

A Corpus-Informed Framework For Adaptive Immersive Foreign Language Learning In Uzbekistan

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Abstract: This article proposes an adaptive immersive language-learning framework for Uzbekistan through exploratory secondary analysis of three published school interaction episodes. It examines instructional support, participation, mediation and technical ambiguity, translating these observations into a teacher-supervised architecture. Its central contribution is an evidence-validation gate that distinguishes independent performance, supported completion, unsuccessful performance and missing evidence before adaptation. An A1–A2 museum scenario illustrates task design and CEFR alignment. Future evaluation would compare adaptive VR, non-adaptive VR and matched classroom activities. The analysis establishes design requirements; it reports no newly collected learner data or demonstrated learning effects.

Keywords: virtual reality; adaptive learning; secondary analysis; CEFR; Uzbekistan

1. Introduction and research gap. Immersive virtual reality (VR) supports situated communication, but task failure can reflect language difficulty, interface problems, unclear instructions or unequal participation. Adaptation requires distinguishing these explanations before changing a learner's estimated readiness.

Reviews identify promising applications alongside unresolved effectiveness questions [2]; a vocabulary experiment found no significant advantage for higher immersion or object interactivity in its comparisons [3]. CAMIL connects presence and agency with cognitive and affective processes, including cognitive load [8]. Consequently, immersion should serve explicit language objectives rather than visual complexity.

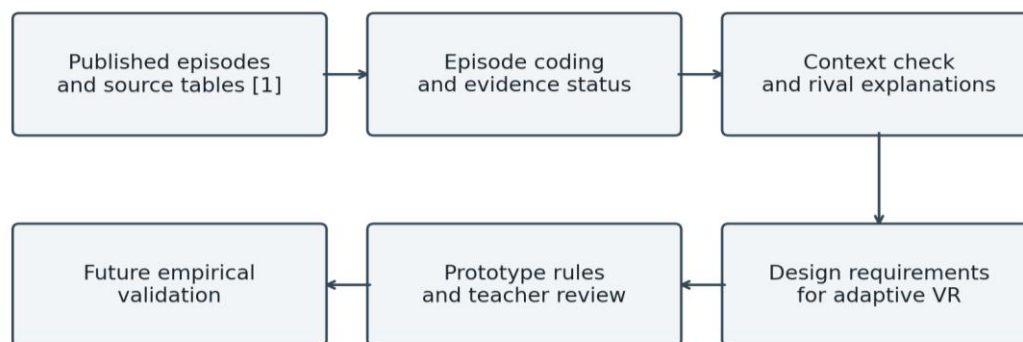
Uzbekistan's foreign-language policy [5] and local work on digital 3D environments and VR/AR [6,7] motivate contextual development without establishing this framework's effectiveness. CEFR descriptors guide task design [4], while UNESCO guidance supports teacher oversight of educational AI [9].

Existing approaches address personalised Kazakh-language recommendations [10], comprehension estimation in VR-based TOEIC sessions [11], and adaptive feedback in an embedded-systems course [12]. Their contexts differ from this proposal. The present contribution focuses on validating assistance, participation opportunity and technical adequacy before using events for adaptation; it does not establish superiority over earlier systems.

The study asks: which design-relevant distinctions emerge from published interactions, and how can they inform an adaptive platform and evaluation for Uzbekistan?

2. Materials and analytical method. The bounded corpus comprises three published episodes and accompanying CEFR-related assessment tables from Dooly, Thrasher and Sadler [1]: C1, a VR gallery-description task; C2, a classroom identification game; and C3, collaborative picture placement in VR. Duplicate screenshots in the supplied copy were counted once. The source study involved 24 learners, Immerse and Oculus Quest 2, with rotating VR/non-VR activities over ten weeks. These participants and procedures belong to the source study, not the present analysis.

A single analyst coded instructional support, participation opportunity, mediation, multimodal evidence and technical ambiguity. Published observations, source-author ratings and proposed design requirements were separated. Source-assigned CEFR levels were not independently validated or converted into overall proficiency scores. Complete recordings, a second coder and participant-level data were unavailable; no prevalence estimates, reliability statistics or intervention effects were calculated.



Analytical outputs inform design; effectiveness requires new learner data.

Figure 1. Published-excerpt analysis, design synthesis and prospective validation. Original conceptual workflow; source episodes: [1].

3. Analytical observations. C1 combines repeated prompts, peer assistance, avatar exploration and an audio-related complaint [1]. Limited responses therefore cannot be attributed to language alone. The proposed system would check audio and instructions before offering linguistic support, recording assistance separately from independent performance and identifying the helper's mediation.

C2 uses a controlled question-answer structure [1]. Accurate responses within this structure differ from independently initiated communication. Task scripting and prompting should be logged. When no assessable turn is available, the learner needs another participation opportunity; silence alone does not justify an easier task.

C3 combines reading, spoken coordination and object placement, including difficulty with the placement mechanism [1]. Correct object identification and failed manipulation may coexist. Comprehension and controller operation should therefore be checked separately. Table 1 links this observation to a proposed response; the follow-up checks are prospective, not observed adaptations.

Table 1. Traceable evidence-to-design example

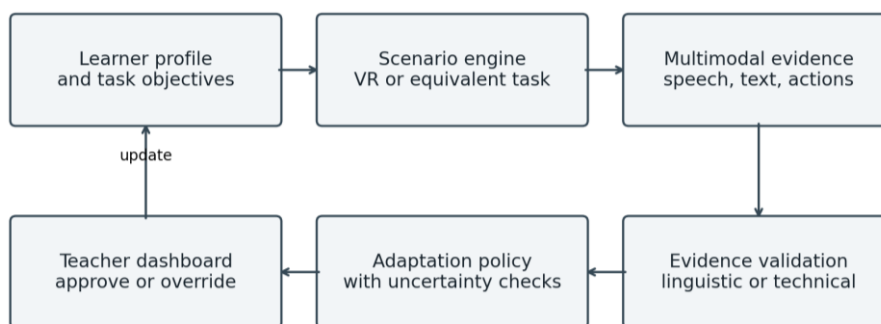
Source evidence	Code / interpretation	Proposed response	Status
C3: picture-placement difficulty; mechanism explained [1].	Technical ambiguity: failed movement does not establish language difficulty.	Check intended object/location separately from controller operation.	Published observation → proposed check.
Correct identification; failed manipulation.	Comprehension evidence with technical difficulty.	Offer controller guidance; retain language target.	Prospective follow-up.
Incorrect identification with adequate controls.	Possible comprehension difficulty.	Offer a shorter prompt; collect another response.	Prospective follow-up.

4. Proposed framework and teaching scenario

The architecture links learner profiles, a scenario engine, multimodal evidence collection, a validation gate, adaptation rules and a teacher dashboard (Figure 2). An evidence record would contain anonymised learner/task identifiers, target activity, response, assistance, technical status and teacher review. Four statuses distinguish independent success, supported success, failure under adequate conditions and missing evidence.

Only relevant, technically adequate evidence would update task-specific readiness. Ambiguous events would trigger a follow-up check or teacher judgment. Transparent rules would initially select the smallest

justified adjustment: technical help, a targeted language cue, another participation opportunity or reduced support after repeated independent success. Advancement thresholds require pilot calibration. The excerpt corpus cannot train a reliable AI model.



Every recommendation retains its evidence, confidence and teacher decision.

Figure 2. Proposed teacher-supervised architecture. Components and feedback links are conceptual, not implemented.

The A1–A2 scenario, “Help a visitor explore an Uzbek museum,” combines exhibit identification, route reading, spoken directions and a short written message. A1 models include “Go straight” and “Turn left”; A2 tasks add ordered directions and a follow-up question. Uzbek or Russian instruction cues may support access while target-language performance is assessed separately.

Table 2 summarises paraphrased CEFR descriptor links [4]. These author-developed tasks are not CEFR-certified tests. Assessment would distinguish task fulfilment, intelligibility and assistance; answer-revealing cues require a fresh independent check. Single-task success does not establish overall proficiency.

Table 2. Proposed A1–A2 objectives, support and assessment

Task/objective	CEFR scale [4]	Permitted support	Assessment
A1: identify exhibit from request.	Understanding an interlocutor, p. 73.	Slow speech; repetition.	Correct identification; controls checked separately.
A1: follow written route.	Reading instructions, p. 58.	Rereading; familiar labels.	Destination/direction identified without answer cue.
A1: answer location question.	Overall oral interaction, p. 72.	Repetition/rephrasing; models logged.	Relevant, intelligible response; independence recorded.
A2: exchange directions.	Obtaining goods/services, p. 78.	Familiar map; clarification.	Destination and ordered directions conveyed.
A2: interpret route notice.	Reading instructions, p. 58.	Step illustrations; rereading.	Steps understood; movement scored separately.
A2: write route message.	Notes/messages/forms, p. 84.	Vocabulary list; dictionary use logged.	Usable directions; intelligibility and assistance recorded.

5. Future evaluation and limitations

Evaluation would begin with teacher and assessment-specialist review, followed by a usability pilot examining controls, audio, legibility, comfort and workload. A prospective comparison would include adaptive VR, non-adaptive VR and matched non-VR activities, aligning topics, practice time, partner arrangements and objectives. These comparisons would examine adaptation and immersion while acknowledging remaining differences.

Sample size would follow a prospective power or precision analysis rather than the source study's 24 learners. Independent language-performance ratings, baseline and delayed assessment, rater agreement and appropriate handling of clustering/repeated measures would support evaluation. Mechanism-level outcomes would include recommendation appropriateness, technical-error downgrades and participation opportunities. A comparison with and without the validation gate would test its contribution directly.

Research would require institutional review, consent/assent, data minimisation and secure retention. Speech processing would need validation for relevant learner groups, and generated content would remain teacher-reviewable [9].

The three selected, edited excerpts are not representative of the original study. Omitted interaction, single-analyst interpretation and unavailable recordings limit inference. Transfer to Uzbekistan depends on language background, curriculum, device access and teacher experience. No implementation performance, prediction accuracy or learner gains are reported; the architecture and scenario remain proposals.

6. Conclusion

The framework connects published interaction evidence to an adaptive immersive design that records both performance and its conditions. Its validation gate separates linguistic difficulty from technical failure, assistance and missing participation. A locally reviewed prototype and prospective comparison must establish whether these distinctions improve decisions and language outcomes.

Data availability

Only published excerpts from [1] were analysed. No original recordings or participant-level dataset were accessed, and no new learner dataset is reported.

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