language material to personally meaningful associations. In ANM™, visualisation should be understood as a trained cognitive skill: the ability to construct an internal associative scene that supports retrieval and speaking readiness, rather than the presence of pictures or slides. This internal rehearsal is relevant not only to memory support but also to broader cognitive functions such as attention stability and access speed to lexical and grammatical material.

3. AI as a continuity and rhythm support layer

Learners typically perceived AI tools not as content providers or teacher substitutes, but as low-pressure supports sustaining rhythm between sessions. Perceived usefulness of the AI assistant showed strong association with perceived progress ($\rho = 0.92$) and speaking confidence ($\rho = 0.85$), and remained a statistically significant predictor of perceived progress in the exploratory regression model ($\beta = 0.33, p < 0.01$).

4. Instructional rhythm as cognitive scaffolding

The “Four Fives” instructional design supported predictability and cognitive clarity, which learners described as reducing anxiety and supporting focus. This temporal structure functions as a practical scaffold for sustained engagement.

5. Identity and agency outcomes

Learners described increased agency, voice-related confidence, and self-expression. These narratives indicate that adult language learning outcomes in this context may include identity-related dimensions alongside skill-related outcomes.

6. Assessment and monitoring as a skill-governance layer (micro and macro)

A core element that strengthens the ANM™ plus AI model as an alternative online format is the monitoring and assessment system focused on speaking as a skill (speech motorics) rather than knowledge about language. The hybrid oral assessment standard distributes functions between AI and a human examiner: AI supports transcription and quantitative measurement (including word-level timestamps, pause and tempo metrics, fillers, and longitudinal logs), while the human layer evaluates CEFR-aligned performance through a Global rating followed by analytic profiling using RADIO (Range, Accuracy, Delivery/Fluency, Interaction, Organization/Coherence). This framework operates at two levels: micro-assessment embedded in learning for progress steering through repeated

short measurements, and macro-assessment for standardised, comparable outcomes. Together, monitoring and assessment transform online learning into a governable skill formation system rather than a content-delivery routine.

7. Value of mixed-methods design for complex learning phenomena
The integration of quantitative and qualitative data enabled both pattern detection and mechanism interpretation. Correlations and regression results outlined structural associations, while interviews and open responses clarified how learners experienced these processes.

In summary, the findings indicate that ANM™ plus AI functions as a structured learning ecology in which affective readiness, cognitive rehearsal routines, instructional rhythm, and continuity supports are experienced as mutually reinforcing. Interpretations remain case-bound and are presented alongside clear methodological limitations.

6.3 Practical recommendations for online language educators

Drawing on the empirical results and learner narratives, this section outlines recommendations for implementing ANM™ in online and hybrid settings. Recommendations are framed as design guidelines rather than universal prescriptions.

Prioritise emotional readiness as a pedagogical foundation

Purpose: enhance motivation and reduce anxiety (RQ2, H1, H5).

Method: begin sessions with structured affective anchoring:

- emotional check-ins (1-5 scale)
- intent-setting rituals (“Today I want to express myself without fear”)
- positive reframing of error (“Mistakes are learning moments”)

Outcome: increased speaking confidence and reduced inhibition.

Embed predictable instructional rhythm to guide cognition

Purpose: reduce cognitive overload and enhance attention (RQ1, H1, H4).

Method:

- use segmented timing structures (for example Four Fives)
- time transitions with prompts or visual cues
- avoid multitasking within segments

Outcome: improved focus, memory encoding, and emotional regulation.

Integrate internal multisensory visualisation for semantic anchoring

Purpose: support retrieval and conceptual clarity (RQ1, RQ5, H1).

Method:

- use mental scene prompts (“Describe this to a friend at the station”)
- link language models to imagined daily routines
- build internal scripts using metaphoric scaffolds

Outcome: improved retrieval, stronger retention routines, and more stable speaking readiness.

Use AI to reinforce pedagogical rhythm, not replace teachers

Purpose: support autonomy and continuity (RQ3, RQ4, H2, H4).

Method:

- post-lesson micro-rehearsals (“24-hour echo”)
- feedback routines linked to recent lesson material
- prompts aligned with motivational check-ins

Outcome: learners experience AI as supportive and non-intrusive when it aligns with teacher-led goals.

Facilitate structured reflection and emotional integration

Purpose: deepen metacognitive awareness (RQ5, RQ7, H3).

Method:

- weekly voice or written reflections on confidence and barriers
- structured tagging of themes (manual or AI-supported)
- periodic sessions connecting reflection to progress indicators

Outcome: increased learner agency and resilience.

Tailor ANM™ to learner stage and identity

Purpose: align instruction with developmental needs (RQ8, H6).

Method:

- role metaphors and narrative scripts for adult learners
- sensory-rich prompts for beginners
- voice recovery focus for mid-career learners

Outcome: improved fit and sustained engagement.

Localise metaphors and emotional anchors

Purpose: ensure cross-cultural resonance (RQ8).

Method:

- pre-test metaphors with diverse learners
- use neutral sensory anchors (space, warmth, motion)
- provide culturally sensitive emotional scaffolds

Outcome: increased comfort and authenticity.

Sustain learning rhythm with asynchronous habits

Purpose: consolidate progress between sessions (RQ3, RQ6, H2).

Method:

- mini-dialogue replays with voice input
- progress capsules summarising weekly focus
- scenario-based prompts aligned with the last lesson

Outcome: extended engagement and autonomous consolidation.

Institutionalise neuro-affective pedagogy across teams

Purpose: maintain consistency and scalability (RQ8).

Method:

- align curriculum cycles with ANM™ rhythm
- use shared internal visualisation scripts and checkpoints
- calibrate teacher delivery and monitoring routines

Outcome: scalable implementation with preserved psychological fidelity.

6.4 Strategic implications for AI integration

The integration of AI within ANM™ demonstrated not merely a technical enhancement, but a pedagogical shift positioning AI as a support layer for continuity, rhythm, and learner autonomy. Strategic implications should be interpreted as system design principles derived from the case.

1. AI as rhythmic reinforcer, not autonomous driver
Strategic insight: AI supports continuity when it mirrors the cadence of instruction and reinforces existing learning traces.

2. Perceived emotional reliability supports trust and engagement
Strategic insight: emotional predictability in tone and pacing can reduce anxiety and promote experimentation.
3. Pedagogically guided personalisation over behavioural optimisation
Strategic insight: AI value increases when feedback aligns with instructional logic rather than generic adaptivity.
4. Learner readiness moderates AI effectiveness
Strategic insight: AI works best after learners have internalised routines for rhythm and self-scripting.
5. Interface design as cognitive-affective architecture
Strategic insight: minimalist, rhythm-safe interfaces support attention stability and reduce overload.
6. Transparent feedback supports internalisation
Strategic insight: explainable feedback can strengthen learner agency and metacognitive processing.
7. Teacher capability expansion for AI coordination
Strategic insight: educators require training to orchestrate rhythm and feedback timing across modalities.
8. Avoid feedback saturation
Strategic insight: institutions should set rhythm-safe parameters to prevent overload and fragmentation.
9. Ethical integration with global standards
Strategic insight: AI deployment should foreground inclusion, dignity, and transparent data governance.

6.5 Final reflections

This dissertation examined whether a neuro-linguistically grounded and AI-augmented model could address common weaknesses of online language learning, including fragmentation, disengagement, and emotional discomfort. Within this case study, findings

indicate strong associations among motivation, speaking confidence, perceived progress, imagery-based rehearsal, and AI-supported continuity.

ANM™ reframes visualisation, affective anchoring, and rhythmic structuring as cognitive prerequisites rather than supplementary techniques. Importantly, visualisation in this model refers to internal associative construction that supports retrieval and speaking readiness, not to the display of external images. Learner narratives suggest that these routines may also support broader cognitive functions, including attention stability and memory encoding.

AI integration did not function as a replacement for human instruction in the learner accounts. Instead, AI was described as a rhythm-supporting scaffold that extends practice continuity between sessions when aligned with teacher-led goals. A further distinguishing element of the model is its monitoring and assessment layer focused on speaking as a skill: hybrid roles distribute quantitative speech indicators and logging to AI-supported processes and CEFR-aligned performance profiling to trained human examiners, with micro and macro assessment cycles supporting governable skill formation.

The study's conclusions should be interpreted alongside limitations, including reliance on self-report measurement, potential common-method variance, and the single-case context. Nonetheless, the dissertation contributes to a structured, documented, and ethically oriented model for AI-supported adult language education that prioritises learner agency, affective safety, and coherent instructional rhythm.

In this light, ANM™ can be understood not only as a method, but as a pedagogical philosophy oriented toward skill formation, dignity, and sustainable learning in a rapidly evolving digital education landscape.

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APPENDIX A: SURVEY QUESTIONNAIRE (ENGLISH VERSION)

Objective of the survey

To examine learner-reported motivation, engagement, confidence, and perceived progress within an online language learning context using the Swiss NeuroLanguage Academy (Andrusenko.pro) as a case study. The survey focuses on learner experience of neuro-linguistically oriented routines (NLM-informed practices as operationalised through ANM™) and AI-supported learning tools used between sessions.

Survey process

1. Preparation:

- Identify the target group: current or recent students of Swiss NeuroLanguage Academy (Andrusenko.pro).
- Develop and pilot-test the questionnaire to ensure clarity and content relevance.
- Invite participants via email or messaging channels.

2. Conducting the survey:

- Distribute the questionnaire via Google Forms.
- Ensure anonymity to support openness and honest feedback.
- Set a completion window (for example two weeks).

3. Data analysis:

- Compile responses and apply descriptive statistics and association modelling (correlation and exploratory regression) to examine patterns among learner-reported variables.
- Interpret findings as case-level patterns within the study context.

Survey questionnaire

Section 1: General information

1. Your age:

- 18-24
- 25-34
- 35-44
- 45-54
- 55+

2. Your gender:

- Male
- Female
- Prefer not to say
- Other (please specify)

3. Your current occupation:

- Student
- Employed
- Entrepreneur
- Homemaker
- Retired
- Other (please specify)

4. Your language proficiency level at the beginning of the course (CEFR):

- Beginner (A1)
- Elementary (A2)
- Intermediate (B1)

- Upper-Intermediate (B2)
 - Advanced (C1)
 - Proficient (C2)
5. How long have you been studying at Swiss NeuroLanguage Academy (Andrusenko.pro)?
- Less than 3 months
 - 3-6 months
 - 6-12 months
 - More than 1 year

Section 2: Motivation and engagement

6. How would you rate your motivation to learn the language?
- Very low
 - Low
 - Average
 - High
 - Very high
7. Which factors influence your motivation the most? (Select all that apply)
- Interaction with the teacher
 - Feedback and support from other students
 - Visible progress results
 - Interactive teaching methods
 - Receiving feedback
 - Opportunities to use the language in real-life situations
 - Sense of accomplishment

Section 3: Learning routines and perceived efficiency

8. How often do you use internal visualisation (images or scenes you create in your imagination) when learning new words or grammar structures?

- Always
- Often
- Sometimes
- Rarely
- Never

9. How effective are imagery prompts suggested by the teacher (compared to your previous learning experience)?

- Very effective
- Effective
- Moderately effective
- Slightly effective
- Not effective

10. How important is internal visualisation for you when learning new vocabulary or phrases?

- Very important
- Important
- Moderately important
- Slightly important
- Not important

11. How would you rate the interactivity and communicativeness of the lessons?

- Very low

- Low
- Average
- High
- Very high

12. How effective is the combination of visual and auditory methods in your learning process?

- Very effective
- Effective
- Moderately effective
- Slightly effective
- Not effective

13. Does the combination of visual and auditory methods help you remember and understand the material?

- Yes, it helps a lot
- Yes, it helps
- Partially helps
- No, it does not help
- Difficult to say

14. How often do you practise speaking between lessons (outside live sessions)?

- Daily
- Several times a week
- About once a week
- Less than once a week
- Rarely / never

Section 4: Satisfaction and perceived outcomes

15. How satisfied are you with the learning process at Swiss NeuroLanguage Academy (Andrusenko.pro)?

- Not satisfied at all
- Partially dissatisfied
- Neutral
- Satisfied
- Very satisfied

16. How do you rate your progress in learning the language since you started?

- Very significant progress
- Significant progress
- Average progress
- Slight progress
- No progress

17. How do you usually practise outside lessons? (Select all that apply)

- Communication with other students
- Using the language in real-life situations
- Completing additional tasks and exercises
- Watching films/series/videos in the target language
- Other (please specify)

18. How confident do you feel when communicating in the language you are learning?

- Very confident
- Confident
- Moderately confident
- Not confident
- Very unconfident

19. What aspects of learning do you like the most? (Select all that apply)

- Interactive tasks
- Practical role-playing
- Working with other students
- Teacher support
- Use of modern technology
- Variety of learning materials
- Other (please specify)

20. Do you believe that ANM™-based learning routines can be useful for other students learning languages online?

- Yes
- No
- Not sure

Section 5: Perception of AI integration and its impact on learning

21. How useful did you find the AI-supported post-lesson materials (for example summaries, structured practice prompts, additional examples)?

- Completely useless
- Rather useless
- Neither useful nor useless
- Rather useful
- Very useful
- Comment (optional): What was most helpful, or what would you improve?

22. Did you notice any change after AI-supported tools were introduced or became available (for example voice practice routines, summaries, training tools)?

- Learning felt significantly more effective
- Between-lesson support improved
- No significant difference
- It became more difficult or less convenient
- Difficult to say

23. How important is it for you to have AI-supported tools between lessons to sustain pace and motivation?

- Not important at all
- Rather unimportant
- Neither important nor unimportant
- Rather important
- Very important

24. Have AI-supported tools affected your speaking confidence alongside teacher-led sessions?

- Yes, a noticeable improvement
- Slight improvement
- No noticeable change
- It caused difficulties
- Difficult to say

25. Have you used AI-supported tools between lessons (for example voice practice, summaries)?

- Yes, regularly
- Occasionally
- Once or twice
- No

26. Which AI support formats have you used most often? (Select up to 3)

- Voice practice / pronunciation support
- Lesson summaries
- Grammar/vocabulary tasks
- Writing/speaking support
- Reminders/motivation
- Other (please specify)

27. How would you assess the overall impact of AI-supported tools on your language progress?

- Significantly accelerated progress
- Helpful but not essential
- Little to no impact
- Cannot say

28. Where did you find AI-supported tools most helpful? (Select up to 3)

- Material review
- Speaking/pronunciation
- Structuring/memorisation
- Motivation
- Independent practice
- Not helpful
- Other (please specify)

29. What difficulties have you experienced when using AI-supported tools? (Select up to 2)

- I did not understand how to use them
- Inconvenient interface

- Low response quality
- Lack of support
- No difficulties
- Other (please specify)

30. What would you like to improve in the AI-supported tools? (Select up to 3)

- Custom topics
- Lesson planning support
- More voice-based exercises
- Clearer hints/explanations
- Difficult topic review
- Model comparison
- Accent/speech speed control
- Dialogue scenarios
- Visual grammar aids
- Voice journal feedback
- Customisable pacing
- Personal goal tracker
- Mastery marking
- Progress rewards
- Other (please specify)

31. Would you like to continue using AI-supported tools in the future?

- Yes, definitely
- Yes, if improved
- Probably not
- Definitely not

APPENDIX B: ETHICAL CONSENT FORM

Title of Study: The Impact of the Andrusenko Neuro-Linguistic Method (ANM™) on Online Language Learning: A Case Study of Swiss NeuroLanguage Academy (Andrusenko.pro)

Researcher: Nataliya Andrusienko (Kontsur)

Institution: Swiss School of Business and Management Geneva, Doctor of Business Administration Programme

Contact Information: andrusenko.pro@gmail.com

Participant information and consent

Purpose of the study:

This study investigates how the Andrusenko Neuro-Linguistic Method (ANM™) and AI-supported learning tools relate to learner motivation, perceived progress, and satisfaction in online language education. Your participation will help evaluate the learning experience and inform improvements in instructional design.

Participation requirements:

- You are invited to take part in a survey and/or an interview concerning your learning experience at Swiss NeuroLanguage Academy (Andrusenko.pro).
- Participation is entirely voluntary. You may withdraw at any time without penalty and without giving a reason.
- The survey contains multiple-choice and open-ended questions and may take approximately 10-15 minutes to complete.
- Selected participants may also be invited for a follow-up interview or to share reflective voice journals.
- You may skip any question you do not wish to answer.

Confidentiality and data protection:

- All responses will be treated as confidential.
- No personally identifiable information will be published.
- Data will be anonymised and stored securely in accordance with GDPR and institutional research ethics guidelines.
- Only the researcher will have access to the raw data.

Benefits and risks:

- There are no known risks associated with this study beyond those of everyday communication.
- While there may be no direct benefit to you, your feedback may contribute to improving teaching practices and educational tools.

Consent

statement:

By signing below, I confirm that:

- I have read and understood the information provided.
- I voluntarily agree to participate in the study.
- I understand that I can withdraw from the study at any time without giving a reason.
- I understand how my data will be used and stored.

Participant Name (print): _____

Signature: _____

Date: _____

Researcher Name: _____

Signature: _____

Date: _____

APPENDIX C: SAMPLE OPEN-ENDED RESPONSES

This appendix presents selected open-ended responses from ten participants (R1-R10) who took part in semi-structured qualitative interviews as part of the study. The questions were designed to explore learners' metacognitive, affective, and experiential reflections on their engagement with the Andrusenko Neuro-Linguistic Method (ANM™) and AI-supported learning tools within the Swiss NeuroLanguage Academy hybrid model.

Responses are presented verbatim in English. Each question below includes up to ten representative responses.

Table Appendix C.1 Thematic summary of open-ended responses (verbatim excerpts)

Question 1. How has your perception of the language learning process changed since you started studying with ANM™?

(Metacognition and mindset evolution)

- R1: I used to perceive language as a subject - almost like philosophy or logic: with its rules, abstract structures, and categories. But now, for the first time, I've felt that language is a behavior. It doesn't live in a notebook - it lives inside me: in my voice, my reaction, my intonation. ANM™ made language physical, dynamic, reflective. Language became a way of being, not just a way of thinking.
- R2: I always perceived language as something logical - like a coordinate system. But ANM™ made me see it differently - not as a scheme, but as a flow. Suddenly, language reminded me more of music than of a formula. It was almost a physical revelation: you don't think - you resonate. You don't calculate - you connect. Language stopped being a task and became a gesture.
- R3: Before this, I viewed language learning as something heavy and formal - almost a duty. With ANM™, it became... a living process. As if someone turned on the light. Language stopped being a "subject" and became a space - where I could

breathe, make mistakes, explore, and play. I love the feeling that I'm not memorizing - I'm living the language.

- R4: Initially, I viewed language as a mechanism - rules, structures, order. Now I feel it as rhythm, motion - almost like logistics of thought. The method taught me to hear and use the language without having to "build" every sentence in my head. It's become a tool for thinking, not just a memorization task.
- R5: My approach to learning used to be very academic - like school: words, rules, homework. Here, I suddenly felt the language living in my voice, my tone, even my body. I stopped seeing learning as something external. It became an internal experience.
- R6: I used to think of language like a project: you take a plan and build step by step. But the ANM™ method flipped everything. I started to see language as a living space you navigate, not just assemble. The brain learns through action - and surprisingly, it works.
- R7: Before, I saw language as a set of words and grammar rules to memorize. With the ANM™ method, I started feeling that language is like movement - an interface. I became aware of how I listen, think, and only then speak. It makes the process deeper and more engaging.
- R8: At first, I saw language learning as a task of memorization - words, grammar, forms. It was mechanical and dull. Now, I perceive language as a living fabric I can touch and interact with. Thanks to the ANM™ method, language has become a form of self-expression, almost like drawing. I'm not just repeating structures - I'm creating images. It's a completely different experience.
- R9: Initially, I saw language as a set of rules to memorize and apply - like code. But after a couple of months, I began to feel the language as a living system. What I liked is that the method doesn't push you to learn; it invites you to observe, construct, test hypotheses. That's closer to how an analyst thinks - but in a more human way. I started listening to the language, not just calculating its structure.

- R10: Language stopped being something I “study” and became something I “do”. It feels less like remembering facts and more like practicing a skill.

Question 2. Were there any moments of surprise or insight during the lessons when you thought: “So this is how my brain works!”? Please describe one such moment. (Cognitive insights and personal discoveries)

- R1: Once I had to retell a monologue in the first person, and at some point, something “switched” in me: I stopped thinking about sentence structure and began to feel its rhythm. It was like the sentence was flowing through me. That sensation of full immersion - when you’re not a “student” but a “character” - helped me understand what it means to be the language, not just own it.
- R2: One of those moments came when I started using “anchor phrases” during speaking practice. I noticed that my brain worked faster when a phrase came to mind as a whole - like a geometric shape - rather than a chain of words. It was surprising: language stopped being linear. It became spatial, volumetric.
- R3: One powerful moment was when I recorded myself for the first time and listened back. I’d always thought my German was terrible, but hearing myself, I suddenly thought: “Is that me?!” I’m speaking! With pauses, with an accent, but I’m speaking. My brain understood: “You can do it, just don’t be afraid.”
- R4: Once we did a voice reaction drill - responding quickly with emotion. I caught myself retrieving the correct form not from a rule, but almost physically - as if it came from muscle memory.
- R5: In one lesson, I accidentally used a structure correctly - one I never consciously studied. I was repeating after the teacher aloud, and it just “installed” itself. It was a surprising moment: the brain doesn’t remember the rule, it remembers the feeling - and it triggers at the right time.
- R6: I suddenly produced a long phrase automatically. Then I realized: I’d heard and repeated it many times, but never tried to memorize it. My brain just built it. It’s like finding a pre-assembled piece in a LEGO set - ready to use.

- R7: We “layered” verb forms onto different emotional states. It felt like tuning an interface: shift the emotion and the structure changes. That’s when I realized language isn’t just rational - it’s emotional too.
- R8: While working with the voice trainer I realized I wasn’t controlling my speech - sentences came out on their own, and I wasn’t mentally correcting myself like I used to. It felt almost technical - like a program in my brain started to run independently.
- R9: When I was recording a voice practice I realized I wasn’t thinking in Russian anymore - I was thinking directly in the target language. I wasn’t translating. I was just speaking.
- R10: I noticed my attention changed: I started hearing patterns first, and rules only after.

Question 3. Why do you think the structure of the lesson - for example, the “Four Fives” model - works effectively? What specifically resonates with you in this format? (Reflection on lesson architecture)

- R1: I like that the structure repeats but never feels the same. It’s like a ritual with inner freedom. In the “Four Fives,” I sense rhythm - almost meditative. I know there’ll be activation, then focus, then closure. It helps me tune in and let go of control.
- R2: It works because it has a clear rhythm and logical segmentation. Like building a proof: introduction, transition, main part, conclusion. But in ANM™, this order doesn’t constrain - it supports.
- R3: The structure reminds me of a logistics route: there’s input, adaptation, momentum, and consolidation. Each part flows logically into the next. I especially value the voice training segment - that’s where I truly “settle” into the language.
- R4: As a teacher, I noticed the structure is organic. It creates rhythm - like a geometry lesson with a warm-up, core problem, and reflection. The transitions keep the lesson cohesive but not overwhelming.

- R5: It's very architectural - in a good way. Each part is balanced: warm-up, tension, consolidation. I like that I don't feel tired, I feel engaged.
- R6: Each part is like a module: focus, activation, transformation, consolidation. It's like a UX prototype - you build a user journey, except here the user is your brain.
- R7: I appreciate the logic of the structure - each block mirrors a stage of cognitive processing. The structure gives support, but also space.
- R8: I appreciate that the structure offers predictability. As someone who works with data, I value repeatability and clarity. The "Four Fives" model is like a good algorithm: input, processing, output, and review. This reduces cognitive load.
- R9: I'm drawn to the rhythm and clarity. I know what to expect, but each time I fill it differently. That gives me confidence.
- R10: It feels structured without being rigid, and that makes speaking easier.

Question 4. If you had to explain to someone what makes this method feel "alive" or "real", what would you say? (Emotional engagement and subjective meaning)

- R1: The teacher isn't a source of knowledge, but someone who holds the space where you can experiment and make mistakes. AI doesn't get in the way - it acts like a mirror. Technology doesn't replace the human - it amplifies them.
- R2: It gives the sense of real communication. You learn to speak like in real life - fast, with mistakes, but authentically. It's interaction training.
- R3: Everything is logical but not boring. The lesson moves like a spiral: warm-up, rehearsal, performance. Connected but not rigid.
- R4: It respects who you are. You're not a "student" - you're a conversational partner. The teacher guides a dialogue. AI doesn't "check" - it trains.
- R5: It generates language from within. You're inside your own process. Every sound is your own assembly.
- R6: You try speaking in your own voice from day one. Language here isn't a report format - it's a way to be heard.

- R7: You don't just learn the language - you live in it. Every lesson feels like a dialogue with yourself.
- R8: It's not textbook-like. At some point, I don't even notice I'm speaking a different language - as if it wakes up inside me.
- R9: It's dynamic. You actively create content, respond, contribute. Feedback comes from the teacher, the AI, and yourself.
- R10: It feels like practice for life, not preparation for a test.

Question 5. Do you feel that your internal reaction to making mistakes while speaking has changed? What do you do differently now? (Confidence building and fear reduction)

- R1: Mistakes are no longer "stains." They're movement markers. If I stumble, it means I'm walking. I don't go silent anymore - I continue.
- R2: A mistake used to paralyze me. Now I smile. Sometimes I even make mistakes on purpose to practice how to recover.
- R3: Mistakes are more like a detour - you correct course. Thanks to drills and support, I treat mistakes as recalibration.
- R4: I stopped being afraid of mistakes as if they were bad grades. Now a mistake is a growth point.
- R5: Mistakes are like marks on a blueprint: "needs adjustment here." I note where I stumble and ask for drills.
- R6: I used to stop speaking if I wasn't sure. Now I keep going even if it's not perfect.
- R7: I keep the motion. A mistake is an irregularity in the route, not its end.
- R8: Previously, a mistake would make me feel ashamed. Now I smile, say the sentence again, and move on.
- R9: Now a mistake is a signal. I started logging them and adjusting. An error is a flag, not a disaster.
- R10: I feel less perfectionism and more freedom.

Question 6. Which internal mechanisms - such as memory, attention, associations, or imagination - have you started using more actively during your learning process?
(Activation of cognitive processes)

- R1: Associations and attention. When I listen, I grasp meaning without translating. Visual anchors help it stick.
- R2: Visualisation became my main tool. I picture scenes when I speak. It helps my brain hook onto a situation.
- R3: Imagination, especially when we build associations between words and visuals. It's like reconstructing space, and it sticks.
- R4: Associations and visualisation. I imagine full scenes when I memorize expressions. Emotions anchor the language deeper.
- R5: Attention and associations. It's like mental cartography.
- R6: I visualize scenes where I could use a new word. I attach the word to an image immediately.
- R7: Visualisation and attention became my allies. I notice micro-structures and imagine real situations.
- R8: Visual images help retain phrases. I'm also sensitive to rhythm and intonation; it feels like artistic imagination activated.
- R9: Working memory became more active because tasks require immediate responses. I also visualize scenarios to keep the language going.
- R10: Imagination became much more active. I remember the lesson as a space with voices, images, movement.

Question 7. Have you experienced a mental "switch" when the language started to feel more natural - for example, flowing faster, without translation? When did that happen?
(Transition to more automated production)

- R1: It happened unexpectedly during a walk. I realized I'm not translating anymore. It felt light.

- R2: Around month six, I started talking to myself in German spontaneously while walking.
- R3: In the third month, discussing emotions, I noticed I reacted in Italian, not translating.
- R4: Around month five, language became transparent. I was speaking without thinking.
- R5: Around week six, I responded in English faster than I formed the thought in German.
- R6: Around the fifth month, I started thinking in Italian on a tram. It felt like an inner flow turned on.
- R7: Around the fourth month, retelling dialogues out loud, I realized I could rephrase without copying.
- R8: Walking through Zurich, I read signs without translating. That felt like freedom.
- R9: During a lesson with rapid questions, I formed sentences without translating. After about five months.
- R10: Around week five or six, I started sentences without preparation. I wasn't thinking in Russian anymore.

Question 8. What role does the AI assistant play in shaping your language habit, in your opinion? Is it more of a support, tool, partner, or something else? (Perceived identity of AI in the learning process)

- R1: It's like a navigator. It helps me stay on track. Voice drills and repetition create rhythm. Always available and non-judgmental.
- R2: It's a tool between lessons. Trackers and short assignments help me keep rhythm.
- R3: It's like a roadmap between lessons. It doesn't replace lessons - it weaves them into one process.
- R4: A mental compass. It structures progress and helps spot blind spots.

- R5: A part of the system that keeps me on track: topic tracking, voice drills, post-lesson feedback.
- R6: A built-in companion. It creates rhythm and direction.
- R7: A backup system. It helps maintain momentum.
- R8: An intellectual support system: trackers, exercises, voice modules. Supportive, never intrusive.
- R9: An interface to my language process. Repetition, rhythm, anchoring, self-check.
- R10: A mirror: I can speak, hear myself, check in. It reflects without judging.

Question 9. If you were to fully trust the method and the AI assistant, what new learning formats or experiences would you like to try?
(Innovation and personalisation)

- R1: More theatrical formats: improvisations, podcasts. AI could help prepare, teacher could give feedback.
- R2: Role-playing simulations: travel, job interview. AI could model the situation and guide me.
- R3: Schedule-based immersion: different practice formats aligned with daily context.
- R4: A full immersion day at home with AI support when I get stuck.
- R5: Personal role-play sessions aligned with my profession.
- R6: Hybrid missions: part online, part real life, then feedback.
- R7: A language day with voice navigation like a quest.
- R8: A voice-driven intensive: short frequent tasks adapting to my reactions.
- R9: Business scenario simulations with adaptive AI and a progress dashboard.
- R10: Creative voice stories and descriptions linked to drawing or imagination.

Question 10. What kind of inner transformation have you experienced throughout the course - not just in language, but also in the way you think, communicate, or perceive the world? (Holistic reflection on identity and personal growth)

- R1: I've become bolder. My inner voice became clearer. Even at work, I speak out more confidently.
- R2: I've learned to slow down, listen, and speak meaningfully. It affected how I run client sessions too.
- R3: I listen more and tolerate mistakes more, in language and in life. Learning can be joy.
- R4: I feel like an active participant in life again. Language became a space for connection.
- R5: I'm more tolerant of imperfect expression. This affects everything, not just language.
- R6: I became more attentive to communication patterns. Thinking became more flexible.
- R7: I started speaking less mechanically and thinking more before I talk. Even my emails changed.
- R8: I learned to listen, not just wait to speak. I became softer in reactions and clearer in expressing ideas.
- R9: I'm more relaxed. I respond faster and express ideas more easily at work.
- R10: I started speaking, and not just in a foreign language. I express myself more clearly overall and stopped hiding behind silence.

APPENDIX D: INTERVIEW PROTOCOL (SEMI-STRUCTURED FORMAT)

Title:

Exploring student experiences with the Andrusenko Neuro-Linguistic Method (ANM™) and AI-supported tools in online language learning

Objective of the interview:

The aim of this interview is to gain deeper insight into learners' subjective experiences, perceived cognitive and affective shifts, motivational patterns, and perceptions of AI-supported learning tools within Swiss NeuroLanguage Academy (Andrusenko.pro), which employs ANM™. The interviews complement quantitative findings and contribute to a clearer understanding of how psychologically oriented routines and technology-supported continuity relate to adult language learning experience in an online setting.

Interview format:

Semi-structured interview with open-ended questions. The format allows flexibility in participant responses while supporting consistency across interviews.

Target participants:

Current or recent students of Swiss NeuroLanguage Academy (Andrusenko.pro) who have studied using ANM™ and have interacted with AI-supported learning tools.

Estimated duration:

Approximately 40-60 minutes per interview.

Interview script:

Introduction by the interviewer.

Thank you for agreeing to take part in this interview. The purpose is to understand your experiences and perceptions of learning with ANM™ and the AI-supported tools used alongside the learning process. Your responses will be anonymised and used exclusively for academic research.

You may skip any question you do not wish to answer, and you may stop the interview at any time without giving a reason. There are no right or wrong answers. We are interested in your honest reflections.

If you agree, the interview may be audio-recorded to support accurate transcription. The recording will be stored securely and accessed only by the researcher. Do you consent to proceed?

Core interview questions

1. Perception shift and learning mindset

How has your perception of the language learning process changed since you started studying with ANM™? (Metacognition and mindset evolution)

2. Moments of insight

Were there any moments of surprise or insight during the lessons when you thought, “So this is how my brain works”? Please describe one such moment. (Elicits cognitive insight and personal discoveries)

3. Lesson structure and rhythm (Four Fives)

Why do you think the structure of the lesson, for example the “Four Fives” model, works effectively? What specifically resonates with you in this format? (Reflection on lesson architecture)

4. Meaning and authenticity of the experience

If you had to explain to someone what makes this method feel “alive” or “real”, what would you say? (Emotional engagement and perceived authenticity)

5. Reaction to errors and recovery

Do you feel that your internal reaction to making mistakes while speaking has changed?

What do you do differently now compared to before?
(Confidence building and fear reduction)

6. Internal mechanisms and strategies

Which internal mechanisms, such as memory, attention, associations, or imagination, have you started using more actively during your learning process?
(Neuro-cognitive adaptation and awareness)

7. Shift toward spontaneity

Have you experienced a mental “switch” when the language started to feel more natural, for example flowing faster or with less translation? When did that happen, and what did it feel like?
(Transition toward more automated production)

8. Role of AI-supported tools

What role do the AI-supported tools play in shaping your learning routine, in your opinion?

Do you view them more as support, a tool, a partner, or something else?
(Perceived role of AI in the learning process)

9. Openness to new formats

If you were to fully trust the method and the AI-supported tools, what new learning formats or experiences would you like to try? (Openness to innovation and personalisation)

10. Perceived changes beyond language

What kind of inner transformation have you experienced throughout the course, not only in language, but also in the way you think, communicate, or perceive the world? (Holistic reflection on identity and personal growth)

Closing statement

Thank you very much for sharing your thoughts. Your input is valuable for this study. If you would like to receive a short summary of the research findings once the project is complete, please let the researcher know.

APPENDIX E: SUMMARY TABLES AND FIGURES OF SURVEY RESULTS

This appendix provides descriptive summaries and selected statistical outputs from the quantitative survey dataset used in this research. The tables and figure illustrate patterns related to learners' motivation, engagement, satisfaction, AI-supported learning routines, and perceived language progress within the Andrusenko Neuro-Linguistic Method (ANM™) framework.

Table 4.1 Distribution of Respondents by Age Group

Age	Group Percentage
18-24	29%
25-34	24%
35-44	29%
45-54	12%
55+	6%

Most participants were aged 18-24 and 35-44 (29% each). The smallest group was 55+ (6%).

Table 4.2 Distribution of Respondents by Gender

Gender	Percentage
Female	62%
Male	38%

The sample was predominantly female (62%).

Table 4.3 Distribution of Respondents by Occupation

Occupation	Percentage
Employed	44%
Student	26%
Homemaker	18%
Entrepreneur	6%
Retired	6%

Respondents were mostly employed (44%) or students (26%), with smaller groups of homemakers, retirees, and entrepreneurs.

Table 4.4 Distribution of Respondents by CEFR Language Level

CEFR Level	Percentage
Beginner (A1)	24%
Elementary (A2)	38%
Intermediate (B1)	32%
Upper-Intermediate (B2)	6%

Most learners were at A2 (38%) or B1 (32%), reflecting beginner-to-intermediate proficiency.

Table 4.5 Duration of Respondents' Language Study

Duration of Study	Percentage
Less than 3 months	26%
3-6 months	32%
6-12 months	35%
More than 1 year	6%

Most respondents had studied for 3-12 months, with 35% studying for 6-12 months.

Table 4.6 Respondents' Motivation Level to Learn a Language

Motivation Level	Percentage
Very High	44%
High	29%
Average	9%
Low	15%
Very Low	3%

A high level of motivation was reported by 73% of respondents (very high or high).

Table 4.7 Frequency of Using Imagination in Language Learning

Use of imagination in learning	Percentage
Always	41%
Often	32%

Sometimes	21%
Rarely	6%

Most participants reported frequent use of imagination (41% always, 32% often).

Table 4.8 Perceived Effectiveness of Teacher-Suggested Imagery

Effectiveness of teacher-suggested imagery	Percentage
Very effective	56%
Effective	26%
Moderately effective	18%

Teacher-suggested imagery was rated as very effective by 56% of respondents.

Table 4.9 Perceived Importance of Imagination in Language Learning

Importance of imagination for learning	Percentage
Very important	56%
Important	26%
Moderately important	18%

Imagination was rated as very important by 56% of respondents.

Table 4.10 Frequency of AI Assistant Use

Frequency of use	Percentage
Regularly	65%
Occasionally	32%
Once or twice	3%

Most respondents reported using the AI assistant regularly (65%).

Table 4.11 Perceived Usefulness of AI Assistant in Language Learning

Perceived usefulness of AI assistant	Percentage
Very useful	65%
Rather useful	9%
Neutral	12%
Rather useless	15%

AI was perceived as very useful by 65% of learners.

Table 4.12 Desire to Continue Using AI in Language Learning

Desire to continue using AI	Percentage
Yes, definitely	85%
Yes, if made easier to use	15%

A majority (85%) expressed a clear intention to continue using AI tools.

Table 4.13 Most Frequently Used AI Features in Language Learning

Most frequently used AI features	Selected by (% of participants)
Grammar/vocabulary review	62%
Speaking and writing support	56%
Motivation prompts and task reminders	56%
Lesson summaries	47%
Pronunciation trainer	41%

The most frequently used features included grammar/vocabulary review (62%), speaking and writing support (56%), and motivation prompts/task reminders (56%).

Table 4.14 Key Variable Correlations and Interpretations (Spearman's rho)

Variable pair	Spearman's rho	Interpretation (case-level)
Motivation ↔ speaking confidence	0.95	Strong association between affective readiness and confidence
Motivation ↔ satisfaction	0.90	Motivation aligns with affective commitment
Motivation ↔ perceived progress	0.91	Motivation aligns with self-perceived gains
AI usefulness ↔ perceived progress	0.92	AI usefulness aligns with perceived outcomes
AI usefulness ↔ speaking confidence	0.85	AI usefulness aligns with rehearsal and confidence indicators
Importance of imagination ↔ memory help	0.91	Imagery-related routines align with perceived memory support
Visual-audio effectiveness ↔ satisfaction	0.97	Multisensory experience aligns with satisfaction

Effectiveness of visuals ↔ satisfaction	0.98	Perceived value of imagery aligns with satisfaction
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Strong positive associations were observed among motivation, confidence, satisfaction, perceived progress, and AI-related perceptions ($\rho \geq 0.85$). These values should be interpreted cautiously due to the reliance on self-report measures, potential conceptual overlap among affective constructs, and the modest sample size.

Table 4.15 Predictors of Perceived Language Learning Progress (multiple regression results)

Predictor variable	Standardised beta	t-value	p-value	Interpretation (case-level)
Motivation	0.41	3.57	< 0.01	Strong positive association with perceived progress
Speaking confidence	0.37	3.14	< 0.01	Associated with perceived fluency and self-efficacy
Perceived usefulness of AI assistant	0.33	2.91	< 0.01	Associated with perceived outcomes and continuity of practice
Visualisation frequency	0.29	2.45	< 0.05	Associated with structured imagination routines
Interactivity of lessons	0.26	2.21	< 0.05	Associated with live engagement and retention perceptions
Memory help	0.24	2.03	< 0.05	Associated with perceived retention support
Study duration	0.18	1.64	n.s	Directionally positive; may be non-linear

Motivation, speaking confidence, and perceived usefulness of AI support emerged as statistically significant predictors of perceived progress within this exploratory model. Results are interpreted as indicative patterns within the case.

Table 4.16 Summary of Thematic Patterns in Learner reflections

Thematic domain	Core codes	Illustrative quote
Cognitive activation	internal engagement; semantic flow	“Language is like movement - an interface.” (Q1, R8)
Emotional reframing	mistakes welcome; emotional shift	“A mistake used to paralyze me. Now - I smile.” (Q5, R2)
Structured anchoring	lesson rhythm; algorithm logic	“‘Four Fives’ model is like a good algorithm.” (Q3, R9)
AI-enabled reinforcement	interface; repetition tool	“Provides repetition, rhythm, and anchoring.” (Q8, R9)
Identity and emotional presence	self-expression; voice clarity	“I began to express myself more clearly overall.” (Q10, R10)

Key qualitative themes included cognitive activation, emotional reframing, structured lesson rhythm, AI-supported continuity, and strengthened self-expression.

Figure 4.1 Top Spearman Correlations among Key Variables (n = 34)

Source: Author’s own work.

Summary note (case-level interpretation).

The appendix summarises descriptive distributions and selected statistical outputs. Overall, the results indicate strong clustering among affective variables (motivation, confidence, satisfaction), cognitive-strategy perceptions (imagery-related routines), and perceptions of AI usefulness. These patterns are consistent with the dissertation’s interpretation of the ANM™ plus AI context as multidimensional. However, given the self-report nature of most measures and the modest sample size, results should be treated as indicative associations rather than causal effects.

APPENDIX F: GLOSSARY OF TERMS

Andrusenko Neuro-Linguistic Method (ANM™): A structured instructional approach developed by Serhii Andrusienko and implemented within the Swiss NeuroLanguage Academy. ANM™ integrates psychologically oriented routines (for example anchoring, reframing, internal scripting, and internal associative visualisation) with structured lesson rhythm and teacher-led instruction. In this dissertation, ANM™ is examined in an online context supported by AI tools as continuity and practice supports between sessions.

Affective Anchoring: A pedagogical routine involving deliberate association between a desired emotional state (for example confidence or calm focus) and a cue, phrase pattern, or speaking routine, with the aim of supporting speaking readiness and error recovery.

AI Assistant (within the ANM™ learning environment): AI-supported tools used to support learning continuity between live sessions, for example structured practice prompts, summaries, low-stakes rehearsal routines, and feedback scaffolds. In this dissertation, AI is conceptualised as an instructional mediator and continuity layer, not as a substitute for teacher-led instruction.

Cognitive Rhythm / Instructional Rhythm: The sequencing and pacing of instructional activities into predictable cycles (for example the “Four Fives” format) intended to support attention stability, reduce extraneous cognitive load, and sustain engagement during speaking practice.

Emotional Safety: A learning condition in which learners feel psychologically secure to attempt speech, make mistakes, and recover without fear of judgement, supporting willingness to speak and sustained participation.

Internal Scripting: A practice in which learners mentally rehearse or prepare speech using scenario-based cues and personal meaning, often including role perspective and intended emotional tone, to support spontaneous production and confidence.

Internal Visualisation / Scene-Based Imagination: A trained cognitive skill of constructing internal associative scenes (mental images, sensory cues, and contextual meaning) to support encoding, retrieval, and speaking readiness. In this dissertation, visualisation refers primarily to internal representation rather than external images or slides.

Mixed-Methods Design (explanatory sequential): A research methodology combining quantitative analysis (for example survey-based measures and association modelling) with qualitative analysis (for example semi-structured interviews and thematic coding), where qualitative data are used to interpret and deepen understanding of quantitative patterns.

Neuro-Affective Alignment: The interaction between emotional readiness (for example reduced anxiety and increased confidence) and cognitive processing during learning, relevant to speaking performance and sustained engagement in adult online instruction.

Ontological / Identity-Related Change (in learner narratives): A learner-reported shift in perceived agency, voice, or self-expression associated with language learning experience. In this dissertation, such changes are treated as qualitative themes reported by participants rather than as objective clinical outcomes.

Semantic Anchoring: The process of linking new language input to meaningful associative traces (for example scenario cues and internal imagery), supporting retention and faster retrieval during speaking.

Visual Anchors / Metaphoric Frames: Internal or external cues (for example metaphors, brief rules, or schematic prompts) used to support comprehension and memory by connecting abstract language material to familiar representations. Within ANM™, the emphasis is placed on internal associative anchors that support speaking readiness.

Micro-assessment / Macro-assessment (oral performance monitoring): Two complementary levels of monitoring speaking development. Micro-assessment refers to

repeated short measurements used for progress steering within the learning process. Macro-assessment refers to more standardised performance profiling aligned with CEFR descriptors and used for summarising outcomes in a comparable way.

CEFR: A widely used framework describing language proficiency levels (A1 to C2). In this dissertation, CEFR is used as a reference for positioning learner level and for structuring oral performance profiling in the Academy's monitoring logic.

APPENDIX G: ANM™ HYBRID ORAL ASSESSMENT STANDARD (THESIS VERSION)

Version: v3.0 | Date: 1 February 2026 | Owner: Swiss NeuroLanguage Academy

Purpose: To document the hybrid oral assessment and monitoring standard used in the case study, including assessment architecture, evidence logic, and human-in-the-loop governance. This thesis version intentionally omits technical code and internal operational SOP details.

Materials availability and IP notice: Certain technical artefacts (e.g., internal scripts, prompts, and processing code) constitute proprietary IP of the Swiss NeuroLanguage Academy and are therefore not reproduced in this thesis. To preserve auditability, the dissertation reports the full procedural workflow, evidence logic, indicators, and governance rules. Additional technical materials can be made available to examiners upon reasonable request under controlled access and, where appropriate, a non-disclosure arrangement.

G.1 Scope and definitions

This standard applies to oral assessment and ongoing monitoring of target-language (L2) speaking performance in online delivery contexts. It distinguishes between:

- Target language (L2): the language being assessed.
- Language of instruction/mediation (L1/Lx): the language used for task instructions and controlled prompts, typically the learner’s strongest communication language.

The standard supports both micro-assessment (frequent, lesson-adjacent checks) and macro-assessment (periodic profiling).

G.2 Assessment architecture (A/B/C task design)

The assessment is organised into a three-part task architecture designed to elicit both controlled and spontaneous production:

A) Precision Check (controlled output): short prompts delivered in the language of instruction/mediation; the learner responds in the target language with maximum precision. Primary focus: Range and Accuracy.

B) Structured production: guided speaking with defined constraints (topic, time, target structures). Primary focus: Organization and Delivery/Fluency.

C) Spontaneous interaction: open-ended speaking task to elicit natural discourse. Primary focus: Interaction and overall communicative effectiveness.

G.3 Evidence logic and rating dimensions

The standard uses a two-stage interpretation logic:

1) Global CEFR impression (first 2–3 minutes): an initial global judgement used as a screening anchor.

2) Analytic profiling using a CEFR-aligned RADIO framework:

- Range (lexico-grammatical resources)
- Accuracy (grammatical control and stability)
- Delivery/Fluency (tempo, pausing behaviour, smoothness)
- Interaction (responsiveness, turn-taking where applicable)
- Organization/Coherence (logical structuring, cohesion)

G.4 Hybrid (AI + human) roles and governance

The hybrid model assigns AI the role of technical mediator and structured assistant, while final interpretive responsibility remains human.

AI-supported functions (non-exhaustive):

- Speech-to-text transcription (ASR) to create an evidence layer for review.
- Extraction of behavioural indicators (e.g., speaking-time ratios, pausing/tempo proxies) to support formative monitoring.
- Draft summaries and structured practice prompts for between-session work.

Human responsibilities (examiner/coach-teacher):

- Validate task adequacy and interpret performance against CEFR/RADIO.
- Calibrate feedback and select next targets (human-in-the-loop).
- Prevent single-metric decisions and mitigate over-reliance on automated outputs.

Replicability capsule (auditability without IP disclosure).

- Input: lesson audio (Zoom/Teams/m4a) and/or recorded speaking tasks.
- Processing: ASR transcription with word-level timestamps (and speaker diarisation where applicable); transcript normalisation for review.
- Indicators: extraction of observable speech-production proxies (e.g., speaking-time ratios, pausing/tempo profiles, repair sequences) used for formative monitoring.
- Outputs: structured summary, brief analytic profile (RADIO with evidence notes), and a targeted practice pack for the next cycle.
- Decision rule: final interpretation and target selection remain human (examiner/coach-teacher); AI outputs are treated as inputs, not final judgements.
- Storage: outputs stored on the Academy's external storage device with controlled access; retention follows a minimal-need principle for monitoring and quality assurance.

G.5 Outputs and documentation

For each assessment event, the system produces traceable outputs that support monitoring and quality assurance:

- A structured summary (what was assessed; main strengths; main constraints).
- A short analytic profile (RADIO) with brief evidence notes.
- A practice pack (targeted drills and speaking tasks for the next cycle).

All outputs are stored on the Academy's external storage device with access control. Audio and transcript retention follows a minimal-need principle and is limited to monitoring and quality assurance purposes.

G.6 Limitations and safeguards

This standard acknowledges known limitations of AI-supported assessment (e.g., ASR errors, uneven accuracy by accent/language, and risks of automation bias). Safeguards include:

- Human oversight for interpretive decisions.
- Clear separation of AI indicators from proficiency decisions.
- Periodic internal calibration and review of rating consistency.

APPENDIX H: CEFR ALIGNMENT MEMO FOR ORAL SPEECH ASSESSMENT (THESIS VERSION)

Version: v3.0 | Date: 1 February 2026 | Owner: Swiss NeuroLanguage Academy

Purpose: To summarise how the hybrid oral assessment dimensions and decision rules are aligned with CEFR levels and descriptors for speaking. This thesis version provides the mapping logic and interpretive principles without internal operational details.

H.1 CEFR alignment approach

Alignment is based on the CEFR conceptualisation of speaking proficiency as a combination of resource control, fluency, interaction, and coherence. The assessment uses a global-to-analytic logic: an initial global CEFR impression is followed by analytic profiling (RADIO) to reduce the risk of misclassification driven by fluency alone.

H.2 Mapping of RADIO dimensions to CEFR speaking constructs

RADIO dimension	CEFR construct (speaking)	What counts as evidence (examples)
Range	Lexical range; grammatical range; appropriateness	Variety of structures; ability to paraphrase; lexical flexibility under time pressure
Accuracy	Grammatical accuracy; control; stability	Error density; recurrence of the same error; self-repair effectiveness
Delivery/Fluency	Fluency; tempo; pausing; smoothness	Length and placement of pauses; breakdowns; ability to maintain speech flow
Interaction	Turn-taking; responsiveness (where applicable)	Appropriate responses; managing breakdowns; maintaining communicative intent
Organization/Coherence	Coherence; cohesion; discourse management	Logical sequencing; connectors; clear thought groups; topic development

Source: Author's own work

Table Appendix H.1 Mapping of RADIO Dimensions to CEFR Speaking Constructs

H.3 Decision rules and interpretation principles

- 1) No single metric rule: proficiency decisions are not made from one indicator (e.g., tempo alone).
- 2) Profile-based interpretation: uneven profiles are expected; analytic confirmation is required when global impression and analytic evidence diverge.
- 3) Task sensitivity: evidence is interpreted relative to task type (controlled vs spontaneous).
- 4) Human oversight: final level decisions are made by a trained examiner/coach-teacher; AI-derived indicators support but do not replace expert judgement.

H.4 Notes on language of instruction/mediation

When controlled prompts are delivered in the language of instruction/mediation, evidence is still elicited and assessed in the target language. This design reduces extraneous cognitive load during task comprehension while preserving validity of target-language performance evidence.

APPENDIX I. METHOD PASSPORT FOR DBA

ANM™ (Andrusenko Neuro Method): Method Core, Implementation Model and Documentation Framework

Version: v3.0 Date: January 2026

Organisation (context of use): Swiss NeuroLanguage Academy ANDRUSENKO.PRO

Einzelfirma	IDE	CHE-324.044.691
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Location: Switzerland

Abstract (for appendix use)

This Method Passport summarises the ANM™ framework as a proprietary instructional method developed by Serhii Andrusienko and operationalised within the Swiss NeuroLanguage Academy ANDRUSENKO.PRO. It clarifies the status and use of the “™” symbol, outlines documentation sources, and distinguishes the core method from the ANM™ plus AI implementation layer examined in this dissertation. The passport supports academic transparency while protecting proprietary instructional artefacts.

1. Purpose of this document and the status of the “method passport”

This document (“Method Passport”) provides a structured description of ANM™ (Andrusenko Neuro Method) in the context of its use and operationalisation within Swiss NeuroLanguage Academy ANDRUSENKO.PRO.

The purpose of the passport is to ensure academic transparency, reproducibility at the level of description, and a clear distinction between:

- authorship of the method core (ANM™ Core);
- the implementation and standardization layer (Implementation and Standardization Layer), where the method is translated into a managed educational process;

- digital and informational business assets supporting the Academy’s operations and the delivery of the method.

The passport does not replace internal documentation and does not disclose commercially sensitive elements (know-how). It is intended for academic verification of the method’s structure, governance and documentation framework.

2. The ANM™ designation and the academic use of the “™” symbol

In this passport, the designation ANM™ is used as a branding identifier. The use of the “™” symbol in this context does not constitute a claim that the trademark is registered in Switzerland, unless such registration is explicitly confirmed by a separate document or register.

3. Authorship of the core and the implementation framework within the Academy

3.1. Authorship of the core (ANM™ Core)

The author of the ANM™ method core (ANM™ Core) is Serhii Andrusenko. The “core” refers to the original conceptual and algorithmic logic of instructional design, including principles, methodological decisions and the base architecture of the training process. The core is described in a way that can be communicated independently of any single target language.

3.2. Implementation and Standardization Layer

The implementation of ANM™ within the Academy includes an institutional (operational) implementation model developed jointly by Serhii (Serhii) Andrusenko and Nataliya Andrusienko within the Einzelfirma activity. This layer covers the creation, updating and management of documents, protocols, monitoring formats and assessment tools, as well as

the organisational processes required for consistent application of the method in educational practice.

3.3. Digital and informational business assets

The website, CRM system (Pipedrive), student contact base, and templates for marketing and reputational communications are treated as business assets controlled and managed within Einzelfirma IDE CHE-324.044.691. For academic transparency, the key aspects are the fact of control, access regimes and use within the Academy's operations.

4. The object and focus of the method

ANM™ is applied in the field of foreign language education and is oriented towards the practical formation of speaking performance. In other words, it focuses on developing the learner's ability to select and deploy relevant language models in real communicative interaction.

Within this dissertation, ANM™ is considered a methodological approach that shifts learning from "knowledge about language" to a managed skill formation process supported by a defined training architecture, scenario-based repetition and quality assurance protocols.

5. ANM™ architecture: Core - Implementation - Business Assets

To describe and document ANM™ within the Academy, the following structural model is used.

5.1. Level A: ANM™ Core (method core)

ANM™ Core includes:

- original methodological principles and the algorithmic logic of the training design;
- baseline rules for building the training process;

- general criteria for valid methodological decision-making (internal standard).

The core is “language-agnostic”: it defines the method architecture and a framework for methodological choices.

5.2. Level B: Implementation and Standardization Layer

This layer consists of managed components that translate the method into a reproducible educational system:

- Method documentation and learning materials: manuals, protocols, scenarios, an exercise library, checklists, presentations, internal instructions, course plans and lesson structures.
- QA and Monitoring: training and monitoring protocols, observation sheets, rubrics, quality control tools, and internal reporting and tracking formats.
- Assessment: assessment templates, testing blocks, rating scales and rubrics, the structure of assessment procedures, and, where applicable, calibration materials.
- ANM™ plus AI Implementation Model: research and development of an AI-supported learning model, internal prompt packs and instructions (where applicable), operational process descriptions, and formats for supporting teachers and learners.

5.3. Level C: Business and Digital Assets

Assets associated with the operational delivery of the method within the Academy include:

- the website and website content (andrusenko.pro);
- the CRM system (Pipedrive) and its operational configuration;
- the student contact base (within lawful data processing);
- marketing and reputational communications and templates.

6. Scaling across languages: Language Packs

ANM™ is scaled across multiple languages. Practical delivery is organised through Language Packs, defined as modular packages created on the basis of a single ANM™ Core and documented as separate entities with versions and access regimes.

Each Language Pack includes language-specific adaptations of materials (scenarios and scripts, examples, exercise blocks and other elements of the Implementation Layer), while preserving the architectural principles of ANM™ Core. This approach maintains methodological consistency while accounting for language-system specifics.

7. Documentation framework and version governance

7.1. Documentation

The documentation framework for ANM™ within the Academy is supported by two foundational documents:

- Ownership Statement (Declaration of authorship, control and use regime);
- IP Register (Register of objects related to ANM™ / NeuroÉlan and key business assets).

7.2. Versioning and storage

For the master copies of the method and key materials, the following are defined:

- Storage location: owner-controlled secure offline storage (digital archive on a local device/media), with restricted access (owner-only).
- Backup arrangements: encrypted backup copy on a separate external offline device, stored separately; access restricted.
- Versioning system: a two-layer versioning approach:
 1. ANM™ Core (method core) is versioned as vX.Y with a release year/date (major versions reflect changes to principles/algorithm/architecture; minor versions reflect refinements that do

not alter the core). Historical baseline versions include v1 (1997, printed edition), v2 (2002), v3 (2015).

2. Language Packs (implementation modules by target language) are versioned independently as LP-[language code] vA.B with a release date. The introduction of a new target language is documented as a new Language Pack (LP-XX v1.0) and is not treated as a new ANM™ Core version unless the method core itself changes.

Responsibility for maintaining the method register and archive (master copies, versions and storage) lies with Serhii (Serhii) Andrusienko. Operational administration of internal assets and institutional formalisation processes lies with Nataliya Andrusienko.

8. Relationship to the dissertation research

This method passport is included in the dissertation as an appendix to:

- strengthen transparency in the description of the case study;
- clearly distinguish authorship of the method core, joint development of the implementation layer, and the business context;
- demonstrate that the studied system is documented, governed and describable in a reproducible manner.

9. Boundaries of the passport and confidentiality regime

This passport:

- does not disclose internal protocols and materials in a volume that could substitute access to the method or enable replication without the Academy;
- records the method architecture and its documentation framework, but does not constitute a full methodological manual;
- is intended for academic purposes and is not designed for distribution to third parties as a standalone product.

10. Related internal documents (not included in the dissertation)

The following internal documents support governance and version control but are not reproduced in the dissertation due to confidentiality and IP considerations:

- Ownership Statement (Declaration of authorship, control and use regime).
- IP Register (Register of objects related to ANMTM / NeuroÉlan and key business assets).