

CONSTRUCCIÓN DEL CONOCIMIENTO EDUCATIVO: ESTUDIOS EMPÍRICOS, EXPERIENCIAS Y ANÁLISIS TEÓRICO

M^a SOLEDAD VILLARRUBIA ZÚÑIGA
PAULA GONZÁLEZ GARCÍA
LEYRE ALEJALDRE BIEL
ANTONIO MARTÍNEZ-ARBOLEDA



EDITORIAL
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Construcción del conocimiento educativo: estudios empíricos, experiencias y análisis teórico

María Soledad Villarrubia Zúñiga, Paula González García,
Leyre Alejaldre Biel y Antonio Martínez-Arboleda

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Meléndez Valdés, 61 - 28015 Madrid
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MOSL4L: towards a framework for learner-based and context-sensitive technology enhanced language learning

Timothy Read

Juan-José Magaña

Elena Barcena

Universidad Nacional de Educación a Distancia (UNED)

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Abstract: This chapter presents the evolution of the MOSL4L (Mobile Open Social Learning for Languages) framework, a model developed to support Technology Enhanced Language Learning (TELL) by integrating the dimensions of mobility, openness, and social learning. This framework was initially conceived in the SWITCHED-ON research project and later refined through the NEXUS and AGORA projects. MOSL4L has undergone three major iterations. Version-1 served as a conceptual foundation based on Activity Theory, integrating MALL, OERs/OEPs, and Social Language Learning. Version-2 examined the learner's profile and role and developed a systematic, evidence-based model through an extensive review of over five hundred TELL studies, which was formalized via UML (Unified Modeling Language) to define key domain entities and interactions. This iteration provided a structured analytical tool for researchers, enhancing the reproducibility and comparability of experimental scenarios. Version-3, MOSL4L-r, examined the role of the educational context, using rural settings as a case study, and was aligned with the 'Train to Transform' (T2T) macro-strategy, which unified the set of research initiatives undertaken as part of AGORA. The chapter concludes by framing the iterative development of MOSL4L as a longitudinal case study in framework design for TELL.

Keywords: mosl4l, tell, pedagogical frameworks, rural education.

1. INTRODUCTION

Language learning frameworks support researchers, teachers, curriculum designers, education inspectors, and other stakeholders, by providing them with a validated set of principles that can be used to undertake research, planning, supervision, and assessment in a rigorous and well-founded way. Frameworks provide a clear vision of what learning should look like, why it matters, and how it can be achieved. Specifically, they enable the configuration and reproducibility of key variables and their interrelationships to define effective methodological scenarios. The resulting construct should underlie learning scenarios, courses, activities, tasks, materials, and related resources, preventing instructional design from being *ad hoc*, imprecise, incomplete, or even inaccurate. Unsurprisingly, language learning frameworks have been developed since the mid-20th century. Thus, the Grammar-Translation Method (pre-1950s-60s) was centred on grammar drills, memorization, and the translation of literary or classical texts, but its separation from orality and communicative context led to much criticism (Richards & Rodgers, 2014). The Audiolingual Method (1950s-60s) also emphasized repetition and

drills, but it was more practical and oral-focused, i.e., it was designed to build speaking fluency through habit formation and imitation (Skinner, 1957). Communicative Language Teaching (1970s-80s), as its name suggests, was centred on interaction and real-world communication, incorporating functional and sociolinguistic competence (Canale & Swain, 1980).

Within this general communicative approach, Task-Based Language Teaching (1980s-90s) was a structured and activity-oriented method, offering clear, purposeful outcomes (Long, 1985). Computer-Assisted Language Learning emerged in the 1990s from the availability and popularity of digital computers and their application to language instruction (Levy, 1997). To begin with, programs were essentially behaviourist in nature and gradually evolved into communicative and multimedia systems (Warschauer & Healey, 1998). In a similar fashion, from the beginning of this century, Mobile-Assisted Language Learning (henceforth, MALL) reflects the appearance of a range of devices that took computing away from desktop and even portable computers, which explored new conceptual areas, such as personalization, ubiquity, and connectivity (Stockwell, 2010). The recognition of the multiple benefits that technology brings to education, particularly of second languages, has led to the incorporation of such tools into most educational applications, to varying degrees (Kennedy & Levy, 2008; Kim, 2014). This ongoing trend was labelled Technology-Enhanced Language Learning (henceforth, TELL; Yang & Chen, 2007; Drakidou et al., 2019) in the 1990s–2000s and generally refers to language learning supported by an increasingly broad range of digital tools, contexts, and circumstances (Weller, 2011).

In the same way as these and other language learning frameworks were superseded by subsequent ones which built upon both pedagogical and technological advances, this chapter tracks the evolution of an integrated TELL framework called MOSL4L (Mobile Open Social Learning for Languages), that was originally conceived by the authors in the context of the SWITCHED-ON research project (Empowering Social, Open, and Massive Language Learning through Mobile Technology: Harnessing Interactions, Transgressing Boundaries; ref. no. FFI2016-80613-P; 2017–19), and later refined in the context of two other projects: NEXUS (Promoting the Nexus of Migrants through Active Citizenship; ref. no.: 2019-1-ES01-KA203-065861; 2019-22; www.nexus4civics.eu), and AGORA (Technological and Methodological Innovation for Language Teaching and Generation of Synergies in Rural Areas; ref. no. PID2021-128182OB-100; 2022-26; <https://www.agora-atlas.es>). The theoretical goal of SWITCHED-ON was to explore a language learning paradigm (applied to higher education students of business English) with a triple linguistic, methodological, and technological dimension. MOSL4L was then developed to strategically integrate the dimensions of mobility, openness, and collaboration into a single TELL framework, where each aspect was conceived as being central to the learning process, rather than just a complementary element (Read et al., 2021).

NEXUS was a research project conceived to promote active citizenship, principally of migrants, by empowering them through participatory digital tools. The application of MOSL4L here revealed its limitations since it did not effectively capture a conceptual area that had been identified as being key in its learning scenario, i.e., the integration of three innovative pedagogic mechanisms: a combination of passive and active scaffolding, the identification and application of ‘e-leading students’ and ‘educational proxies’ (Read & Sedano, 2023; Read et al., 2024; Barcena & Read, In press 1), and the potentiation of ‘activeness’ by building on the concepts of investment, integration, and performance (Read & Barcena, 2021). Furthermore, an attempt to expand the framework

to systematically define the heterogenous and fragmented TELL experiments present in the literature (Ziegler, 2014; Traxler et al., 2018) through the identification of all their significant elements (and mutual interrelations or interactions) highlighted the limited usability of MOSL4L. Finally, the theoretical goal of AGORA was to test a simplified and refined version of the framework for teachers in rural educational centres, particularly those in deprived regions, which are characterised by severe budget and infrastructure limitations, as well as locally specific needs.

In this chapter, the evolution of the MOSL4L framework is presented through its various iterations: from the initial generic version, to a second version that incorporates conceptual areas supported by an extensive body of literature, and finally, to a third version that addresses a real-world, challenging application scenario. Each iteration is examined in terms of its conceptual foundations, strengths, and limitations. Accordingly, the chapter begins by discussing the theoretical and methodological underpinnings that first guided the development of the framework; then provides a detailed analysis of each version; and ultimately focuses on the integration of MOSL4L with the ‘Training to Transform’ (henceforth, T2T) macro-strategy, which serves as a means to evaluate the framework’s current robustness and practical applicability.

2. THE GENERIC MOSL4L FRAMEWORK

The MOSL4L framework, version 1.0, presented in Figure 1 (available online, link included at the end of this document), was developed following a qualitative synthesis of the literature across three interrelated conceptual areas within the field of language learning: MALL, Open Educational Resources/Practices (henceforth, OERs/OEPs) for languages, and Social Language Learning (henceforth, SLL). These modalities were subsequently used to define the foundational pillars upon which the framework was built (Read et al., 2021). Firstly, learning is based on the flexible and convenient use of smartphones/tablets for learning ‘anytime, anywhere’, in an ubiquitous fashion, or ‘sometime, somewhere’, involving context as a learning trigger (Sharples et al., 2007; Noriega, 2016; Mehraban & Abtahi, 2023). Secondly, open learning revolves around OERs and OEPs (UNESCO, 2002; de los Arcos & Weller, 2020), where LMOOCs (Language Massive Open Online Courses; Martín-Monje & Barcena, 2014; Sallam et al., 2020) are a prominent OEP modality aiming to overcome economic/geographic divides and ‘democratize’ access to knowledge (Conole, 2013; Wiley, 2014; Anderson, 2016). Thirdly and finally, social learning involves peer interaction and support, which can take place in classrooms and also in social networks, forums, and collaborative platforms (Murphy, 2011; Murray & Fujishima, 2013; Ouyang & Zhu, 2020). It is based upon Social Constructivist Theory (Vygotsky, 1978; Illeris, 2009) and has proven to be effective for languages, particularly as part of the learner-based learning approach (Gerami & Baighlou, 2011; Mills, 2011; Murphy, 2011).

Despite the partial overlaps of the three conceptual areas present in TELL experiments (Drakidou, 2019; Read et al., 2017; Read et al., 2021), it was not until the development of MOSL4L that they were integrated into a single language learning framework, enhancing the benefits in each individual modality, as was demonstrated during the implementation of the SWITCHED-ON English learning system (Read et al., 2021). As can be seen in Figure 1, the MOSL4L framework was intended to conceptualize not only the compatibility but also the suitability of the mobile, open, and social dimensions to potentiate language learning. Furthermore, an analytical tool was developed to specify the components that made up MOSL4L, make their mutual interrelationships explicit, and add theoretically grounded functionality for the design of complex learning scenarios. To this end, Engeström’s (1999) Activity Theory was selected, which, as can be seen on the

diagram on the right hand side, strategically specified and integrated subjects (learners), objects (language learning goal), tools (mobile devices and technologies, and open resources and practices), communities (online/hybrid peer groups monitored by teachers and institutions), rules (expectations and established operating procedures), and the division of labour (distribution of roles and responsibilities within each task).

Version 1 of the framework was essentially a conceptual model, with limited experimental application in the context of the SWITCHED-ON project. An exploratory analysis of existing tools and platforms for social and open language learning on mobile devices was undertaken, together with an exploration of how they could be applied in real formal and non-formal learning scenarios (Read et al., 2017). Subsequently, a prototype was developed for a specific research population of business English learners in higher education and monitored to study their use of the tools and resources, as well as the dynamics of peer interaction (Read et al., 2021). The results of this work supported the use of ‘mobile-open-social language learning’ as an approach that fitted easily into professional learners’ daily circumstances, needs, and opportunities, thereby providing initial validation of the MOSL4L framework. However, limitations were identified in the framework. Firstly, it did not directly address other factors arguably important for language learning, such as cognitive scaffolding and metacognition (Safa & Motaghi, 2021). Secondly, it made no reference to educational context, implicitly focusing on higher education and online learning (reflecting MALL and MOOC common applications among adult students in university settings; Nguyen, 2015; Sallam et al., 2020). Thirdly, the framework did not provide implementation guidelines beyond the need for an evaluation rubric for learning scenarios and, therefore, lacked evidence of its practical utility.

3. THE EVIDENCE-BASED VERSION

Motivated by the limitations of the framework at its initial stage, the development of a second version was based upon an extensive and systematic analysis of the TELL literature. Similarly to the previous version, the objective of this modelling process was to further validate MOSL4L and represent the components of language learning activities (e.g., learner roles, technologies, pedagogical strategies, context variables, etc.) and their interrelationships. To this end, a pilot study of MALL, LMOOCs, and SLL research was undertaken by Drakidou et al. (2019), which confirmed that the published work lacked either explicit underlying pedagogies or experimental testing of theoretical proposals. This lack of systematization hindered the deconstruction and comparison of research and arguably hampered scientific progress in the field of TELL. Subsequently, Pareja et al. (2023) followed Wang & Hannafin (2005) recommendations on the design of general educational frameworks and undertook a fine-grained analysis of over 500 journal articles and book chapters from the experimental TELL literature. Surprising findings from this work included the identification of inconsistent reporting of language level and outcomes, among many other irregularities. Once finished, a conceptual model was developed using Unified Modelling Language (UML) which identified the relevant ‘elements’ and ‘interactions’ necessary for effective language learning scenarios to be defined.

Figure 2 (available online, link included at the end of this document) illustrates the main entities involved in TELL scenarios, their attributes, and the interactions between them. These entities are: firstly, Subjects (learners or groups), which are characterized by attributes such as number, age, gender, native/target languages, learning context (e.g., open/closed groups, immigrant status), interaction mode (face-to-face, online, blended), and autonomy. Secondly, Hardware/Devices, described by type (e.g., computer, tablet), operating system, connectivity, and whether learners bring their own devices (BYOD).

Thirdly, Educational Resources – categorized by format (text, audio, video, etc.), purpose, interactivity, online availability, license, and openness (e.g., downloadable, modifiable). As can be seen, the figure also defines three key interaction types among these entities: Resource Interaction (between subjects and educational resources), including learning modality, social interaction, CEFR skills targeted, openness (retain, reuse, remix, etc.), and task types; Technological Interaction (between subjects and devices), covering app usage, device sharing, social interaction type, usage frequency, time, and setting (fixed/mobile); and Software Interaction (between educational resources and devices), described by interactivity level, responsiveness, and software interoperability.

Figure 3 (available online, link included at the end of this document) is an enhanced and empirically grounded version of the original framework (Pareja et al., 2023). The three dimensions (mobility, openness, and collaboration) appear deconstructed and offer a more structured and descriptively richer model for analysing experimental TELL scenarios. Its components are organised into two main categories: domain entities and domain relations. The former represent real-world components involved in TELL environments, specifically: subjects, defined by factors such as their social grouping and the presence or absence of a teacher; hardware and devices, categorized by their type and whether learners are expected to bring their own (BYOD); and educational resources, characterized by their format, online availability, educational aim, and the nature of the activities they support. These entities interact through three primary types of relations or interactions. Firstly, technological interaction refers to how subjects engage with hardware and devices, including aspects such as social context, frequency and duration of use, mobility (e.g., fixed or mobile learning settings), and the nature of the interaction itself. Secondly, resource interaction captures the relationship between subjects and educational resources, accounting for the degree of sociability, the openness of resources, and how learners interact with the materials. Thirdly, software interaction describes how educational resources operate across various devices, focusing on the level of interactivity, responsiveness of the software, and issues of interoperability. This relation is also informed by empirical data, including published results, research methods, and quantitative findings, making it not only a theoretical construct but also a data-driven component. Overall, this refined framework offers a complete and coherent representation of the causal and structural elements at play in TELL environments, providing a robust foundation for both analysis and experimental design.

The UML model was subsequently encoded into a rubric (as a Google Form, presented in Figure 4; available online, link included at the end of this document), to simplify, systematize and consolidate it into a tool that could be used by language teachers and researchers to specify, validate, or refute language learning scenarios (as per Stevens & Levi, 2013). The rubric encodes a series of domain entities and relations in mobile, open, and social language learning scenarios as follows. It reflects both domain entities (4 characteristics of hardware and devices, 14 characteristics of subjects, and 6 characteristics of educational resources) and relations (7 characteristics of technological interactions [mediation between subjects and hardware and devices], 7 + [1 - 5 for each activity] characteristics of educational resource interactions [mediation between subjects and educational resources], and 4 characteristics of software interactions [mediation between hardware devices and educational resources]). This process of creating rubrics or assessment tools is similar to other frameworks like TPACK (Koehler & Mishra, 2009; Brown et al., 2015).

Therefore, this version of the framework was used to analyse existing experiments and guide new ones, which provided an opportunity to validate the framework's applicability or, conversely, identify which elements and relations contained in the rubric were missing in the research projects presented therein. In general terms, this version can be seen to have been developed in a more comprehensive way than the previous one, since its design was evidence-based and focused on the analysis of a large number of studies (all taken from WoS and Scopus; see Pareja et al., 2023). The evolution from MOSL4L 1.0 to 2.0 therefore represents a significant shift from a foundational, theory-driven conceptual model to a more explicit, systematically structured, and empirically informed framework. MOSL4L 1.0 established the core idea of integrating Mobile, Open, and Social learning, using Activity Theory as its interpretive lens. MOSL4L 2.0 took this core idea and, through rigorous analysis of the TELL literature, deconstructed it into a fine-grained set of entities and relations. This made it a more robust tool for analyzing diverse TELL scenarios and for guiding research, moving beyond the primarily conceptual nature of v1.0. The visual model also became more explicit in mapping components to the diagrammatic representation.

4. MOSL4L-r

Building on the foundations laid by the previous iteration of the TELL framework, one of the goals of the AGORA research project was to serve as a highly contextualized testbed for further development and refinement of the evidence-based version of MOSL4L. The project aimed to study the impact of a series of interventions in the language classrooms of rural schools, following a participatory action research (PAR) approach (Hawkins, 2019; Brydon-Miller et al., 2003). Local teachers, educational authorities, and stakeholders collaborated as co-researchers, helping to identify their most pressing challenges in the struggle to improve language education (issues that had led to a high teacher turnover and contributed to the so-called 'demographic challenge'; UNESCO, 2020; Bárcena & Read, 2024). To this end, a needs analysis was carried out, providing triangulated data obtained from questionnaires, interviews, and classroom observations. Key findings from this analysis included the need for teacher training and support to overcome gaps and psychosocial barriers affecting professional engagement; the lack of adequate curricula and materials adapted to rural realities; and limitations in budget and infrastructure (Sari & Wahyuni, 2022; Al-Saadi & Al-Jabri, 2023).

The needs analysis laid the groundwork for a high-level macro-strategy called 'Train to Transform' (henceforth, T2T), the objective of which was to ensure the pedagogical coherence, local relevance, and long-term sustainability of the research. It recognised the teacher as the leading agent in the rural educational scenario, and as such their responsibility to be trained and supported to fulfil the demands of this professional role within the wider context of the community. A roadmap was subsequently developed that identified four lines of action identified by the language teachers as high-priority: firstly, methodological optimization (e.g., attention to learner diversity, use of communicative approaches, integration of personalized methodologies); teacher professional development (e.g., linguistic, digital, methodological, sociocultural); collaboration and networking (e.g., between teachers, across disciplines and institutions, with student families and the surrounding community); and professional diversification (e.g., research, innovation projects, academic dissemination) (Barcena & Read, in press 1). The methodology for applying T2T consists of three phases. Firstly, a needs analysis is conducted to identify intervention priorities as defined by the stakeholders involved in the educational process, who thereby become genuine agents of change. Secondly, given the heterogeneity observed across different regions and institutions, the implementation

of micro-projects is carried out. These consist of context-sensitive, teacher-led initiatives that follow the established framework. Thirdly, a phase of knowledge transfer is undertaken, in which the results obtained are disseminated for potential replication. This is because, while the approach does not aim to produce prototypical interventions, the research aspires to ensure both scalability, with the necessary modifications, and sustainability, so that the strategy remains active beyond the end of the project.

MOSL4L was considered to be the low-level complement of the T2T macro-strategy, designed to diagnose existing language learning scenarios and guide the development of new ones in a structured theoretically grounded fashion in rural settings (Barcena & Read, in press 2). This was based on the initial assumption that similarities with urban communities might be epiphenomenal enough not to require explicit conceptual differentiation within the framework. However, since the evidence-based version of the MOSL4L framework and its associated rubric were aimed at researchers rather than language teachers, it proved to be of limited practical value for course design and evaluation processes at the practitioner level. As Fullan (2007) notes, frameworks often fail at the “last mile” before reaching classrooms if they are not translated into teacher-friendly terms. This made a new refinement necessary to capture key distinctions between rural and urban language education, including: the linguistic, pedagogical, and technological training needs of teachers dealing with, e.g., the erosion of their own language proficiency due to limited opportunities for use; multi-grade classrooms and complex multicultural groups (often the result of large-scale migration from low socio-economic backgrounds); and multimodal materials, which were fundamental to cater for diverse learning styles and required digital and transliteracy skills (Goicoechea & Barcena, in press).

As can be seen in Figure 5, the most outstanding feature of this version of MOSL4L with respect to the previous one, however, is the tension between the need to reach unnegotiable standardized quotas of educational quality (reflected in the technology-based concepts and its interrelationships, despite restrictions motivated by demographic inferiority) and the weight of community-specific configuration, which needed to be present in the learning process to guarantee student involvement and the progressive creation of a much needed positive imagery of rural environments.

Figure 5 (available online, link included at the end of this document) visually represents the MOSL4L-r framework, a model specifically adapted for language teaching and learning within rural areas. At its core, MOSL4L-r appears defined by three primary interacting elements: Affordable Hardware and Devices, and Context-Sensitive Educational Resources, and Teacher Leadership. Thus, novel aspects of this version of the framework include the incorporation of budgetary and infrastructural constraints (e.g., the lack of libraries with relevant books, modern software, robust internet connectivity), and the adaptation of resources and materials (curricula, programs, and textbooks) to the specific realities of rural environments (e.g., economic activities, role of nature, alliances with local institutions) in an attempt to overcome alienating urban-centric biases. With the necessary specialised training (methodological, technological, and community-based), teachers can more than make up for the many challenges and shortcomings of rural education systems, promote multiple literacies, help bridge the gap between local culture and formal education, and play a leading role in their centres and communities. Their responsibilities frequently extend beyond the classroom, as they build trust with families, adapt learning to local contexts, and take on multiple roles, thus becoming agents of social change. The three dynamic interactions (Digital Literacy, Tools and Media, and Community Competence) reflect the framework's aim to provide a ‘glocal’

approach to improving language education in these specific environments, drawing on the principles and findings of the AGORA project.

5. DISCUSSION AND CONCLUSIONS

MOSL4L-r is presented in this chapter as a usable theoretical complement of the T2T pedagogical macro-strategy and as a compromise between an original, generic framework for language learning and a second, overly granular model developed in an attempt to compensate for the initial lack of synthesis. The research project that served as the foundation for MOSL4L-r aimed not only to function as a tool for academic inquiry, but also to support pedagogical practice, particularly focusing on the pivotal role of language teachers in rural educational settings. These educators are seen as key agents capable of addressing the complex challenges prevalent in such environments, thanks to their specific and soft skills and their commitment to their students and communities, together with the participatory attitude and goodwill of local associations and institutions.

T2T is introduced as a holistic, innovative, and sustainable macro-strategy that aligns with the design principles of MOSL4L-r. The evolution of this framework into a rural-specific version reflects a transition from theory to experience and actionable practice. In this regard, it is intended to inform curriculum development, teacher training, and resource allocation, among others. The implementation of MOSL4L-r ensures that all these components are coherently organized, with a strong emphasis on standardization. Within this framework, teachers are recognized as the primary driving force in rural education, not only because of their experience teaching languages in resource-constrained and often complex classrooms (marked by heterogeneity and socioeconomically disadvantaged student populations), but also due to their deep familiarity with the local context. When this expertise is supported by adequate training and resources, it fosters professional growth and strengthens teacher retention, counteracting the detrimental effects of high turnover in rural schools. This, in turn, arguably motivates teachers to innovate and expand traditional teaching approaches to keep pace with the evolving pedagogical trends present in high-performing urban educational institutions (Hawkins, 2019; Barcena & Read, in press 1). Furthermore, the integration of MOSL4L-R into rural schools has benefits not only for teachers and students, but also for the local communities. Teacher engagement and commitment leads to the mobilization of community hubs for mutual collaboration (e.g., outside classroom learning, service learning), thereby strengthening the rural social fabric.

Regarding the integration of T2T and MOSL4L-R, as mentioned above, the latter adds systematicity, consistency, and reproducibility to the former. An additional feature that makes the framework suitable for applicability in heterogeneous rural contexts is its flexibility of use. In this way, for example, while one teaching innovation project for practicing/improving oral interaction in the target language might emphasize social learning because the institution where it takes place happens to have tablets available, another one might focus on service learning, benefitting from previously established institutional alliances that could provide relevant support staff.

MOSL4L has gone through an evolutionary process, illustrating how language learning frameworks can develop: starting from the theory present in the literature (version 1), through the incorporation of learner profiling, and evidence-based formalization (version 2), to a focused contextualisation for rural areas (version 3), which not only sharpens and elaborates the components and relationships introduced in version 2, but also grounds them in a real-world environment where the framework can be applied, tested and refined. This step is particularly aimed at assessing its usability by the target audience, namely

rural language teachers, as well as researchers. From a pedagogical perspective, even though eight years have passed since the initial version was created, its foundational principles (mobility, openness, and social learning) remain highly relevant to current language learning practices.

Looking ahead, the next phase in the ongoing refinement of MOSL4L will involve evaluating the framework in the context of a new cycle of microprojects currently being implemented in AGORA, as part of the broader T2T macro-strategy. Finally, the goal of this research is to make a methodological contribution to the development of theoretical foundations in TELL, beyond the MOSL4L framework itself, thus turning this iterative process into a longitudinal case study of framework development within this field.

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Additional references and figures available here: <https://acortar.link/FxEO2u>

<https://tinyurl.com/3semzd9p>

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