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UNIVERSAL DESIGN IN MUSEUMS: INTEGRATING TACTILE AND AUDIO DESCRIPTION STRATEGIES

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Abstract. Museum accessibility for blind and partially sighted visitors is usually built as two separate provisions: tactile objects designed by one team, audio description written by another. This article develops a three-level model, cognitive-semantic, technological and procedural, for integrating them, developed from practice and examined against participant-produced material: a SOCINTEGRA staff-training project in Latvian museums during 2025, a pre-course questionnaire completed by 69 staff, an audio description script written before the model existed, and eighteen excursion-route assignments, seventeen analysed as independent cases and one flagged for a prior consultation link to the authors. Half the questionnaire respondents had already planned to combine both channels without any framework for doing so. Every independent submission extended the model beyond its two channels, adding ambient sound, smell, taste, warmth, scripted consent or embodied activity it does not formalise. The model gives that instinct a method; the data complicate it more than they confirm it.

Key words: universal design, museum accessibility, audio description, tactile accessibility, synesthetic translation, inclusive museum.

1. Introduction

Universal design in museum space is not reducible to a set of compensatory measures: tactile floor markings, Braille signage, an audio guide offered as an optional extra. What is at stake, rather, is a systemic approach to designing exhibitions and accompanying services, one that makes the space legible, comfortable and informative for every visitor, including blind and partially sighted people, from the outset rather than through later adaptation of an already finished solution. The museum experience itself needs rethinking on this basis. Perception of an exhibition does not reduce to the visual channel; it unfolds as a multisensory process, where tactile and auditory information do not merely supplement sight but constitute independent, fully adequate means of accessing content.

Despite growing normative recognition of universal design principles in museum practice, empirical evidence points to a persistent gap between stated principles and their systemic implementation (Fortuna et al., 2023). The gap shows up mainly in how the literature and institutional practice treat the tactile and audio description components of accessibility: as a rule, these are described and implemented as separate, parallel strands of work. Tactile graphics and relief replicas are designed by designers and conservators; audio description is developed by translation scholars and linguists. The functional relationship between the two rarely becomes an object of study in its own right.

Set two research traditions side by side, one serving the tactile modality, the other audio description, and the gap becomes especially visible. The design and engineering tradition develops largely within HCI (human-computer interaction) and cultural heritage studies, concerned with technical solutions such as relief printing, tactile interfaces, multisensory installations. The translation studies tradition treats audio description as intersemiotic translation (Jakobson, 1959), and has established itself as

a distinct field of training and research within translation and interpreting studies. Interestingly, the need to move beyond a purely verbal channel is acknowledged within the translation tradition itself: live-guided audio description tours are sometimes enriched with scent, music, or tactile exploration of objects and diagrams. Tactility is recognised as an adjacent modality already at the level of genre definition, yet it rarely receives systematic analysis within translation studies scholarship.

A systematic review of research at the intersection of museum accessibility, multisensory interaction and digital technology is telling in this respect (Hou & Riccò, 2025). It finds that multisensory experience improves comprehension of cultural artefacts among people with visual impairments, with particular weight given to translating information across visual, auditory and tactile modalities. The phrase 'translating information between modalities' is worth pausing on. It effectively describes a translational operation without naming it as such, which points to an unrealised potential for bringing the design and translation frameworks closer together. Tellingly, one of the review's own authors is already moving in this direction from the design side: Riccò's (2016) earlier framework of synesthetic translation accounts for media accessibility through cross-modal correspondences rather than through isolated adaptation for each sensory channel on its own.

At the intersection of these two traditions, the engineering practice of accessible design and the translational practice of audio description, lies the theoretical gap this article addresses. Tactile and audio-descriptive components are each analysed within the boundaries of their own discipline. A model of their systemic, rather than additive, integration (the principle by which tactile and verbal channels jointly, rather than in parallel, construct an accessible museum experience) has yet to be worked out in either the design or the translation studies literature. Without it, moving from a compensatory model of accessibility toward the systemic universal design adopted here as the theoretical frame remains difficult.

This framing needs one clarification: tactile replicas and audio description for blind visitors could themselves be described as targeted accommodations for a specific group, closer to what universal design was originally meant to move away from. What justifies the label here is not the individual components but the level at which integration is pursued. A tactile replica commissioned as an add-on, evaluated on its own, is a targeted accommodation regardless of how well it is made. The claim this article makes is narrower: building tactile and verbal access into an exhibition's core design process, rather than procuring each modality separately afterward, is what moves a museum from compensation toward universal design, even where the resulting components primarily serve one group of visitors.

Research question:

How can the tactile and audio description components of museum accessibility be conceptually and methodologically integrated within a systemic, universal-design-based approach to designing exhibitions and educational services?

1. Where do tactile and audio description strategies for representing a museum object to a blind audience functionally intersect and complement one another?

2. How can museum staff training operationalise this integration, translating the theoretical principle of systemicity into a practical toolkit?

The article's contribution can be located on three levels. First, it offers an integrative conceptualisation of the tactile and audio description components of museum accessibility, not as independent services but as elements of a single perceptual system, drawing on the concept of synesthetic translation (Riccò, 2016) as a bridge between the design and translation studies traditions. Second, this framework is grounded empirically in a practical case: joint museum accessibility projects and the staff training course developed on their basis, which allows the discussion to move from declared principles to concrete methodological solutions. Third, the article sets out practical recommendations for museum institutions in the Baltic region, where empirical evidence on the implementation of universal design in museum practice remains fragmentary.

The article proceeds as follows. Section 2 reviews the literature across the two traditions, design and engineering (HCI, cultural heritage studies) and translation studies (audio description as intersemiotic translation), and argues for bringing them closer together. Section 3 sets out the methodology: a practice-oriented case study. Sections 4 and 5 examine, respectively, the tactile and audio description components on the material of the projects under discussion. Section 6 proposes an integrative model linking both modalities, together with the staff training course built on it. Section 7 discusses the findings in light of the universal design framework and formulates recommendations for museum practice.

2. Literature Review

2.1. The Design and Engineering Tradition: Technical Solutions and Their Conceptual Limits

Museum accessibility research within HCI and cultural heritage studies has grown quickly alongside the falling cost of 3D scanning and printing. Museums now routinely produce touch replicas of paintings, sculptures and archaeological objects, sometimes embedding sensors or NFC tags that trigger audio content when a visitor's hand reaches a particular point on the surface. Interactive multimodal tangible interfaces, evaluated with blind and low-vision visitors, have shown a clear preference for simple, predictable controls such as pushbuttons over more elaborate gesture-based systems (Avni, Danial-Saad, & Sheidin, 2025). Gesture-tracked tactile reliefs, by contrast, allow finer exploration of two-dimensional works such as paintings and photographs, enriching the relief with contextual audio as the visitor's fingers move across it, an approach consistent with the broader case for multisensory museum design (Levent & Pascual-Leone, 2014).

The scale of this research is considerable, but its focus is narrower than the volume suggests. A recent systematic review of the literature on technologies for blind and low-vision museum visitors found that touchable objects feature in the overwhelming majority of studies, with roughly half examining full 3D replicas and a further large share working with 2.5D relief formats (Avni, Danial-Saad, & Kuflik, 2026). Concrete, transferable guidelines, however, were far rarer: only about one in ten of the reviewed papers offered anything resembling a practical framework that could travel from one museum to the next. The tradition, in other words, is rich in artefacts and thin on generalisable principles. Audio content, when it appears in these studies at all, tends to be treated as a technical parameter to be optimised, something to test and refine alongside button placement or print resolution, rather than as a linguistic object with its own compositional logic. Tactility, in this literature, is the subject; the words that accompany it are an implementation detail.

Two recent contributions push against this pattern. Ciaccheri (2022) offers the fullest articulation to date, arguing that museum accessibility should be consolidated as a systematic discipline rather than a set of technical or legal provisions bolted onto an otherwise finished institution. Laws and regulations, she argues, can paradoxically block institutional thinking, since compliance becomes the ceiling rather than the floor; her alternative, a "culture of accessibility" running through curation, design, mediation and policy alike, treats the museum as "an interconnected organism capable of responding to different human needs." She also names a structural cause for the parallel-tracks problem this article addresses: fragmentation between departments, which keeps accessibility siloed as a specialist responsibility rather than a shared commitment, exactly the pattern that emerges whenever tactile and audio-descriptive work are commissioned separately. Her own second half turns to staff training and co-design as the mechanism for closing that gap, anticipating the role Section 6 assigns to the joint training course. A study of universal design in historic museum buildings makes a related point at the architectural scale, distinguishing physical accessibility from perceptual accessibility through the case of the Graz Museum Schlossberg (Filová, Rollová, & Čerešňová, 2022), though without extending its framing to the verbal channel. A third, earlier contribution approaches the same shift from the training side: Saluti (2019), drawing on Universal Design for Learning, argues that museum accessibility should be redefined around how visitors learn and engage, not only how they move through space, a pedagogical framing this article returns to in Section 6.

2.2. The Translation Studies Tradition: Audio Description as Intersemiotic Translation

Where the design tradition treats the verbal channel as secondary, translation studies treats it as the primary object of analysis. Audio description entered this field through Braun's (2007) definition of AD as intersemiotic, intermodal or crossmodal translation, and has since accumulated a substantial literature on how a describer converts visual composition into a parallel verbal text. Museum AD, within this literature, is usually read against its older sibling, screen AD, and found to differ in ways that matter for method: a museum object carries no built-in timeline, so the describer's constraints are spatial and interpretive rather than temporal.

The disagreement over objectivity, introduced in Section 1, is not merely anecdotal. A survey of forty-two museum describers across twelve countries found that European respondents agreed significantly more often than their American counterparts that AD should explore meaning rather than restrict itself to visual description, and were likewise more willing to treat emotional engagement as part of the describer's task (Hutchinson & Eardley, 2020). The American tradition is often summarised through the maxim "what you see is what you say" (WYSIWYS), which leaves little room for interpretive framing. Hutchinson and Eardley conclude that the field needs a clearer account of how objectivity itself gets contextualised in practice; this article treats that conclusion as a starting point rather than a settled matter.

Corpus-based work within this tradition remains comparatively rare but is directly relevant to the present study. Jiménez Hurtado and Soler Gallego's (2015) corpus study of pictorial audio description frames the practice explicitly as translation, tracing how museum guides render composition, colour and gesture into parallel verbal text. Soler Gallego's (2018) later semantic analysis of a corpus of audio description guides from UK and US art museums extends this line of work, mapping recurring lexico-semantic patterns used to describe an artwork's visual features. Taken together, these studies suggest that a corpus of museum AD is not simply a collection of individual scripts but a body of text with recoverable regularities, the kind of regularity a comparable analysis of the present case's material could test against a different linguistic and institutional context.

2.3. Where the Two Traditions Fail to Meet

Read side by side, the two bodies of literature are strikingly asymmetrical. The design and engineering tradition documents an enormous range of tactile artefacts and interaction techniques but rarely asks what makes an accompanying description work as language. The translation studies tradition has developed a fine-grained understanding of how museum AD constructs meaning verbally but treats tactile exploration, when it appears at all, as an occasional sensory enrichment rather than a component with its own design logic. Neither literature, on its own terms, is equipped to answer the question this article asks: not how a tactile object or an AD script performs in isolation, but how the two are meant to work together. That gap, already outlined in Section 1, is the point from which the remainder of this article proceeds.

One recent project comes close to bridging this gap directly and is worth addressing on its own terms. Reviers and Hanoulle's (2023) participatory action research project, "A Touch of Museum to Scale," co-develops tactile objects and an inclusive audio guide for five artworks with stakeholders of varying visual ability, treating the tactile translation as an artistic contribution in its own right rather than a support add-on. Their focus, however, falls on the collaborative process of creation and its aesthetic and ethical stakes, not on formalising how the tactile and verbal channels function together once created. Their project raises the integration question this article answers; it does not itself propose a model of how the two channels are meant to work together, which is the gap the present article addresses.

The clearest evidence for this gap comes, perhaps unexpectedly, from within the AD guidelines themselves. Hutchinson and Eardley (2020) note that every major international guideline for museum AD they reviewed, European and American alike, recommends touch as a complement to verbal description wherever the object allows it. The recommendation is telling in what it stops short of.

None of the guidelines offer any account of how touch and verbal description are meant to function as a single, coordinated experience; touch is added alongside the description, not built into its structure. Their interview data point the same way: describers who raised the subject, across both European and American groups, tended to talk about touch as something that makes an object "come alive" rather than as an information channel that could take over part of the work the verbal text would otherwise have to do. The guidelines converge on the value of combining modalities without ever specifying how that combination is meant to work. That is exactly the gap the present study sets out to close.

3. Methodology

Given the nature of the material, a practical case at the intersection of accessible design and translation studies, this study is conducted as a qualitative embedded case study (Yin, 2018). Case study design is appropriate where the research question is framed in terms of how and why, which matches the research question set out above.

3.1. Research Design

The case is the SOCINTEGRA project "Attīstības vektors" (Development Vector), launched in March 2025 with the aim of introducing modern, inclusive approaches to Latvian museums so that blind and partially sighted visitors can have a full cultural experience. Between May and October 2025, SOCINTEGRA ran both in-person and online training courses for museum staff wishing to acquire practical skills in building accessible environments and delivering quality visitor service. Seventy museums took part, including the Riga Porcelain Museum, the Latvian National Museum of Literature and Music, the Latvian National Museum of Art, the Latvian Railway History Museum, and the Latvian Museum of Natural History. The project was funded under the Riga City Council's Social Integration Programme. The embedded units of analysis are: (1) the tactile accessibility component, (2) the audio description component, (3) the methodology of their integration within the training course.

The course team itself was not exclusively sighted. Vlada Khmelevska, an accessibility specialist who is herself blind, took part in developing and delivering the training. Her involvement is worth stating plainly rather than folding into a general claim about inclusive process: it means the course that produced the three-level model in Section 6 was not designed for a blind audience by sighted practitioners alone, but shaped in part by someone with direct, first-hand experience of the museum access problem the course addresses. This is the concrete form the co-design principle discussed in Section 2.1 (Ciaccheri, 2022) takes in the present case, rather than a claim asserted only at the level of theory.

3.2. Data Sources

Drawing on multiple sources of evidence, in keeping with case-study methodology, the following sources are used, structured around the training course's four thematic areas: audio description and commentary; tactile models; communication etiquette; and hands-on practical sessions in small groups, where participants developed and tested audio materials, evaluated recording clarity, and drafted tour scenarios adapted to the accessibility of the museum environment.

• Three graded participant assignments (10 points each). The first (set 17 May 2025, due 26 May) asked participants to produce an audio description of their museum building's exterior, following the basic AD principles set out in Section 5, with a sample script and a required photograph. The second, the typhlo-tour route assignment (same dates), asked for a step-by-step accessible route from the nearest public transport stop or car park to the museum entrance, specifying the starting landmark, turns and distances, sound and tactile landmarks en route, and the perceptual cues signalling arrival, submitted with a map or sketch. The third (set 4 June, due 20 June) is the one most directly relevant to the model in Section 6: participants planned a full excursion route through their own museum for blind and partially sighted visitors, using the museum's floor plan, marking a starting point (ideally a tactile map) and five to eight content stops combining existing or proposed tactile objects and audio description, with an explicit account of what physical materials each stop would require. These briefs, and the submissions they produced, exist for a substantial share of the 69 participating museums.

Eighteen excursion-route-type submissions have been analysed for this article and are discussed in Section 6.6 (seventeen as independent cases, one flagged separately).

• The authors' own audio description scripts, produced independently of the course: Jūlija Rastorgujeva's pre-course script for the Bauska Museum permanent exhibition, analysed in Section 5.2, and a post-course set of paintings-focused AD scripts by the same author.

• Project documentation, including training briefs and tactile object mock-ups produced for the course.

• Course materials documenting the four thematic areas above and the session format described in Section 6. No separate written syllabus was retained as a standalone document.

• A pre-course application questionnaire completed by 69 museum staff before training, spanning museums across Latvia (32 respondents in Riga, 37 outside it).

• No contemporaneous field observation notes from the practical sessions were kept. The case draws instead on the authors' own recollection as the sessions' designers and facilitators, folded into the reflexive notes below.

• Reflexive notes by the authors as practitioner-researchers (practice-based research).

The questionnaire data merit closer attention, since they establish a clear baseline for why the course was built around an integrated model rather than a single-modality one. Just over half of respondents (55.1%) reported that their museum had no tactile object and no experience serving blind visitors at all; a further 24.6% had some tactile exhibits but no coherent programme; only 2.9% had both exhibits and a programme in place. Stated motivation was high (mean readiness 8.84 out of 10, SD 1.21), but the free-text responses show that motivation outpacing know-how, not indifference, was the starting condition the course had to address. Most tellingly for the argument advanced in this article, when asked what they planned to add to their exhibitions, 69.6% named audio descriptions and 56.5% named tactile 2D/3D objects; 50.7% of respondents named both. This does not show that half the cohort already understood tactile and audio description as functionally integrated modalities; wanting both provisions in the same museum is not the same as conceiving of them as one coordinated system. What it does show is substantial pre-existing interest in implementing both modalities together, with no guidance in either the design or the translation studies literature (see Section 2.3) on how that combination should actually work. Closing that guidance gap, not manufacturing the interest, is what the course, and the integrative model in Section 6, set out to do.

The respondents' job titles speak to a related point raised in Section 2.1. Just over half (52.2%) held department- or unit-head positions, but the remaining cohort was spread across directors and deputy directors (11.6%), project managers (11.6%), communications specialists (11.6%), museum educators (8.7%), curators (5.8%), researchers and collections staff: sixty distinct job titles among sixty-nine respondents. Accessibility, in other words, was not something only education staff signed up to think about; participation cut across departmental lines, which is itself a small piece of evidence against the very fragmentation Ciaccheri (2022) identifies as a structural barrier to systemic accessibility work.

The free-text responses also show how differently "starting point" could mean from one museum to the next within the same cohort. A respondent from the Pharmacy Museum, housed in a protected historic building in Riga's Old Town, described renovation options as severely limited and asked for help finding the balance between visitor need and what the building would allow, the exact tension Filová, Rollová and Čerešňová (2022) describe for historic museum buildings more generally. A respondent from the Latvian National Museum of Art, by contrast, was already mid-way through developing a "multisensory tour" for visitors with visual impairments and saw the course as a way to deepen an initiative already underway. The course had to serve, within a single cohort, museums starting from architectural constraint and museums already iterating on a multisensory concept of their own.

3.3. Analytical Procedure

Three analytical procedures correspond to the three embedded units in 3.1. The pre-course questionnaire (Section 3.2) is analysed thematically, grouping free-text responses by starting point, motivation and planned modality. The audio description material (Section 5) is examined qualitatively for factual versus evaluative language and explicit tactile cross-references, following the objectivity/interpretation distinction in Section 2.2. The tactile and audio components of the model (Section 6) are analysed comparatively, examining where the two channels address the same descriptive problem and where each does work the other cannot.

The three-level model in Section 6 was not coded inductively from a dataset, nor assembled deductively from the literature reviewed in Section 2 before the course began. It was developed retrospectively, after the training, through the authors' own reflection as its designers and facilitators on what the course had actually required them to teach: a cognitive-semantic account of what AD needs to do while hands are on an object, a technological account of what keeps touch and audio synchronised, and a description of the session sequence itself. Reviewed against the literature only after this reconstruction, the model turned out to name distinctions that literature already gestured toward piecemeal, such as the general-to-specific structure Hutchinson and Eardley (2020) find across international AD guidelines, without assembling them into a single framework. This origin means the model should be read as a structured articulation of practice-based knowledge developed by two practitioner-researchers, not as a framework independently validated against data collected for that purpose.

3.4. Author Contribution

Marija Kožarina (Socintegra) was responsible for developing and analysing the tactile component; Jūlija Rastorgujeva was responsible for developing and linguistically analysing the audio description component. The integrative model and the training course methodology were developed jointly.

3.5. Limitations

A single case limits external validity (generalisability). The article is best read as a foundation for subsequent comparative studies across several museum sites. A further limitation concerns the course evaluation itself: a questionnaire was administered before training to establish participants' baseline knowledge, but no equivalent instrument was run afterward. The case can therefore document the course's design, content and the three-level model underlying it, but it cannot support claims about measured learning gains, changed staff practice, or downstream effects on visitor experience. Where Section 6 discusses outcomes, this should be read as a description of what the course set out to do rather than as evidence that it succeeded; the article flags that gap explicitly as a direction for future, outcome-focused research. A related limitation applies to the AD corpus material analysed in Section 5: both scripts discussed there were written by one of the present authors, not by course participants. Any contrast between them documents the reflexive development of a practitioner-researcher's own practice, a legitimate source of insight in practice-based research, but it is not evidence of how the course shaped participants' own practice. Participant-produced material of exactly this kind does exist: audio description scripts, typhlo-tour route descriptions, and, most directly relevant to the model in Section 6, full excursion-route plans in which participants combined tactile stops and audio description across their own museums (Section 3.2). Seventeen independent excursion-route submissions have been analysed (Section 6.6) and suggest the model is narrower in scope than what participants actually produced, but seventeen cases, however consistent, cannot establish how general that pattern is across the full population of participating museums. Extending the analysis across the full set of submissions is the most direct way to close this limitation.

4. Tactile Component

Converting visual museum content into tactile form has to reckon with the psychophysiology of haptic perception, which unfolds sequentially rather than all at once: where a visual image can be taken in largely at a glance, a tactile one is built up detail by detail, over time, through the mov-

ing hand (Millar, 1994). Several established principles follow from this difference and structure the design of tactile exhibits and relief graphics used in the projects discussed here.

The first is a principle of filtering, or reasonable simplification. Copying every fine detail of a visual original onto a 3D model or relief overloads the hand with information it cannot process sequentially, a concern central to tactile graphics standards more generally (Braille Authority of North America, 2010). Closely related is a principle of textural and height contrast: legibility comes not from fine linework but from a pronounced difference in height and from contrasting textures, such as smooth against rough or matte against glossy. The specific figures used in the projects discussed here, a height differential in the 0.5–3 mm range and a panel tilt of roughly 15–30 degrees from horizontal, reflect Kožarina's own professional practice as an accessibility specialist rather than a single universally codified standard, and are reported here as the parameters this case worked to, not as fixed thresholds established in the literature. A third principle concerns proportionality and scale: a model has to be sized to the reach of a hand. Objects that are too large force repeated repositioning of the whole body and disorient the visitor; objects that are too small lose their detail. The workable scale is the one where the key form can be explored with both hands at once. Finally, safety and ergonomics set a hard constraint: no sharp edges, no toxic polymers, no easily broken parts.

Barriers

Bringing tactile objects into museum space runs into institutional, psychophysiological and practical barriers that are worth naming separately, since each calls for a different kind of solution. The most deeply rooted is institutional and cultural: museums have long operated on a strict no-touch principle as a means of conservation, and that convention produces a kind of reflexive caution on both sides: staff worried about damage to the object, and visitors with visual impairments who, in many cases, have never had the chance to build a habit of confident tactile exploration in a public institution.

A second barrier is physiological. Prolonged contact with a uniform surface can reduce the sensitivity of the fingertip receptors, an effect sometimes called tactile fatigue, which means timing and the intensity of interaction need to be actively managed rather than left open-ended. A third, more mundane barrier is upkeep: tactile surfaces wear quickly under repeated contact and require regular cleaning that does not erode the microrelief and texture the design depends on.

The final barrier is the one this article treats as central rather than incidental: the epistemic limits of tactile experience taken on its own. A tactile object, however well designed, cannot on its own convey colour, light and shadow, the object's scale relative to its surroundings, its original material, or its historical and cultural significance. It is precisely this limit that makes synthesis with audio description not an optional enhancement but a structural necessity, the argument taken up directly in Section 6.

5. Audio Description Component

5.1. Between Objectivity and Interpretation: The Generic Specificity of Museum AD

Screen and museum audio description are related but not identical. Screen AD deals above all with questions of timing and narrative coherence (Braun, 2011): the describer's task is constrained by tight windows between dialogue and sound effects. A museum object, unlike a film frame, is static. There is no editing constraint, but there is the object's space and materiality, which still need to be rendered in words. AD emerged as a practice in the United States and the United Kingdom in the 1980s, first for theatre and film; description for the visual arts in the UK took shape by the 1990s (Fryer, 2016). Dedicated guidelines for museum AD specifically remain scarce, and it is within this methodological gap that the present section operates.

The central debate in the field concerns objectivity. The classic recommendation is to maintain neutral, factual description and avoid evaluative judgement; this stance dominates much US training material. The European tradition, reflected in the ADLAB project, frames the task differently: describers are encouraged to "deconstruct" the artwork and reconstruct it through suggestive language, sound effects and music, treating interpretation, contextualisation and selection as an inevitable part of the

process (Remael, Reviers, & Vercauteren, 2014). A growing number of researchers now argue that absolute objectivity in AD is barely attainable: the describer remains a viewer, and the story they tell inevitably carries the imprint of their own interpretation of what is depicted, a concern closely related to what Hutchinson and Eardley (2018) call the problem of textual fidelity in museum AD.

Section 2.2 already reported the scale of the objectivity disagreement across the same forty-two-describer survey (Hutchinson & Eardley, 2020). A further finding from that survey bears directly on the framing set out in Section 1: describers across regions largely agreed that AD aims to help the listener form a mental picture of the object, but Hutchinson and Eardley argue against reading that "picture" as narrowly visual. Mental imagery, they note, is available in every sensory modality, including touch and hearing, and people who have never had sight can form it without ever having had visual experience to draw on. Grass, in their example, has a tactile form and a spatial form as well as a visual one. If the imagery AD is meant to construct is multisensory by nature, then treating the verbal channel as a stand-in for sight, a translation of the visual into words, undersells what audio description is actually doing, and understates how naturally it could be built together with a tactile channel rather than alongside it.

An audio description script written by one of the present authors (Jūlija Rastorgujeva) for the Bauska Museum's permanent historical exhibition, produced before the training course discussed in Section 3, offers a way to test this framing against actual practice rather than only against guidelines. The script does not sit at either extreme. Individual objects (a mechanical wall clock, a pair of blacksmith's tongs, a horseshoe) are built almost entirely from verifiable detail: material, colour, surface condition, position relative to neighbouring objects. Each period room, however, opens with a short evocative frame that no strict WYSIWYS approach would sanction: the museum's façade is described as carrying an atmosphere of quiet contemplation and history, and the photography studio's lighting is said to create a cozy atmosphere. The script, in other words, already occupies the position Section 2.2 associates with the European tradition: factual at the level of the individual object, interpretively framed at the level of the room or scene, without having been written against any explicit guideline to that effect.

5.2. AD as Intersemiotic Translation: Terminology and Composition

Over the past few decades, audio description has established itself not only as an accessibility practice but as an object of translation studies in its own right. Sabine Braun (2007) defines it as intersemiotic, intermodal or crossmodal translation. Applied to the museum context, this definition gains an additional layer of complexity: a museum object is translated not in isolation, but together with information about its historical and artistic context, and sometimes together with a description of the space it occupies.

Corpus-based approaches to museum AD texts remain scarce, but two studies bear directly on the present case. Jiménez Hurtado and Soler Gallego's (2015) corpus study of pictorial audio description frames the practice explicitly as an act of translation, tracing how museum guides render composition, colour and gesture into a parallel verbal text. Soler Gallego's (2018) later semantic analysis of a corpus of audio description guides from UK and US art museums extends this line of work, identifying recurring lexico-semantic patterns used to describe an artwork's visual features. Read together, the two studies suggest that a corpus of museum AD is not merely a set of individual scripts but a body of text with recoverable regularities, the same kind of regularity a comparable analysis of the present case's Latvian-language material could test against a different institutional and linguistic setting.

A methodologically related study of subjectivity in AD for art museums combines interviews with describers and corpus analysis (Olalla Luque & Soler Gallego, 2019). Applying a similar combination of methods to the material of the present case could itself become one of this section's practical contributions.

Structurally, the Bauska script is organised around consistent spatial anchoring. Each room is introduced as a whole: its shape, its number of walls, the fact that a missing fourth wall leaves visitors feeling as though they are looking into an open box, before the description narrows to individual

objects positioned relative to one another through a small, repeated vocabulary of orientation: to the right of, to the left of, behind, in front of, along the wall. This general-to-specific movement matches the structural principle Hutchinson and Eardley (2020) identify across international AD guidelines, arrived at here independently of any guideline consultation.

More striking for the argument of this article is a feature the script was never asked to include. Several passages explicitly flag which described objects are also available to touch: a set of old keys and, later, a row of horseshoes in the blacksmith's workshop are each followed by a short note that they may be touched. The script was written before the integrative model in Section 6 existed, yet it already contains the seed of that model's central move: marking, within the verbal description itself, which details the visitor's hands should expect to verify. What the script lacks is not the impulse toward integration but a systematic principle for which objects to flag this way, how consistently, and how to phrase the cue itself, exactly the gap Section 6 sets out to close in more general terms.

6. Integrative Model and Training Course

The gap identified in Sections 2 and 3, tactile and audio-descriptive work commissioned separately, with no shared account of how the two are meant to function together, calls for a model that specifies the connection rather than simply asserting its value. Drawing on the projects underlying this case, integration can be described on three levels: what AD is doing cognitively while a visitor's hands are on the object, what technology has to do to make the two channels arrive together, and what sequence of steps the visit itself follows.

6.1. The Cognitive-Semantic Level: Audio Description as Tactile Guide

At this level, AD performs two functions a tactile object cannot perform for itself. The first is navigational: description walks the visitor's hands across the object in a deliberate sequence rather than leaving exploration unguided. A typical instruction might run: "Place your palms at the lower edge of the model. Find the raised smooth frame – that is the base of the building. Now move your fingers slowly upward to the first rough line…" The second function is to fill what might be called sensory gaps: the object's true scale and proportions relative to the original, colour, light and shadow, the texture and material of the original where the model itself is cast in a different substance such as resin or plastic, and the historical, cultural or narrative context that no amount of touching would otherwise convey.

Beyond navigation and gap-filling, AD carries out a third, more synthetic function: building the gestalt. Touch proceeds piece by piece, one raised edge and one texture change at a time. Left alone, that sequence stays fragmentary. AD's role is to assemble the pieces into a single mental structure as they accumulate: "you are touching a three-nave basilica; the element under your fingers now is the central nave." The result is a sequential haptic process that resolves into a unified image rather than a list of local sensations.

6.2. The Technological Level: Engineering the Synchronisation

The cognitive functions above depend on a technical infrastructure that keeps touch and audio moving together in real time. The three configurations below are presented as options the model is compatible with, not as a report of which specific system each participating museum implemented; the case material does not permit a confident claim about which configuration, if any, was deployed at scale, and this is a gap the present article does not resolve. Interactive audio-tactile panels combine a touch-sensitive surface with a tactile relief, so that a finger placed on a specific detail (a column, a dome, a figure's face) triggers the corresponding fragment of description automatically. NFC tags or Bluetooth Low Energy beacons embedded in a tactile stand, or in individual sectors of a larger scale model, achieve a looser but more flexible version of the same coupling: a visitor's smartphone or a dedicated audio guide picks up the nearest tag and plays the relevant track as the hand moves across that zone. A third configuration keeps the coupling under the visitor's own control: an audio guide with track-by-track navigation, where the visitor advances, replays or skips segments, using physical buttons or voice commands, as their own hands, rather than a sensor, dictate the pace.

6.3. The Procedural Level: A Three-Stage Exploration Sequence

The model proposes that a session follow the same broad arc regardless of which technical configuration delivers it, though this sequencing has not itself been tested against alternatives. A macro-level opening establishes the object's real dimensions, its original material, the model's scale relative to that original, and any orientation or safety information the visitor needs before touching anything; the visitor's hands then sweep the model as a whole, both hands together where the object allows it, to register overall shape and boundary before any detail work begins. A micro-level stage follows, in which description proceeds detail by detail while the visitor's fingers trace relief, texture and edge in the sequence the audio sets out. A closing, summarising stage moves past physical description entirely: AD accounts for the object's artistic intention, the history of its making, and its significance, while the visitor, now holding a complete tactile impression, is free to consolidate that impression into a considered, rather than merely sensory, understanding of what they have explored.

6.4. Design Constraints Carried Over from the Case

Three practical constraints recur across the material and are worth stating explicitly, since they follow directly from the cognitive and technological levels above rather than being separate design advice. Terminology in the AD script has to match tactile fact exactly: a script that calls a surface "rough" is unusable if the model under the visitor's fingers is smooth. Pacing has to build in tactile pauses, since haptic exploration is slower than listening, and description that runs at spoken-word speed will consistently outrun the hand. And control over the pace has to sit with the visitor rather than the system: the ability to pause, stop, or return to the description of a detail already passed is not a convenience feature but a precondition for the sequential, self-paced nature of tactile perception described in Section 4.

6.5. A Worked Example from the Case

The model is easiest to evaluate against a concrete instance rather than in the abstract. The table below sets out two objects from the Bauska Museum script discussed in Section 5, alongside a third, illustrative row that extends the same object toward the fuller navigational and gestalt-building functions described in Section 6.1. The first two rows report what the script actually does; the third is not drawn from the case and is marked as such.

Museum object	Tactile information	AD information	AD tactile cue	Function
Old keys (blacksmith's workshop wall)	Varied sizes, metal, hung in a row at hand height	Historical function and hanging arrangement described in the surrounding text	"These may be touched"	Touch verification (case evidence, Section 5.2)
Horseshoes (blacksmith's workshop)	Varied sizes, worn and rusted metal surface	Condition and historical use described in the surrounding text	"The horseshoes may be touched"	Touch verification (case evidence, Section 5.2)
Building façade model (illustrative, not from the case)	Raised outline, textured base indicating the building's footprint	Real dimensions, material, historical period	"Place your palms at the lower edge. Find the raised smooth frame, that is the base of the building."	Navigation and gestalt-building (proposed by the model, Section 6.1; not case-tested)

The contrast between the first two rows and the third is informative. What the case demonstrates is touch verification: a describer flagging, after the fact, that an object may also be touched. What the model proposes, beyond that, is a shift from an after-the-fact flag to touch instructions woven into the description's own syntax. That gap, between current practice and the model's fuller claim, is one this article has not closed with evidence.

One piece of the case bears on that gap more directly than the questionnaire or the authors' own scripts do. A third course assignment, set after the audio description and typhlo-route tasks discussed in Section 3.2, asked each participant to plan a full excursion route through their own museum for blind and partially sighted visitors: a starting point, five to eight content stops combining tactile objects and audio description as the participant saw fit, and an explicit account of what physical materials each stop would require. This is, in effect, participants building their own version of the procedural level described in Section 6.3, independently and before they had read any statement of the three-level model as such, since the model itself was only articulated by the authors after the course (Section 3.3). Whether participants' route plans converge on something resembling the model's structure, or diverge from it in informative ways, is the most direct available test of how far the training operationalised the kind of integration this article proposes. Eighteen of these submissions are analysed in Section 6.6 below, seventeen as independent cases and one flagged separately for a prior consultation link to the authors.

6.6. Cross-Case Analysis of Participant Submissions

Eighteen submissions in total were available for this article; seventeen are treated as independent cases, and one, discussed separately below, is flagged for a prior consultation link to the authors. The seventeen span the Varakļānu Novada muzejs route already discussed, a live-guide script for the Valmieras muzejs, a brief accessibility-planning note for the Mencendorfa nams (Mentzendorff House), a diagnostic report for the Jaunpils muzejs (Jaunpils Museum), a two-part route for the Āraišu ezerpils archaeological park, a guided-tour script for the Railway History Museum, a room-by-room plan for the Talsu novada muzejs (Talsi Regional Museum), a memorial-house route for the Franča Trasuna muzejs "Kolnasāta," a manor-house route for Lužnavas muiža, and eight further submissions introduced below. The genre variation across all of them is itself informative: participants produced first-person tour scripts, sensory inventories, diagnostic reports, phased development plans, self-audits and fixed guided sequences, depending on how far their own museum had already progressed. One point applies across nearly all of them: the tactile objects, audio content and typhlo-routes described are proposals the participants drew up after the course's explanations, not features already installed in their museums. Most submissions state this explicitly, marking content as "vēlams" (desirable) or "nepieciešams" (needed); where a submission instead describes something that already exists, such as a pre-installed sensory table or a tactile model already on display, this is noted as such below.

The Varakļāni finding, that participants add channels the two-channel model does not name, replicates rather than stands alone. The Valmiera script has visitors touch a bronze relief map and assemble a wooden coat-of-arms puzzle and a castle built from marked blocks, while a soundtrack of "castle sounds" plays to build "a sense of mood" (noskaņu sajūta). The Jaunpils report proposes battle and metal-clash effects alongside a sword and shield replica. Ambient sound now appears in four of seventeen cases.

The Mencendorfa note extends the pattern with a formal legend coding stops by touch, sound, taste, smell and warmth, and describes offering visitors tea, coffee or pancakes to taste near the kitchen hearth; Āraiši independently adds smell again, inviting visitors to smell beeswax beside a replica beekeeping tool. Smell now appears in three of seventeen cases; taste and warmth remain confined to Mencendorfa.

Valmiera adds a dimension with no analogue in the tactile or technological literature reviewed in Section 2: the guide's script repeatedly asks permission before touch ("I will ask permission to place

your hand…") and opens with a physical self-description, age, height, hair, glasses, before the tour begins. This is the course's "communication etiquette" strand (Section 6.4) written directly into the same document as the tactile and audio content, not delivered as a separate register.

Āraiši adds a dimension none of the cases discussed so far anticipate: guided visitors are invited to try grinding grain by a reconstructed Bronze Age dwelling, attempt fire-starting by a Stone Age one, and put on a reconstructed Latgalian costume at the lake fortress itself. This goes beyond touch-verification (Section 6.5) and the constructive puzzle-building seen in Valmiera: it is participation in a physical activity historically tied to the site, using the whole body rather than the hands alone. Āraiši also proposes pairing Braille signage with tactile floor plans at two stops, and QR codes linking lakeside markers to audio narration, the technological configuration Section 6.2 lists as literature-derived rather than case-tested; it now has at least one instance of participant-level support.

The Railway Museum script adds a direct institutional response to the no-touch barrier discussed in Section 4: several stops propose a visible symbol marking that only blind and low-vision visitors may touch that particular exhibit, addressing the convention head-on rather than working around it. The same script also distinguishes, unprompted, a prepared "guide description" of what an object looks like from a separate "guide narration" of its history and use, a split that independently tracks the sensory-gap-filling and context-filling functions Section 6.1 assigns to AD.

Talsu novada muzejs adds a physical-endurance dimension the model omits: a bench is planned for the room with the longest audio track. The same submission proposes an ancient Livonian necklace replica, weighing four kilograms, for visitors to wear rather than only touch, and a broken pot reconstructed from shards with magnets, a second independent instance of constructive tactile engagement after Valmiera (Lužnava and Madona add a third and fourth, below). It also draws its own boundary: rotating art exhibitions will not receive tactile objects, only permanent displays, a resourcing decision the participant states herself.

The Franča Trasuna muzejs "Kolnasāta" route adds two things with no precedent elsewhere. Audio content is planned in three languages, Latgalian, Latvian and English, the first regional language in this corpus and a direct link to Section 2.2. It also treats modality choice as a privacy matter: where a blind visitor is accompanied, the guide offers a recorded track instead of speaking aloud, explicitly to protect privacy rather than for any content reason.

Lužnavas muiža contributes the richest case, mixing existing and proposed features. Its tactile bat model, already on display, comes in two postures, wings spread and hanging asleep, so one touch does not stand in for the whole animal, and the object is named, Mūzis, personifying it. A bridge-building task with magnetic pieces, also already in place, confirms the constructive-engagement pattern from Valmiera and Talsi. Most strikingly, the submission proposes a themed "quest in the dark" as a new option, an experience designed for sighted and blind visitors alike, not for blind visitors specifically: the clearest instance in the corpus of the universal-design argument made in Section 1, where a choice serving one group turns, with little extra effort, into one that benefits everyone.

Eight further submissions extend the picture without introducing radically new categories, but each sharpens one already identified. The Balvu Novada muzejs route pairs a touchable church-wood door with a stand demonstrating the axe-and-plane surface treatment used to make it, and bundles wax, sauna herbs and bobbin lace into a single "smell and touch box," a compact multi-item format for what elsewhere appears as isolated smells. The Madonas Novadpētniecības un Mākslas muzejs (Madona Museum of Local History and Art) route adds a wooden-block building activity, a fourth independent instance of constructive tactile engagement (after Valmiera, Talsi and Lužnava). A route for a Latvian National Museum of Art site maps its own gaps floor by floor, "already in the museum" against "not yet," and flags that one exhibition's audio exists only in English, a language-availability gap none of the other cases raise. The Rīgas Porcelāna muzejs route builds around an already-existing sensory table and proposes carrying a portable "tactile album" across every stop rather than installing

separate objects at each one, a distinct modular solution to the technological level in Section 6.2. The Latvijas Kino muzejs (Latvian Museum of Cinema) route ties a rain sound effect to a model of a film set, sound used to illustrate production technique itself rather than to set mood. The Nacionālais dabas muzejs (Latvian Museum of Natural History) zoology route treats birdsong and antler-clash recordings as the primary informational content rather than atmosphere, and separately criticises its own QR stickers for not being raised or tactile, echoing a limitation Āraiši's proposal shares. A second Bauska Museum exhibition, "Bauska laikā," formalises smell, touch and hearing as an explicit per-stop category, a simpler echo of Mencendorfa's five-channel legend.

One further submission, for the Rīgas Geto muzejs (Riga Ghetto Museum), is reported separately. It proposes a raised, threshold-free floor marking at the entrance, QR-linked survivor testimonies, a tactile Hebrew alphabet, a mechanism for visitors to leave audio feedback, and explicitly recommends testing the route with blind experts before implementation. That recommendation converges with the limitation this article states in Sections 3.5 and 7. It is not treated as independent convergence, however: the authors had a prior consultation relationship with this museum, so its planning may have been shaped by that contact rather than arrived at independently, and it is excluded from the frequency observations above for that reason.

Seventeen cases still cannot support a formal frequency claim, and the genres remain too different for a like-for-like count. But every independent case analysed extends beyond touch and audio in some way, adding ambient or content-carrying sound, smell, taste, warmth, scripted consent, wearable or constructive engagement, physical endurance needs, privacy-driven modality choice, regional-language content, or explicit self-audit of accessibility gaps the model does not name. That is enough to treat the model's two-channel scope as provisional rather than settled.

The three-level model maps onto the course's own structure with one addition. Two of the four thematic areas SOCINTEGRA's training covered correspond directly to the levels above: audio description and commentary to the cognitive-semantic level, and tactile models to the material substrate that level operates on. A third area, hands-on practical sessions, corresponds to the procedural level, since it was here that participants built and tested audio materials, judged recording clarity, and drafted tour scenarios adapted to each museum's own accessibility constraints. The course's fourth area, communication etiquette (covering how staff address and guide visitors with visual impairments, and how to avoid discriminatory language), sits outside the three-level model as described so far. It points to a dimension the model does not yet formalise: the interpersonal register in which a describer or guide delivers the AD and tactile experience, as distinct from the content and timing of the description itself.

The training itself followed a fixed three-part format, stated to applicants before enrolment: one introductory webinar, a period of remote consultations with SOCINTEGRA specialists, and one full day of in-person practical training in Riga, held at a general training venue rather than inside any of the participating museums. The webinar and consultations carried the course's more theoretical content, the two thematic areas of audio description principles and tactile-model standards; the in-person day was reserved for the hands-on practical sessions in which participants built and tested audio materials, judged recording clarity, and drafted tour scenarios for their own museums' exhibits, working from documentation and photographs rather than on site. No post-course evaluation was conducted (Section 3.5), so this section describes the course's design and its pre-course baseline rather than claiming measured outcomes. Whether any of the 70 participating museums went on to launch documented adaptation programmes beyond the course itself is not something the present case can establish.

7. Discussion and Recommendations

The findings assembled across Sections 4 through 6 speak most directly to the distinction set out in Section 1 between a compensatory and a systemic model of museum accessibility. A compensatory model treats tactile objects and audio description as separate line items, commissioned separately, evaluated separately, and bolted onto an exhibition once its core design is already fixed. Nothing in

the case examined here required that separation, and the baseline questionnaire data in Section 3.2 suggests museum staff do not think in those terms either: half of respondents wanted both provisions in their museum before the course gave them any account of how the two might work together. That is evidence of demand for both modalities, not evidence that staff already understood them as one coordinated system; the gap the course addressed was the missing account of coordination, not a missing desire for accessibility. What Section 6 supplies is that account: the cognitive-semantic, technological and procedural structure that turns unconnected demand for two provisions into a workable design method for one.

The cross-case analysis in Section 6.6 complicates that account in a way worth stating plainly here rather than leaving implicit. The model was built to integrate two channels, touch and audio description, and the case material used to develop it (Sections 4 and 5) stays within those two channels. But every one of the seventeen independent participant submissions analysed in Section 6.6 exceeded them, independently adding ambient sound, smell, taste, warmth, scripted interpersonal protocols or embodied activity that the model does not name. The most defensible reading of this is not that the model is wrong, but that it may be smaller than the phenomenon it describes: a tactile–audio core that museum professionals, left to their own judgement, routinely extend into a broader multisensory and interpersonal practice. This article does not attempt that larger model, since seventeen cases, though consistent, remain too heterogeneous to support one, but it names the extension as the concrete next step rather than treating the two-channel scope as a finished boundary.

The cohort's own diversity is itself a finding worth taking seriously. The Pharmacy Museum and the Latvian National Museum of Art, both discussed in Section 3.2, sat at opposite ends of the same course: one constrained by a historic building with almost no room for physical adaptation, the other already mid-way through its own multisensory tour concept. A model serving only museums starting from zero, or only those with an existing programme to extend, would have left roughly half the cohort unaddressed. The three-level model is deliberately agnostic about starting point: the cognitive-semantic level (6.1) applies to a purpose-built relief or an improvised adaptation alike, and the technological level (6.2) ranges from full audio-tactile panels to a simple audio guide, so a museum like the Pharmacy Museum is not asked to solve an architectural problem before an accessibility one.

For museum institutions in the Baltic region more broadly, three recommendations follow. First, accessibility planning for blind and partially sighted visitors should be commissioned as a single integrated brief, covering both tactile and audio components together, rather than as two procurements handled by different departments on different timelines. The fragmentation Ciaccheri (2022) identifies as a structural barrier is not abstract here; it is the default condition this course's own participant pool started from. Second, staff training should draw on the full range of institutional roles rather than routing accessibility exclusively through education departments: the course's own participant profile, spread across sixty distinct job titles, suggests this cross-departmental model is already achievable within existing staff structures, not a distant aspiration. Third, museums operating under architectural or budget constraints comparable to the Pharmacy Museum's should not be advised to wait for a comprehensive renovation before beginning tactile and audio integration; the technological options surveyed in Section 6.2 include configurations, such as a simple synchronised audio guide without embedded sensors, that require no structural intervention at all.

These recommendations are offered with the limitation already flagged in Section 3.5 firmly in view. Because no post-course evaluation was conducted, the case can show that the model was coherent enough to be incorporated into training delivered to a genuinely diverse cohort representing 70 museums; it cannot show that participating museums went on to produce more effective accessible exhibitions than they would have otherwise. Establishing that link, ideally through a follow-up survey of the same cohort or a comparative study measuring visitor outcomes at museums that did and did not receive this training, is the most immediate direction for future research the present case makes visible.

8. Conclusion

The case examined here does not prove that tactile and audio description components function better when designed together than when designed apart. No comparison of that kind was built into the project, and the absence of post-course data (Section 3.5) rules it out retrospectively. What the case shows is narrower, and for a first article on this material, probably more useful: a three-level model connecting the cognitive, technological and procedural aspects of tactile-audio integration was incorporated into training delivered to a genuinely heterogeneous group of museum professionals, from a protected historic building with almost no room to manoeuvre to an institution already developing its own multisensory concept. The intuition behind the model was not imported from outside. Half of the course's own applicants had already reached for both channels before anyone offered them a reason why.

That coincidence is worth taking seriously without overstating it. Museum staff sensing that tactile and verbal channels belong together is not the same as knowing how to build that connection, and the gap between the two is where Section 6's model does its work. The Bauska script analysed in Section 5 shows the same pattern on a smaller scale: a describer flagging which objects can be touched, years before any formal integration model existed, with no system for deciding which objects deserve the flag or how consistently to apply it. The convergence suggests that instinct may be outpacing method in current museum accessibility practice, although the present case cannot establish how widespread that pattern is.

Two limitations bear repeating, because they define what would need to change before the claims made here could travel further. The corpus evidence in Section 5 comes from one author's own practice, not from participants trained under the model; whether the model reshapes how other describers write remains largely untested by this article. Seventeen independent excursion-route submissions have been analysed (Section 6.6), and they complicate the model rather than simply confirming it: participants independently added ambient sound, smell, taste, warmth, scripted consent, embodied activity and self-audited accessibility gaps the model does not formalise. The remaining participant-produced excursion routes noted in Section 3.2 make a fuller test possible without a new round of data collection. The three-level model itself was built from a single set of related projects rather than validated against a second, independent case. Analysing the participant material already in hand, and eventually comparing it against a second, independent case, are the natural next steps; the first is within reach of the present data, the second is not.

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