

Remedial Teachers Considerations To Integrate Universal Design For Learning (Udl) And Assistive Technology (At): A Book Review

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Title Of Book: Teaching in Today's Inclusive Classroom: A Universal Design for Learning Approach

Author: Richard M. Gargiulo and Debbie Metcalf

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1.0 Introduction

Nearly a quarter of the world's more than 2 billion children are still out of school. In low- and middle-income countries, at least half of children with disabilities are excluded from school; in some cases, the figure is closer to 90%. These children face a number of challenges, including difficult travel to school due to wheelchairs, remote and inaccessible rural areas, congested roads in the capital, and a lack of easily accessible transportation. When children go to school, teachers are generally not trained or supported in adapting the curriculum to children with disabilities of all types. As a result, these children often do not have the opportunity to learn even the basics, and only a small fraction of them are able to achieve higher levels of education and training. Children with disabilities were found to be 19% less likely than children without disabilities to achieve minimum reading proficiency in ten low- and middle-income countries. Those with sensory, physical, or cognitive disabilities are 2.5 times more likely to experience it (UNESCO 2020).

It is important to remember that all students will have difficulty reading and writing at various levels of their education. We all come across unfamiliar words. Most of us have read something and then wondered what it was. Sometimes we delay reading information that will benefit us but not interest us. Due to our busy schedules, we may not have time to read for long periods of time. Inclusion and diversity are more important than ever. In this difficult environment, the task of fostering inclusiveness and diversity can be easily taken over, and the meticulous progress made by many educational institutions in recent years can be reversed. Some teachers, on the other hand, seem to regard it as a "luxury we can't afford" during a health crisis. We believe that such teachers risk tarnishing their careers and missing out on opportunities to innovate in their classrooms and strengthen their professional development. Using a flexible course design that incorporates UDL principles, Universal Design for Learning (UDL) is a promising teaching approach with the potential to maximise the learning experience and minimise barriers for all students.

2.0 Integration Universal Design for Learning and Assistive Technology

The term "Universal Design for Learning" (UDL) was coined by David Rose, Anne Meyer, and colleagues at the Center for Special Applied Technology (CAST). Following the re-enactment of the Education of Individuals with Disabilities Act in 1997, the principle of Universal Design for Learning (UDL) was developed (IDEA). UDL is a framework designed to support students by removing barriers to learning and maximising learning opportunities by creating equity and allowing all students to succeed. It directs the development of teaching objectives, assessments, methods, and materials. The Guidelines for Universal Design for Learning (UDL) can be applied to any discipline or domain to ensure all students can access and participate in meaningful and challenging learning opportunities (CAST 2020). This framework is structured based on the three principles of CAST: various means of engagement, representation, and action, as well as expression. Because there are fewer barriers, all students, including those with disabilities, can benefit from courses designed with UDL principles in mind.

In a book excerpt published by Gargiulo and Metcalf (2013), he emphasises the basic features of the UDL concept and provides suitable examples for use in diverse classroom teaching. Using a variety of auditory, visual, tactile, kinesthetic, and affective methods also alters repetition for those who need a lot of additional training. It includes the use of assistive technology (AT) to reduce learning barriers. book excerpt published by Gargiulo and Metcalf (2013), he emphasises the basic features of the UDL concept and provides suitable examples for use in diverse classroom teaching. Using a variety of auditory, visual, tactile, kinesthetic, and affective methods also alters repetition for those who need a lot of additional training. It includes the use of assistive technology (AT) to reduce learning barriers.

The definition of an assistive technology device has been defined throughout the legislative mandate. The Assistive Technology Act of 2004 (PL 108-364) defines an assistive technology device as "any item, equipment, or product system, whether commercially acquired off-the-shelf, modified or adapted, used to augment, maintain, or enhance the

functional capabilities of a deficient individual." Assistive Technology does not come in one package that is suitable for everyone. Classroom teachers must carefully consider the specific skills and needs of each student, as well as the technology needed to access the curriculum and achieve good academic achievement.

In Chapter Two, headed "Introducing Universal Design for Learning," the book *Teaching in Today's Inclusive Classroom: A Universal Design for Learning Approach*, shows how each UDL principle role of teaching in an inclusive classroom.

1. *Multiple Means of Representation*

It means "what" of teaching and learning. It provides flexibility in how to present, receive, and interpret information/content (to assess and build connections), adapts to different languages, learning styles, multiple intelligences, cognitive stages, sensory needs, perceptual differences, social needs, adjusts material complexity presented (customise content), and adjusts the environment so that everyone can see, hear, and reach.

Table 1.0 Example of Multiple Ways to Present Lesson Content

Auditory	Visual	Tactile/Kinesthetic	Affective	Technology Options
<ul style="list-style-type: none"> • Lecturing • Presenting information orally through a character • Singing • Reading aloud 	<ul style="list-style-type: none"> • Reading articles, books • Watching video clips or slide show • Showing on a poster, chart, graf, or slide • Watching a play • Using sign language • Providing an advanced organizer 	<ul style="list-style-type: none"> • Taking a field trip • Demonstrating (drawing, sculpting, constructing, playing a game) • Watching a dance • Using sign language/gestures • Using Braille 	<ul style="list-style-type: none"> • Presenting to large or small group • One-on-one presentations or tutorials • Cross-age tutoring • Role playing • Connecting to student interest areas 	<ul style="list-style-type: none"> • Overhead projector • Electronic whiteboard • Books on tape • Video/DVD • TV/VCR (closed caption) • Podcasts • Online tutorials • Youtube

2. *Multiple Means of Engagement*

Flexibility in "Why," methods of customising affective network systems in learning to increase participation, adjusting for student interests and cultural backgrounds, arranging the environment to allow for variety in grouping arrangements, individual work, and access to

technology and other materials, and utilising human resources in the classroom and school (collaboration).

Table 1.1 Example of Multiple Ways to Engage Student

Auditory	Visual	Tactile/Kinesthetic	Affective	Technology Options
<ul style="list-style-type: none"> • Listening to text read aloud • Debating • Discussing • Giving verbal prompts • Talking through steps • Using songs, raps • Oral story telling 	<ul style="list-style-type: none"> • Adding novelty with props • Posting goals • Charting progress • Outlining steps to solving a problem • Using visual schedules • Designing posters • Illustrating/taking pictures 	<ul style="list-style-type: none"> • Using manipulatives • Building a model • Using response cards • Using a game format • Working outside • Building movement into lessons • Role play 	<ul style="list-style-type: none"> • Working in areas of student interest with some choice • Working alone, with a peer, or in co-operative groups • Using positive behavior support • Increasing self-regulation • Developing coping skills • Providing feedback • Adding mentors 	<ul style="list-style-type: none"> • Recording on tape or iPods • Word processing • Charting data with spreadsheets • Creating a video • Using wikis • Video conferencing • Blogging, text messaging

3. *Multiple Means of Expression*

Provides flexibility in “How” students respond to information presented by providing output formats that can be easily changed to accommodate preferred means of control (perceptual, sensory, motor control), using different cognitive strategic systems, tracking students' progress, identifying areas of strengths and needs, and assessing content knowledge.

Table 1.2 Example of Multiple Ways Student Can Express Themselves

Auditory	Visual	Tactile/Kinesthetic	Affective	Technology Options
<ul style="list-style-type: none"> • Oral report • Speech/debate • Song/rap 	<ul style="list-style-type: none"> • Visual demonstration using a chart, graph • Written 	<ul style="list-style-type: none"> • Demonstration of an experiment • Dance 	<ul style="list-style-type: none"> • Group presentation or response 	<ul style="list-style-type: none"> • A recorded tape/CD/DVD

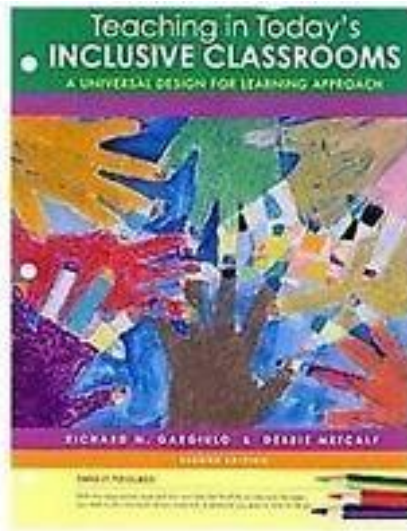
Storytelling • Interview	report • Drawing/poster • Portfolio • Journal/diary • Mural	<ul style="list-style-type: none"> • Written report • Pointing or gazing at answer • Filling in a bubble sheet/ worksheet • Puppet show 	<ul style="list-style-type: none"> • Drama/play production • Role play demonstration 	<ul style="list-style-type: none"> • Multimedia production • Podcast • Electronic book production • Photographic essay • Word-processed report • Electronic assessment • WebQuest creation
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3.0 Universal Design for Learning and Assistive Technology in Literacy

In 2017, it was predicted that 291.2 million (11.2 percent) of the world's 2.6 billion children and adolescents had one of the four listed impairments. The prevalence of these impairments rose with age, rising from 6.1 percent to 11.0%. Low- and middle-income nations, primarily in South Asia and Sub-Saharan Africa, contain 275.2 million (94.5 percent) of the world's population, ranging from children under the age of one to 13.9 percent between the ages of 15 and 19. (Olusanya et al. 2020). Provide training materials and learning aids, and make sure the accessibility features of UDL are tailored to students. Teachers with disabilities are an important part of the classroom. Educational programmes (both beginning and continuing); curriculum modifications; and assistance with the creation of easily accessible learning materials are all available. There are e-formats for each type of disability function limit, ensuring available resources are accessible regardless of user context and localization. While helping teachers reach a wide range of students, with a focus on how they learn and demonstrate knowledge, while acknowledging the fact that "in a classroom full of students, everything is unique." According to the UDL, teaching and learning should use a variety of methods to assist all students, including but not limited to students with disabilities.

Perhaps academics have paid less attention to the book "*Teaching in Today's Inclusive Classroom: A Universal Design for Learning Approach*" by Gargiulo and Metcalf (2011). However, after UNESCO (2020), supported the inclusion of UDL during the health crisis, UDL attracted the attention of academics and article writers around the world. According to Gargiulo & Metcalf (2011), teachers today are tasked with providing effective instruction to a diverse population of students who bring a variety of cultures, languages, learning styles, and abilities, as well as disabilities, into the classroom. This diversity heightens the need for inclusive practices as well as teaching strategies capable of meeting the diverse and often complex needs of a wide range of students. Diversity in our classrooms is the norm rather than the exception. Students with disabilities represent one of the most diverse groups of

students. The Education Improvement of Individuals with Disabilities Act of 2004 (PL 108-446), also known as IDEA 2004, states that students with disabilities include individuals who exhibit mental retardation, hearing impairment (including deafness), speech or language impairment, visual impairment (including blindness), emotional disorders, orthopaedic disabilities, autism, traumatic brain injury, other health disorders, or special learning disabilities". (i) (5 602 (3) (A)).



Some or a few students may struggle with text and other printed materials from which they are expected to gain information in the classroom and at home for a variety of reasons. For practical purposes, these students may be classified as nonreaders. It is safe to assume that they will be unable to access information contained in written text. This is not to say that all of these students are incapable of the thought processes and learning that are expected in today's classrooms. A student with an identified learning disability or one learning English as a second language, for example, may be reading below grade level but is served in the general classroom for the majority of the school day. These students are expected to make progress in general curriculum content area courses. They frequently expend so much time and mental energy decoding the text that fluency and comprehension suffer.

Students with learning disabilities may access and process information in a different way. A student with visual processing difficulties, for example, may have extreme difficulty tracking and reading large amounts of text. Reading charts and graphs can also be difficult. Furthermore, some students with disabilities may be able to decode text and extract information from it, but lack the metacognitive skills to organise this process. They may struggle to identify the main ideas and key components of the readings. Sequencing and paraphrasing can also be difficult tasks. Some students have basic reading and writing skills but are unmotivated to read or write. This can occur for a number of reasons. Some disengaged readers may not be challenged to think critically or deeply about what they read, or they may be uninterested in the subject matter. Expectations for these readers may be too low. Insightful connections between human experience and text responses can make a difference.

It would indeed be unrealistic to present all of the methods and strategies for teaching reading, writing, spelling, and handwriting in a single chapter. Some helpful interventions, on the other hand, will be used as examples to demonstrate how teachers can adapt what they already have. There will be both high-tech and low-tech resources available. As you adapt, keep balanced literacy in mind. Elementary programmes, for example, could include a combination of teacher read-alouds, guided reading, self-selected reading, teacher-selected text, home reading, vocabulary building, and writing. Secondary programmes may include broad, focused reading on universal themes rather than additional books. In a language class, all students are not required to read the same book. Look for universal concepts and provide a menu of options to guide and differentiate instruction. In this article, the author will elaborate on Chapter 13 of the book, entitled "Creating a Literacy-Rich Environment for All Learners." There are 38 pages.

1. *Fostering Phonemic Awareness, Phonics, and Word Recognition*

Rhymes, songs, poems, and sound games can engage young students as they are directed to identify sounds and patterns to promote phonemic awareness. Using song lyrics to teach students with learning disabilities to decode words and become more fluent readers has been shown to be a promising instructional practise. Some students may benefit from direct phonics instruction and vocabulary pre-teaching before beginning a unit or lesson to promote phonics and word recognition. If collaborative teaching is in place, one professional could work with a small group on new words before introducing them to the entire class. Tracing or writing the word in the air (sky writing) as it is sounded out is also beneficial.

Table 1.3 Multiple Ways to Increase Phonemic Awareness, Phonics, and Word Recognition

UDL Principles	Example
Representation	<ul style="list-style-type: none"> ▪ Displaying sounds/sound images, as well as other symbols or things ▪ Sounds are tapped out; words are taught verbally using flash cards and visual and/or tactile clues. ▪ Preparing vocabulary, increasing repetition as required, and presenting numerous real-life examples
Engagement	<ul style="list-style-type: none"> ▪ Methods of reading aloud (such as choral reading) that repeat sounds/words, tunes, tapping sounds/clapping syllables, rhyming, and chanting ▪ Letter/word tracing in sand or salt pan, with a crayon, or in the sky; letter tile movement ▪ Playing rhyming and word games
Expression	<ul style="list-style-type: none"> ▪ Tracking lip movement and tapping sound portions ▪ Creating word clouds or other graphic organisers ▪ Acting out a word or sound, matching sounds, letters, or words to visuals, symbols, or signs ▪ Making sound/word graphic cards, posters, and student dictionaries

Many children learn to read by first grade, regardless of the sort of education they get. Many other pupils, on the other hand, require direct guidance in order to progress. Phonemic awareness is concerned with hearing and using sound. It includes reading books aloud as a

group, singing songs, and reciting poems. These exercises are essential for preparing children for early reading. Phonics is the application of alphabet principles (linking sounds with letters and symbols and patterns) to known and unfamiliar words in reading and spelling. Phonics, when taught properly and methodically to young kids, can help them improve their decoding and word-building abilities. Reading fluency improves when kids can decode words quickly and effortlessly.

2. *Increasing Fluency with Text*

Fluency practise can be done with the assistance of a teacher, a peer, family members, a coach, a tape or digital recorder, or a computer. The student reads alongside the text being read aloud. These research-based methods are referred to as neurologicalimpress, partnered, or audio-assisted reading. Effective gains for struggling readers were observed when neurological impact was combined with storey retelling and comprehension questions. Another paired strategy that many individuals find beneficial in assisting fluency growth is echo reading. One partner reads a sentence, phrase, or word, while the other repeats it while keeping note of the print. This strategy may be tweaked by having each person read every other word. This can give variety while also assisting in the development of fluency.

Table 1.4 Multiple Ways to Increase Fluency

UDL Principles	Example
Representation	<ul style="list-style-type: none"> ▪ Direct instruction ▪ Modeling/demonstration of techniques ▪ Pointing to words/phrases as they are read ▪ Providing leveled text for readability
Engagement	<ul style="list-style-type: none"> ▪ Repeated reading, read along with teacher or peer, choral reading, echo reading, reading scripts (for example, readers' theater) ▪ Students charting own progress and working toward reinforcements ▪ Creating and rehearsing a song or play
Expression	<ul style="list-style-type: none"> ▪ Sharing of progress reports using CBM ▪ Creating vocabulary lists or related words using a computer graphic program (for example, Wordle) ▪ Student performance of readers' theater, song, rap, or play ▪ Multimedia production of performance products

Keep in mind that a first-grade kid who struggles with reading may only be able to add two words every week, depending on the learner. An older student who has become reliant on sight learning may only be able to add one word every week. It is possible that various flexible techniques and higher intensity (smaller group or individual training) are required.

3. *Developing Vocabulary*

There are two "main ideas" for increasing vocabulary. The first stage is to match the level of word knowledge with the teaching goals in order to determine the quantity of word knowledge required, which is then followed by the teaching methodologies. Examine the meaning of the term in academic and daily situations. You may determine what students already know about the word by conducting an evaluation. This enables you to choose the most relevant educational strategies. The second "main principle" is to teach pupils how to discern the meaning of unknown words by using context, learning aids (dictionaries), and word structure analysis (root words, prefixes, and suffixes).

Table 1.5 Multiple Ways to Increase Fluency

UDL Principles	Example
Representation	<ul style="list-style-type: none"> ▪ Presenting sounds/sound pictures or other symbols or objects ▪ Tapping out sounds; words presented orally with flash cards and with visual and/or physical cues ▪ Preteaching vocabulary, increasing repetition as needed, providing lots of real-life examples ▪ Tapping sound segments and tracking lip movement ▪ Completing word webs or other graphic organizers ▪ Acting out a word/sound, matching sounds/ letters/words to pictures or symbols/signs ▪ Creating visual cards, posters, and student dictionaries for sounds/words
Engagement	<ul style="list-style-type: none"> ▪ Read-along methods (for example, choral reading) that repeat sounds/words, songs, tapping sounds/ clapping syllables, rhyming, chants ▪ Tracing letters/words in sand or salt tray, with a crayon, or in the sky; moving letter tiles ▪ Playing word and rhyming games
Expression	<ul style="list-style-type: none"> ▪ Tapping sound segments and tracking lip movement ▪ Completing word webs or other graphic organizers ▪ Acting out a word/sound, matching sounds/ letters/words to pictures or symbols/signs ▪ Creating visual cards, posters, and student dictionaries for sounds/words

A visual compilation, such as a word map, may aid comprehension when teaching vocabulary connected to units and real life. Students assess words based on their meanings, synonyms, antonyms, mnemonics (memory phrases and mental pictures created by students), and scenarios in which they may be used. This may be used for print as well as non-print activities. Some students may require extra graphics and symbols, which can be produced or made available using a software application.

4. *Building Comprehension*

There are several effective treatments for increasing understanding. Many additional materials are available in the Web Resources box, as well as in numerous evidence-based journal publications. Review Chapter 10 to discover how to teach learning techniques. Remember that they must be modelled, learned, and encouraged before being used independently. The treatments alone benefit all learners, and their efficacy is generally boosted when multimodal aspects are included.

Table 1.6 Multiple Ways to Increase Vocabulary

UDL Principles	Example
Representation	<ul style="list-style-type: none"> ▪ Preteach vocabulary in context, using objects, visuals, keywords, symbols, animations, and/or signs paired with related word ▪ Use interactive software, CDs, tapes that target key vocabulary ▪ Use direct instruction/modeling of vocabulary comprehension strategies, including graphic organizers ▪ Teach dictionary skills ▪ Demonstrate and provide computer sound components that give definition when word is highlighted/clicked ▪ Model software programs that hyperlink words ("click for more information"), repeats, replays, provides hints or cues to information/knowledge ▪ Use analogies that tap into prior knowledge
Engagement	<ul style="list-style-type: none"> ▪ Incorporate words that reflect student interests when practicing strategies ▪ Use target words in authentic, relevant contexts ▪ Discuss, question, play word games with peer(s) ▪ Use motivational songs/lyrics with focused vocabulary ▪ Use puppets for conversations with vocabulary
Expression	<ul style="list-style-type: none"> ▪ Point, choose, match, read, select words with definitions ▪ Use key words, mnemonics, flashcards, flow lists ▪ Type, cut, past, illustrate words in response journal; add sign language ▪ Answer questions orally or in writing about vocabulary ▪ Use multiple-choice response assessment ▪ Use and complete graphic organizers (for example, word maps) ▪ Explain/teach a strategy to another student (observed by teacher)

Some of these adjustments for various treatments and processes may be enjoyable for students of all ages. Remember the value of anchored learning, as was discussed in Chapter 10, as we continue to move more consciously toward UDL. Make an effort to place an anchor in front of each unit. You may even examine their experiences as they progress through a year's worth of modules and lesson plans as we move towards writing methods. This is a common misunderstanding.

5. *Assisting with Writing/Spelling/Handwriting*

Many of our varied learners lack writing experience. Provide field excursions, movies, sports clips, and virtual experiences if feasible. To embed the learning, have a discussion with the kids about this and other experiences they have had. Once you've discovered common experiences to respond to, utilise visual organisers to help students arrange their thoughts for later expression. Webs, timelines, graphs, matrices, and maps are examples of these. Remember that visual organisers can help you clarify topics and highlight links between them. In addition to words, symbols, photos, and/or objects can be employed in their production. You and your students can create your own or choose from hundreds of options. Make sure that the organiser you choose is appropriate for the procedure you are attempting.

Table 1.7 Multiple Ways to Increase Writing/Spelling/Handwriting

UDL Principles	Example
Representation	<ul style="list-style-type: none"> ▪ Model/demonstrate writing mechanics (up/down) ▪ Provide examples and non-examples ▪ Model with electronic whiteboards, word prediction software, electronic dictionaries, reading pens
Engagement	<ul style="list-style-type: none"> ▪ Offer choice in writing topics ▪ Provide writing group projects with varied roles for participation ▪ Choose pictures, letters, words/phrases to use in personal writing "bank" or dictionary; computer graphics/clip art; sort by patterns ▪ Practice spelling strategies using preferred modalities (for example, write letters in the sky, paint words with water and brush)
Expression	<ul style="list-style-type: none"> ▪ Provide a variety of writing tools (including pencil grips) and writing surfaces/keyboard/word processing/tablet PC ▪ Written product, poster, journal entries ▪ Provide rubric and checkbox to edit writing ▪ Oral presentation, song, student-led conference, videotape

Many of our diverse students do not have prior writing expertise. If at all possible, include field trips, movies, sports clips, and virtual experiences. Talk with the youngsters about this and other experiences they've had to help them remember what they learned. Once you've identified similar experiences for students to respond to, use visual organisers to assist them in organising their ideas for subsequent presentation. Webs, timelines, graphs, matrices, and maps are just a few examples. Keep in mind that visual organisers can assist you in clarifying subjects and emphasising connections between them. They can use symbols, images, and/or objects in addition to words. You and your pupils may design your own or select from hundreds of available possibilities. Make certain that the organiser you choose is appropriate for the technique you intend to try.

Many children with cognitive and organisational problems can benefit from intensive education in the nuts and bolts of the writing process.

- i. Preparation (brainstorming thoughts and facts)
- ii. Make a preliminary draught (sometimes writing more than one)
- iii. Revise (look for ways to improve the writing/product by expanding, rearranging, adding, and removing words/sentences/ideas)
- iv. Check for spelling and grammatical issue
- v. Publish your stuff work

4.0 Author's view

Today's students come to class with a wide range of reading and writing abilities. Regardless of reading or writing ability, all students are required to grasp the fundamental principles given. When using UDL principles, five key themes in reading must be considered in designing and conducting literacy instruction: phonemic awareness, alphabet principles, fluency with text, vocabulary, and comprehension. Students who struggle with reading and writing at their work level require direct instruction in specific reading skills, as well as scaffolding reading and writing assistance that allows them to access ideas taught at a specific time. Remedial teachers must strike a balance between teaching students to read and teaching them to read. Using UDL concepts in the domains of reading and writing learning can assist remedial teachers and students in teaching and learning through the strengths and needs of students. Gifted pupils will most likely require enrichment activities as well as some curriculum consolidation. Some may be "twice as unique" and need a mix of modifications.

There are several programmes and tactics available to assist pupils with reading and writing. When selecting a programme, rehabilitation teachers must keep broad ideas in mind. They must also develop multimodal learning techniques. Teachers can assist readers who are having difficulty accessing material in four ways: 1) change the reading requirements, 2) change the reading levels, 3) change the formatting, and 4) change the text/print display. The incorporation of Assistive Technology and new learning aids dramatically improves access to print and language for various remedial students. Furthermore, collaborative collaborations within the school community can assist diverse children in making major literacy improvements.

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