

Enhancing Literacy Through Morphological Awareness: The MAP-R Intervention for Diverse Learners

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Abstract

Morphological awareness plays a crucial role in language and literacy development, particularly for students with disabilities, multilingual learners, and those who are d/Deaf or hard of hearing (D/HH). The Morphological Analysis Pathway to Reading (MAP-R) project is a computer-delivered intervention designed to enhance morphological knowledge, academic vocabulary, and reading comprehension through an interactive e-learning platform. This study investigates the effectiveness of MAP-R in improving students’ literacy outcomes by providing explicit morphological instruction, direct vocabulary teaching, and on-demand Spanish and sign language support. The intervention, implemented three days per week for 15-20 minutes, engages third and fourth-grade students in structured activities that reinforce word structure and meaning. Writing samples are collected and analyzed using MorphoLex, a writing sample analysis tool that assesses the complexity of words, including base words, inflections, and derivational morphemes. Additionally, pre- and post-intervention language assessments and embedded weekly quizzes track individual student progress over the 16-week study period. In our findings we hope to see a significant improvement in morphological awareness, vocabulary acquisition, and reading comprehension, with students demonstrating increased use of base words and morphemes in writing tasks. These results would suggest that MAP-R is an effective tool for enhancing literacy skills in diverse student populations. Future research will explore the long-term impact of the intervention and potential adaptations for broader educational settings.

Introduction

- Language and literacy development are essential for academic success, yet many students, particularly those with disabilities, multilingual learners, and students who are d/Deaf or hard of hearing (D/HH), face challenges in acquiring these skills. Morphological awareness—the ability to recognize and manipulate morphemes—plays a crucial role in vocabulary and reading comprehension. Research shows that students with strong morphological skills use more complex words in writing, including inflectional and derivational morphemes. However, many existing interventions lack explicit, systematic morphological instruction tailored to diverse learners.
- The Morphological Analysis Pathway to Reading (MAP-R) project is a computer-delivered intervention designed to enhance morphological knowledge, academic vocabulary, and reading comprehension through an e-learning platform. MAP-R provides explicit instruction, direct vocabulary teaching, and on-demand Spanish and sign language support to improve accessibility. The three-day-per-week intervention integrates writing tasks, progress monitoring quizzes, and structured morphological training.
- To evaluate MAP-R, MorphoLex is used to analyze students’ writing samples, assessing morphological complexity through base words and morpheme usage. Pre- and post-intervention assessments track growth in morphological awareness and literacy skills. This study contributes to developing evidence-based interventions to support language and literacy development in diverse student populations.

Methods

- Intervention Design:
- Participants: 200 students,
- 15 Classrooms, Four schools
- Computer-delivered MAP-R (Morphological Analysis Pathway to Reading) intervention.
- Designed to enhance morphological knowledge, academic vocabulary, and reading comprehension.
- Targets third and fourth-grade students, including multilingual learners and d/Deaf or hard of hearing (D/HH) students.
- Implementation:
- Delivered three days per week via an e-learning platform.
- Each session lasts 15-20 minutes and includes:
 - Direct vocabulary instruction
 - Morphological knowledge training
 - On-demand Spanish and sign language support
- Data Collection & Analysis:
- Student writing samples analyzed for morphological complexity.
- MorphoLex tool used to evaluate base words, inflections, and derivational morphemes.
- Pre- and post-intervention language assessments conducted to measure vocabulary and reading comprehension gains.
- Embedded weekly quizzes track progress over 16 weeks, allowing real-time instructional adjustments.
- Growth trends charted and language samples analyzed using online linguistic tools.
- Objective:
- Assess the effectiveness of MAP-R in improving literacy outcomes for students with diverse learning needs.
- Use technology-driven instruction and systematic data analysis to refine intervention strategies.

		Comparison (<i>n</i> = 124)		MAP-R Intervention (<i>n</i> = 115)	
Characteristic		<i>n</i>	Percent	<i>n</i>	Percent
Gender	Male	63	51	63	55
	Female	61	49	52	45
Race/Ethnicity	Hispanic	5	4	13	11
	Black	22	18	24	21
	White	80	65	68	59
	Multiracial	11	9	3	3
	Asian	5	4	7	6
Exceptionality	No Identified Exceptionalities	112	91	106	92
	Developmental Language Disorder	9	7	8	7
	Articulation Disorder	3	2	1	1
Multilingual Learner Status	English Proficient	120	97	108	94
	Multilingual Learner in ESOL	4	3	7	6

Note: ESOL refers to English for Speakers of Other Languages|

Results

Preliminary results from the MAP-R (Morphological Analysis Pathway to Reading) intervention indicate significant improvements in students' morphological awareness, vocabulary acquisition, and reading comprehension. Writing samples analyzed using MorphoLex revealed a notable increase in the use of base words, inflectional morphemes, and derivational morphemes, suggesting a strengthened understanding of word structures and morphological complexity. Statistical analyses demonstrated strong correlations between morphological knowledge (MK) skills and students’ written morphology measures (WMM). Specifically, suffix spelling showed a significant correlation with the use of multimorphemic words ($r = .385$, $p < .01$), indicating that students with stronger suffix knowledge incorporated more complex word structures in their writing. Additionally, written relatives ($r = .441$, $p < .01$) and spelling of multimorphemic words ($r = .411$, $p < .01$) were strongly associated with the use of inflectional and derivational morphemes, suggesting that students who demonstrated higher accuracy in these areas produced more morphologically complex written responses. These findings align with previous research linking morphological awareness to more advanced word formation skills and richer written expression. Weekly progress monitoring showed consistent vocabulary gains, with students improving in morpheme selection and word construction accuracy over the 16-week intervention period. Furthermore, pre- and post-intervention assessments using the MATRS (Morphological Awareness Test for Reading and Spelling) confirmed that students with greater morphological awareness demonstrated stronger literacy outcomes.

Correlations between MK Skills and Written Morphology Measures

	1	2	3	4	5	6	7	8	9	10
1. Affix Identification	1	.593**	.376**	.493**	.425**	.470**	.288**	.200**	.185*	.184*
2. Affix Meaning		1	.469**	.620**	.551**	.679**	.364**	.392**	.258**	.129
3. Suffix Choice			1	.482**	.454**	.504**	.219**	.284**	.169*	.086
4. Spelling MMW				1	.659**	.716**	.318**	.411**	.229**	.152*
5. Suffix Spelling					1	.578**	.337**	.385**	.116	.093
6. Written Relatives						1	.357**	.441**	.206**	.128
7. WMM Words							1	.549**	.327**	.113
8. WMM Inflectional								1	.245**	.152*
9. WMM Derivational									1	.471**
10. WMM Later Dev.										1

Note. MMW refers to multimorphemic words. WMM refers to written morphology measures taken from students’ written responses.
* $p < .05$ ** $p < .01$ Significant correlations between variables that do not include overlapping measures are bolded in blue. |

References

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Acnowledgements

I sincerely thank Dr. Carla Wood for her invaluable mentorship and guidance throughout this project, as well as Mr. Jim Ellison for his support and collaboration. Their expertise and dedication have greatly contributed to the success of this research. I also appreciate the students, educators, and research team members who made this study possible.