

Mathematics for English Language Learners (MELL) Classroom Practices Framework

Developed by the Project Leaders of the
Texas State University System
Mathematics for English Language Learners Initiative

For more information contact:

Joyce Fischer, Ph.D.
Department of Mathematics
Texas State University-San Marcos

601 University Drive
San Marcos, TX 78666
www.tsusmell.org

Phone: (512) 245-8023
Fax: (512) 245-1211
jf10@txstate.edu

The MELL initiative is a partnership between the Texas State University System (TSUS), its component universities, and the Texas Education Agency (TEA).

MELL Classroom Practices Framework

Developed by

**Texas State University – San Marcos
Joyce Fischer, Ph.D.
Christopher Johnson, M.S.
Leslie Huling, Ed.D.**

For The

Math for English Language Learners (MELL) Initiative

**A Texas State University System (TSUS) and
Texas Education Agency (TEA)
Collaborative**

Participating TSUS Institutions Include:

**Angelo State University
Lamar University
Sam Houston State University
Sul Ross State University
Texas State University**

June, 2005: 1st edition

January 2007: 2nd edition

MELL Classroom Practices Framework

Introduction:

The MELL Classroom Practices Framework (CPF) is a synthesis document compiled by the Texas State University System (TSUS) Math for English Language Learners (MELL) Initiative and funded by a grant from the Texas Education Agency (TEA). In the summer of 2004, TEA, in response to the lingering achievement gap in mathematics between Limited English Proficient (LEP) students and other students, worked with TSUS and its five partner institutions to establish the MELL Initiative. The primary purpose of the MELL Initiative is to develop resources for professional development targeted at improving mathematics instruction for English Language Learners, especially those at the secondary level. MELL and TEA staff identified the need for a concise document that could not only capture the essence of the research but could also provide a roadmap for use in future resources. The MELL Classroom Practices Framework was developed in response to this need.

The MELL CPF was generated collaboratively by MELL and TEA staff and was guided by the question of “What do the findings of our research investigations suggest in regard to classroom practices that contribute to successful math instruction for English Language Learners.” This framework represents the collective thinking of the MELL partners about what the research investigations revealed and it is our intention that all of the MELL professional development products support teachers in implementing these classroom practices. Over time, as additional insights are gleaned from ongoing work, it is likely that this evolving framework will be revised.

Much, perhaps most, of this framework is comprised of elements of effective instruction that is appropriate for all students, and clearly all students would be well-served by these suggested practices regardless of their language proficiency. It appears, however, from our investigations, that the success of ELL students is more highly dependent on receiving instruction geared to their specific needs. In other words, while many students who are not experiencing a language barrier might be able to experience success with less than optimal instructional practices, few ELL students can thrive in such an environment. For this reason, creating a rich classroom experience for ELL students is not simply desirable, but rather is necessary if they are to have a chance to succeed. The MELL Classroom Practices Framework is targeted at achieving this goal.

1 Learning Atmosphere & Physical Environment

- 1.1 A caring classroom atmosphere of mutual respect and support is facilitated by the teacher who:
 - 1.1.1 Knows each child as an individual,
 - 1.1.2 Embraces languages, customs, and cultures of ELL students,
 - 1.1.3 Provides culturally rich learning materials,
 - 1.1.4 Encourages self-expression and provides positive recognition,
 - 1.1.5 Builds student confidence and esteem,
 - 1.1.6 Fosters an emotionally safe environment that allows students to feel secure and to take risks.
- 1.2 The classroom is visually rich to support student learning.
 - 1.2.1 Incorporates displays of student produced work, whenever possible,
 - 1.2.2 Is colorful and thought stimulating,
 - 1.2.3 Contains pertinent, real-world information and applications,
 - 1.2.4 Reinforces math-specific vocabulary and concepts,
 - 1.2.5 Provides color-coded learning supports when appropriate.
- 1.3 Room arrangement facilitates student interaction and group work.

2 Instructional Practices

- 2.1 Instructional practices foster cooperation and collaboration.
- 2.2 Concepts are presented accurately, logically, and in engaging ways.
- 2.3 Multiple representations incorporate mathematics learning levels: concrete, semi-concrete, and abstract.
- 2.4 The teacher employs student-centered instructional practices.
 - 2.4.1 Approaches content from a concept-oriented constructivist method,
 - 2.4.2 Surrounds students with different modalities (e.g., aural, visual, kinesthetic),
 - 2.4.3 Connects new concepts to prior learning,
 - 2.4.4 Encourages students to refine and reflect about their own work and verbalize concept understanding “in their own words”,
 - 2.4.5 Chooses homework to optimize individual content development,
 - 2.4.6 Provides extra help and resources on an individual basis.
- 2.5 Students are frequently partnered with peer learners to enhance learning opportunities.
 - 2.5.1 To develop math content,
 - 2.5.2 To aid English language development,

- 2.5.3 To insure sustained active participation in the class,
- 2.5.4 To welcome new students into an established learning community.
- 2.6 Instructional activities are varied and support diverse learning styles and multiple intelligences, including for instance:
 - 2.6.1 Frequent use of models,
 - 2.6.2 Music as a motivator and anchor,
 - 2.6.3 Mind maps, poster-walks, and word walls
 - 2.6.4 Key vocabulary and cognates presented in different forms,
 - 2.6.5 Vivid adjectives.

3 Mathematics Content & Curriculum

- 3.1 Glossary of mathematical terms is always available for reference.
- 3.2 Content is aligned to appropriate grade-level, mathematics TEKS and professional standards.
- 3.3 Content is based on diagnosed student needs.
- 3.4 Content is systematically designed to incorporate sound learning principles.
 - 3.4.1 To incorporate increased complexity,
 - 3.4.2 To present a cohesive big-picture through chunking,
 - 3.4.3 To connect concepts through bridging and scaffolding,
 - 3.4.4 To emphasize multidisciplinary understandings,
 - 3.4.5 To reflect on inherent patterns by comparing and contrasting concepts.
- 3.5 Curriculum is challenging, relevant, age-appropriate, and well-paced
 - 3.5.1 To include contextually-based problems,
 - 3.5.2 To incorporate student realities,
 - 3.5.3 To involve interactive problem solving.

4 Language Practices

- 4.1 Language support is offered without supplanting English instruction.
- 4.2 Support is aligned with student's diagnosed language needs.
- 4.3 Language used is appropriate to age and grade level and presented in a socially meaningful context.
- 4.4 Mathematics-specific vocabulary is explicitly and implicitly taught and reinforced through repetition.

- 4.5 Teachers are knowledgeable about the second language acquisition theories and best practices embodied in Texas Administrative Code, Title 19, Part II, Chapter 128.
- 4.6 Ideally, dual language instructional support should be offered.
- 4.7 When dual language teachers are not available, sheltered instruction should be utilized to provide strong language support by addressing content through ESL.

5 Family & Community Involvement

- 5.1 Schools connect to student's family-life by embedding contextual experiences and skills in teaching and curriculum.
- 5.2 Projects are relevant and promote family interaction.
- 5.3 Opportunities are available for English-speaking higher grade-level students to mentor ELL lower grade-level students either in an in-school or after-school program, as appropriate.
- 5.4 Teacher engages in frequent communication with families
 - 5.4.1 About activities and events in which parents can participate,
 - 5.4.2 About student progress.
- 5.5 Teacher utilizes services provided by a community liaison and is knowledgeable about community resources.
- 5.6 Parents are informed about the benefits of using their most cognitively advanced language at home.

6 Assessment of Student Learning

- 6.1 Classroom assessment is designed to foster student success.
- 6.2 Assessment methods allow students frequent opportunities to demonstrate mastery in a variety of ways.
- 6.3 Various assessment techniques are used to measure student understandings.
- 6.4 Grades are oriented to promote and emphasize valid step-by-step logical reasoning processes.
- 6.5 Assessment data and results shape instructional planning.
- 6.6 Flexible time allotments are given to demonstrate concept mastery.

REFERENCE LIST FOR THE CPF

- Achilles, C. (1999). *Let's put kids first, finally: Getting class size right*. Thousand Oaks, CA: Corwin Press.
- Anstrom, K., & National Clearinghouse for Bilingual Education Washington DC. (1999). *Preparing secondary education teachers to work with english language learners: Mathematics*. District of Columbia: Ncbe resource collection series, no. 14.
- August, D., & Hakuta, K. (Eds.). (1997). *Improving schooling for language minority children: A research agenda*. Washington, DC: National Academy Press.
- Barki, H. & Pinsonneault, A. (2001). Small group brainstorming and idea quality. *Small Group Research, 32* (2), 158-205.
- Batchelder, M. L., & Austin Independent School District TX. Office of Program Evaluation. (1998). Austin collaborative for mathematics education. 1997-1998 annual report. Publication number 97.18. Texas: Austin I.S.D., Office of Program Evaluation, 1111 West Sixth Street, Austin, TX 78703-5399.
- Blum-Kulka, S., & Snow, C. (2004). Introduction: The potential of peer talk. *Discourse Studies, 6* (3), 291-306.
- Brown, V., Tumeo, M., Larey, T., & Paulus, P. (1998). Modeling cognitive interactions during group brainstorming. *Small Group Research, 29* (4), 495-526.
- Byrnes, H. (2000). Languages across the curriculum—intradepartmental curriculum construction. In M.-R. Kecht & K. von Hammerstein (Eds.), *Languages across the curriculum: Interdisciplinary structures and internationalized education* (pp. 151-175). Columbus, OH: The Ohio State University

- Camacho, M., & Paulus, P. (1995). The role of social anxiousness in group brainstorming. *Journal of Personality and Social Psychology*, 68 (6), 1071-1080.
- Carlo, M., August, D., & Snow, C. (2005). Sustained vocabulary-learning strategies for English language learners. In E. Hiebert & M. Kamil (Eds.), *Teaching and learning vocabulary: Bringing research to practice* (pp. 137-153). Mahwah, NJ: Lawrence Erlbaum.
- Carpenter, T. (1989). Teaching as problem solving. In R. Charles & E. Silver (Eds.), *The teaching and assessing of mathematical problem solving* (pp. 187-202). Reston, VA: National Council of Teachers of Mathematics.
- Carroll, S. (1992). On cognates. *Second Language Research*, 8 (2), 93-119.
- Chirumbolo, A., Mannetti, L., Piero, A., Areni, A., & Kruglanski, A. (2005). Motivated closed-mindedness and creativity in small groups. *Small Group Research*, 36 (1), 59-82.
- Collier, V. (1987). Age and rate of acquisition of second language for academic purposes. *TESOL Quarterly*, 21 (4), 617-641.
- Collier, V. (1989). How long? A synthesis of research on academic achievement in second language. *TESOL Quarterly*, 23 (3), 509-531.
- Collier, V. (1992a). The Canadian bilingual immersion debate: A synthesis of research findings. *Studies in Second Language Acquisition*, 14 (1), 87-97.
- Collier, V. (1992b). A synthesis of studies examining long-term language minority student data on academic achievement. *Bilingual Research Journal*, 16 (1-2), 187-212.
- Collier, V. (1995a). *Acquiring a second language for school*. Washington, DC: National Clearinghouse for English Language Acquisition.
- Collier, V. (1995b). *Promoting academic success for ESL students: Understanding second language acquisition for school*. Woodside, NY: New Jersey Teachers of English to Speakers of Other Languages-Bilingual Educators.

- Collier, V., & Thomas, W. (1989). How quickly can immigrants become proficient in school English. *Journal of Educational Issues of Language Minority Students*, 5 (1), 26-38.
- Collier, V., & Thomas, W. (1999a, August/September). Making U.S. schools effective for English language learners, Part 1. *TESOL Matters*, 9 (4), 1, 6. Retrieved December 31, 2006, from http://www.tesol.org/s_tesol/sec_document.asp?CID=196&DID=812
- Collier, V., & Thomas, W. (1999b, October/November). Making U.S. schools effective for English language learners, Part 2. *TESOL Matters*, 9 (5), 1, 6. Retrieved December 31, 2006, from http://www.tesol.org/s_tesol/sec_document.asp?CID=196&DID=817
- Collier, V., & Thomas, W. (1999c, December/January). Making U.S. schools effective for English language learners, Part 3. *TESOL Matters*, 9 (6), 1, 10. Retrieved December 31, 2006, from http://www.tesol.org/s_tesol/sec_document.asp?CID=196&DID=826
- Collier, V., & Thomas, W. (2002). Reforming education policies for English learners means better schools for all. *The State Education Standard*, 3 (1), 30-36.
- Collier, V., & Thomas, W. (2004). The astounding effectiveness of dual language education for all. *NABE Journal of Research and practice*, 2 (1), 1-20.
- Copley, J. V., & Padron, Y. (1998, February 6-8). Preparing teachers of young learners: Professional development of early childhood teachers in mathematics and science. Paper presented at the Forum on Early Childhood Science, Mathematics, and Technology Education, Washington DC.
- Coskun, H. (2005). Cognitive stimulation with convergent and divergent thinking exercises in brainwriting. *Small Group Research*, 36 (4), 466-498.

- Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research, 49* (2), 222-251.
- Cummins, J. (1983). *Heritage language education: A literature review*. Toronto: Ministry of Education.
- Cummins, J. (1984). *Bilingualism and special education: Issues in assessment and pedagogy*. Clevedon, UK: Multilingual Matters.
- Cummins, J. (1986). Empowering minority students: A framework for intervention. *Harvard Educational Review, 56* (1), 18-36.
- Cummins, J. (1991). Language development and academic learning. In L. Malavé & G. Duquette (Eds.), *Language, culture and cognition* (pp. 161-174). Clevedon, UK: Multilingual Matters.
- Cummins, J. (1996). *Negotiating identities: Education for empowerment in a diverse society*. Los Angeles, CA: California Association for Bilingual Education.
- Cummins, J. (2000). *Language, power, and pedagogy: Bilingual children in the crossfire*. Clevedon, UK: Multilingual Matters.
- Cummins, J., & Swain, M. (1983). Analysis-by-rhetoric: Reading the text or the reader's own projections? A reply to Edelsky et al. *Applied Linguistics, 4* (1), 23-41.
- Curtain, H., & Pesola, C. (1994). *Languages and children: Making the match* (2nd ed.). New York: Longman
- Daniell, B. (1999). Narratives of literacy: Connecting composition to culture. *College Composition and Communication, 50* (3), 393-410.
- Echevarria, J., Short, D., & Powers, K. (2006). School reform and standards-based education: A model for English-language learners. *Journal of Educational Research, 99* (4), 195-210.

- Echevarria, J., Vogt, M., & Short, D. (2004). *Making content comprehensible for English language learners: The SIOP model* (2nd ed.). Boston: Pearson, Allyn & Bacon.
- Educational Resources Information Center (U.S.). (1997). High stakes assessment
a research agenda for english language learners: Symposium summary [microform]. Washington, DC: National Clearinghouse for Bilingual Education: U.S. Dept. of Education Office of Educational Research and Improvement Educational Resources Information Center.
- Egelson, P., Harman, P., & Achilles, C. (1996). Does class size make a difference? Greensboro, NC: South Eastern Regional Vision for Education.
- Evan, R., & Lappin, G. (1994) Constructing meaningful understanding of mathematics content. In D. Aichele & A. Coxford (Eds.), *Professional development for teachers of mathematics* (pp. 128-143). Reston, VA: National Council of Teachers of Mathematics.
- Folger, J. (1989). Project STAR and class size policy. *Peabody Journal of Education*, 67 (1), 1-16.
- Gallegos, R. (1979). Cashing in on cognates. *Pointer*, 23 (3), 10-15.
- Garrison, D. (1990). Inductive strategies for teaching Spanish-English cognates. *Hispania*, 73 (2), 508-512.
- Goodfellow, J., & Sumsion, J. (2000). Transformative Pathways: field based teacher educators' perceptions. *Journal of Education for Teaching: International Research and Pedagogy*, 26 (3), 245-257.
- Gordon, S., (2006). Placement Tests: The Shaky Bridge Connecting School and College Mathematics. *Mathematics Teacher*, 100 (3), 174-178.
- Graham, S., & Perin, D. (2006). *Writing next: Effective strategies to improve the writing of adolescents in middle and high schools: A report to the Carnegie Corporation of New York*. Washington, DC: Alliance for Excellent Education.

- Green, R. (2005). *Expectations: How teacher expectations can increase student achievement and assist in closing the achievement gap*. Columbus, OH: SRA/McGraw-Hill.
- Greene, J. (1997). A meta-analysis of the Rossell & Baker review of bilingual education research. *Bilingual Research Journal*, 21 (2-3), 103-122.
- Haastrup, K. (1991). *Lexical inferencing procedures or talking about words*. Tübingen: Gunter Narr.
- Halpern, D. (1998). Teaching critical thinking for transfer across domains: Dispositions, skills, structure training, and metacognitive monitoring. *American Psychologist*, 53 (4), 449-455.
- Hammrich, P., & Ragins, A. (2002, June). *Science and communication curriculum reform project: A content-based literacy program*. Paper presented at the Head Start National Research Conference, Washington, DC. (ERIC Document Reproduction Service No. ED467559)
- Hartwell, P. (1987). Creating a literate environment in freshman English: Why and how. *Rhetoric Review*, 6 (1), 4-20.
- Hernandez, J. (1991). Assisted performance in reading comprehension strategies in non-English proficient students. *The Journal of Educational Issues of Language Minority Students*, 8 (1), 91-112.
- Hillocks, G. (1995). *Teaching writing as reflective practice*. New York: Teachers College Press.
- Holmes, J. (1986). Snarks, quarks, and cognates: An elusive fundamental particle in reading comprehension. *ESpecialist*, 15 (1), 13-40.
- Horst, M., Cobb, T., & Meara, P. (1998). Beyond a clockwork orange: Acquiring second language vocabulary through reading. *Reading in a Foreign Language*, 11 (2), 207-223.
- Klingner, J., & Vaughn, S. (1996). Reciprocal teaching of reading comprehension strategies for students with learning disabilities who use English as a second language. *The Elementary School Journal*, 96 (3), 275-293.

- Krashen, S., & McField, G. (2005, November/December). What works? Reviewing the latest evidence on bilingual education. *Language Learner*, 7-10, 34.
- Kroll, J., & Dussias, P. (2004). The comprehension of words and sentences in two languages. In T. Ghatia & W. Ritchie (Eds.), *Handbook of bilingualism* (pp. 169-200). Cambridge: Blackwell.
- Laufer, B. (1988). The concept of 'synforms' (similar lexical forms) in L2 vocabulary acquisition. *Language and Education*, 2 (1), 113-132.
- Lesaux, N, Koda, K., Siegel, L., & Shanahan, T. (2006). Development of literacy. In D. August & T. Shanahan (Eds.), *Developing literacy in second-language learners: Report of the National Literacy Panel on Language-Minority Children and Youth* (pp. 75-122). Mahwah, NJ: Lawrence Erlbaum.
- Lowry, P., Roberts, T., Romano, N., Cheney, P., & Hightower, R. (2006). Modeling cognitive interactions during group brainstorming. *Small Group Research*, 37 (6), 631-661.
- Martinez, M. (1994). Spanish-English cognates in the subtechnical vocabulary found in engineering magazine texts. *English for Specific Purposes*, 13 (1), 81-91.
- Martins, L., Gilson, L., & Maynard, M. (2004). Virtual teams: What do we know and where do we go from here? *Journal of Management*, 30 (6), 805-835.
- McQuillan, J. (2005, November/December). An urban myth: The "poor quality" of bilingual education research. *Language Learner*, 13-14, 30.
- Met, M. (1999). *Content-based instruction: Defining items, making decisions* (NFLC Reports). Washington, DC: The National Foreign Language Center.
- Nagy, W. (1992). *Cross-language transfer of lexical knowledge: Bilingual students' use of cognates* (Technical Report No. 558). (ERIC Document Reproduction Service No. ED350869)

- Nagy, W., Breninger, V., & Abbott, R. (2006). Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle-school students. *Journal of Educational Psychology, 98* (1), 134-147.
- Nagy, W., Herman, P., & Anderson, P. (1985). Learning words from context. *Reading Research Quarterly, 20* (2), 233-253.
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.
- National Research Council. (2000). *How people learn: Brain, mind, experience, and school*. Committee on Developments in the Science of Learning. Committee on Learning Research and Educational Practice. Commission on Behavioral and Social Sciences and Education. Washington, DC: National Academies Press.
- National Research Council. (2003). *Assessment in support of instruction and learning: Bridging the gap between large-scale and classroom assessment* (Workshop Report). Committee on Assessment in Support of Instruction and Learning. Board on Testing and Assessment, Committee on Science Education K-12, Mathematical Sciences Education Board. Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academies Press.
- Netten, J., & Germain, C., (2000). Transdisciplinary approach and intensity in second language learning/teaching. *Canadian Journal of Applied Linguistics/La Revue canadienne de linguistique appliquée, 3*, (1-2), 107-122.
- Papai, N. (2000). Literacy development through content-based instruction: A case study. *Working Papers in Educational Linguistics, 16* (2), 81-95.

- Paribakht, T., & Wesche, M. (1997). Vocabulary enhancement activities and reading for meaning in second language vocabulary acquisition. In J. Coady & T. Huckin (Eds.), *Second language vocabulary acquisition: A rationale for pedagogy* (pp. 174-200). Cambridge: Cambridge University Press.
- Paulus, P., & Dzindolet, M. (1995). Social influence processes in group brainstorming. *Journal of Personality and Social Psychology, 64* (4), 575-586.
- Pedder, D. (2006). Are small classes better? Understanding relationships between class size, classroom procedures and pupils' learning. *Oxford Review of Education, 32* (2), 213-234.
- Rains, S. (2005). Leveling the organizational playing field—Virtually. *Communication Research, 32* (2), 193-234.
- Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. New York: Oxford University Press.
- Rowe, M. (1987). Wait time: Slowing down may be a way of speeding up. *American Educator, 11* (1), 38-43.
- Rueda, R., & Monzo, L. D. (2002). Apprenticeship for teaching: Professional development issues surrounding the collaborative relationship between teachers and paraeducators. *Teaching and Teacher Education, 18*(5), 503-521.
- Russell, C., & Baker, K. (1996). The educational effectiveness of bilingual education. *Research in the Teaching of English, 30* (1), 7-73.
- Shillaw, J. (1995). Using a word list as a focus for vocabulary learning. *The Language Teacher (JALT), 19* (2), 58-59.
- Short, D., & Boyson, B. (2004). *Creating access: Language and academic programs for secondary school newcomers*. Washington, DC: Center for Applied Linguistics.

- Shuy, R. (1976). *Problems in assessing language ability in bilingual education programs*. Unpublished manuscript.
- Shuy, R. (1981). Conditions affecting language learning and maintenance among Hispanics in the United States. *NABE Journal*, 6 (1), 1-17.
- Sternberg, R. (1987). Most vocabulary is learnt from context. In M. McKeown & M. Curtis (Eds.), *The nature of vocabulary acquisition* (pp. 89-105). Hillsdale, NJ: Lawrence Erlbaum.
- Stoller, R. (2002, March). *Content-based instruction: A shell for language teaching or a framework for strategic language and content learning?* Keynote address presented at the annual meeting of Teachers of English to Speakers of Other Languages, Salt Lake City, UT. Retrieved December 31, 2006, from <http://www.carla.umn.edu/cobaltt/modules/strategies/Stoller2002/READING1/stoller2002.htm>
- Stahl, R. (1994). *Using "think-time" and "wait-time" skillfully in the classroom*. (ERIC Document Reproduction Service No. ED370885)
- Thomas, W. (1992). An analysis of the research methodology of the Ramirez study. *Bilingual Research journal*, 16 (1-2), 213-245.
- Thomas, W., & Collier, V. (1997a). *School effectiveness for language minority students*. Washington, DC: National Clearinghouse for English Language Acquisition.
- Thomas, W., & Collier, V. (1997b). Two languages are better than one. *Educational Leadership*, 55 (4), 23-26.
- Thomas, W., & Collier, V. (1999). Accelerated schooling for English language learners. *Educational Leadership*, 56 (7), 46-49.
- Thomas, W., & Collier, V. (2002). *A national study of school effectiveness for language minority students' long-term academic achievement*. Santa Cruz, CA; Washington, DC: Center for Research on Education, Diversity & Excellence.

- Thomas, W., & Collier, V. (2003). The multiple benefits of dual language. *Educational Leadership, 61* (2), 61-64.
- Tinajero, J. (2005, November/December). Bilingual education in Texas: Lighting the path, leading the way. *Language Learner, 17-18*, 20.
- Tobin, K. (1987). The role of wait time in higher cognitive learning. *Review of Educational Research, 57* (1), 69-95.
- Torff, B. (2005). Developmental changes in teachers' beliefs about critical-thinking activities. *Journal of Educational Psychology, 97* (1), 13-22.
- U.S. Department of Education. (2000). Before it's too late: A report to the nation from the National Commission on Mathematics and Science Teaching for the 21st century. (Publication Identification Number EE 0449P). Maryland: U.S. Department of Education, P.O. Box 1398, Jessup, MD 20794-1398.
- Valenzuela, A. (2005). Leaving children behind: How "texas-style" accountability fails latino youth. Albany: State University of New York Press.
- Zohar, A. (2006). The nature and development of teachers' metastrategic knowledge in the context of teaching higher order thinking *Journal of the Learning Sciences, 15* (3), 331-377.
- Zohar, A., & Dori, Y. (2003). Higher order thinking skills and low-achieving students: Are they mutually exclusive? *Journal of the Learning Sciences, 12* (2), 145-181.
- Zohar, A., & Schwartzner, N. (2005). Assessing teachers' pedagogical knowledge in the context of teaching higher order thinking. *International Journal of Science Education, 27* (13), 1595-1620.
- Zhu, W. (1995). Effects of training for peer response of students' comments and interaction. *Written Communication, 12* (4), 492-528.