Exhibit Materials for Taylor W. Acee:
Funded External Grant

Paulson, E., Mireles, S., & Acee, T. W. (2011-2013). *Evaluation of the Adult Basic Education Innovation Grant Program* (THECB Contract No. BMS7154 and Amendment No. BMS 7896). Texas Higher Education Coordinating Board, Austin, Texas, $299,895 [Taylor W. Acee is listed as a Co-Investigator on this project.]

Summary: This funded external grant is an example of my applied scholarly research focused on evaluating learning support interventions in adult education contexts. My work on this grant is an interdisciplinary collaboration with my colleagues at Texas State University – San Marcos from the College of Education and College of Science. The funding of this grant also serves as an external recognition of my scholarly work. Currently, we have submitted an interim technical research report on this grant (Paulson, Acee, Mireles, Jung, & Westbrook, 2013). See the full grant proposal below as well as the contracts for our initial funding and extension of funding.

References

Paulson, E. J., Acee, T. W., Mireles, S. V., Jung, J. H. Westbrook, T. (2013). *Evaluation annual report: Accelerate Texas Program*. Austin, TX: Texas Higher Education Coordinating Board.

Cover Form

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Authorized Signature:	Kay Beauchamp for
Printed Name and Title:	W. Scott Erwin, Sr. Director, Office of Sponsored Programs
Date:	6/9/11

Applicant Certification	
Authorized Signature:	Kay Beauchamp for
Printed Name and Title:	W. Scott Erwin, Sr. Director, Office of Sponsored Programs
Date:	6/9/11

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Transmittal Letter

To: Point of Contact PAG@thecb.state.tx.us

My name is Dr. Eric Paulson, and I am submitting an Application for the THECB EVALUATION OF THE ADULT BASIC EDUCATION INNOVATION GRANT PROGRAM. I am committed to provide the services required by THECB, and I am in full acceptance of the terms and conditions described in this Request for Application and the Anticipated Interagency Contract. This Application is valid for ninety (90) days from the deadline for delivery of Applications to the THECB. The Application enclosed is binding and valid at the discretion of THECB.

Name of Applicant:

Texas State University-San Marcos

Name, address, telephone number, and email address of the individual authorized to negotiate and sign a Contract:

W. Scott Erwin, Sr.

Director, Office of Sponsored Programs

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Name, address, telephone number, and email address of the individual to contact regarding questions that may arise during review of the Application.

Eric J. Paulson, PhD

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Thank you for the opportunity to submit this Application.

Sincerely,

Eric J. Paulson, Ph.D.

Kay Beauchamp for

W. Scott Erwin, Sr.

W. Scott Erwin
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Abstract

A diverse group of experienced developmental education researchers with expertise in adult education, English as a Second Language, mathematics, literacy, and learning support at Texas State University-San Marcos will collaborate to conduct the external evaluation of the Adult Basic Education Innovation Grant (ABE-IG) programs. Using a collaborative evaluation framework, the evaluation team will work closely with ABE-IG project sites to first determine their ABE-IG goals and objectives and then to assist in the collection and analysis of process data germane to those goals and objectives. The evaluation team will then complete a cross-site evaluation of all ABE-IG project sites to evaluate the ABE-IG program as a whole. The evaluation team will undertake tasks that include: (1) providing technical assistance in research design—including methodology, human subjects/IRB approval, data collection and analysis—to project sites; (2) developing research instruments and assisting sites with their use; and (3) conducting at least one site visit, including virtual pre- and post- site meetings, at each ABE-IG institution in order to collect data and provide research assistance. The evaluation focus is on process data, efficacy of ongoing implementation of project initiatives, and potential for scalability.

Narrative

9.1 Qualifications of Evaluation Personnel

Each of the key personnel were chosen based on the following criteria: experience teaching adult basic education, adult English as a Second Language students, and/or students that are at-risk, underprepared or underserved/underrepresented; experience with the administration and/or evaluation of programs aimed at adult basic education and college readiness issues; experience with curriculum development and/or non-traditional instructional methods; expertise in qualitative research methods, quantitative research methods, or both; active research agendas centering on the population of interest in the grant program; strong working knowledge of national and state organizations and standards; and, ability to coordinate and communicate constructive feedback.

The evaluation team will consist of three Principal Investigators (Dr. Eric J. Paulson, Dr. Selina Vásquez Mireles, and Dr. Taylor Acee), a consultant (Dr. Emily Miller Payne) and graduate student assistance, with the possibility of utilizing evaluation personnel from other evaluation projects that target institutions with multiple programs (e.g., DEDP) as suggested by this RFA. Although the group will serve as a team, each evaluator brings a unique level of expertise that revolves around adult education, including learning support, English as a Second Language, developmental mathematics, adult basic education, and developmental literacy. Attachment B contains curriculum vitae for the evaluation team.

Dr. Eric Paulson is a professor in the Graduate Program in Developmental Education in the College of Education at Texas State and is the director of the proposed doctoral program in developmental education. Prior to his current position, he was associate professor in the Graduate Program in Literacy Education at the University of Cincinnati, and coordinator of the

Graduate Certificate in Postsecondary Literacy Instruction. In addition, he also served as the Director of Graduate Studies for the School of Education, overseeing several masters and doctoral degrees in a variety of areas of education. In that position, he developed program- and school-level graduate policies and implemented those as well as Graduate College policies, and administered annual graduate assistantship and graduate tuition scholarship budgets totaling $2,471,000. Prior to his work in graduate education, Dr. Paulson taught in the developmental reading programs of Pima Community College in Arizona, and the 2-year University College in Ohio. In University College he served as the program coordinator for the Reading & Critical Thinking Program. He has taught English as a Second Language to adult learners in South Korea, Mexico, and three states in the United States in a variety of institutions including community colleges, 4-year colleges, Intensive English Programs and institutes, and community volunteer organizations.

The principal theme of Dr. Paulson's research over the last decade has been college/adult readers' experiences of texts, reading, and developmental reading instruction, and has utilized a variety of research tools applied both qualitatively and quantitatively within a social-constructivist framework. He developed an approach to examining readers' non-deliberate responses to texts, and the reading process in general, which involves a juxtaposition of eye movement analysis and miscue analysis. He described this in an early book and has used this research approach for theory building, examining developmental reading assessment claims, and evaluating hidden aspects of the ubiquitous college classroom activity of peer-reviewing. Recently, Dr. Paulson's use of metaphor analysis to study student responses to developmental reading contexts has grown substantially, along with methodological developments in how to conduct metaphor analyses. Literature-based theory building has been a useful addition to these

empirical research studies, including in expanding aspects of literacy theory and focusing on postsecondary literacy specifically. Dr. Paulson maintains an active research agenda and in the last ten years has published three books, numerous research articles in first-tier journals in the literacy and developmental education fields (including *Reading Research Quarterly, Research in the Teaching of English, Journal of Adolescent & Adult Education, Journal of Developmental Education, Journal of College Reading & Learning),* and given dozens of conference presentations. Dr. Paulson is qualified to serve as principal investigator and will devote 25% of his time to this grant.

Dr. Selina Vásquez Mireles, professor in the Department of Mathematics, has directed the Developmental Mathematics program at Texas State since 1998. One of her primary research interests is Developmental Mathematics starting with her focus on at-risk mathematics students as a high school teacher and manifesting in a related dissertation where she first evaluated the effectiveness of an instructional method for this population. After receiving her Ph.D. from the University of Texas at Austin (UT) in Mathematics Education, she began her career at Texas State. She was charged with re-inventing the developmental mathematics program and began by observing and then teaching these courses herself. As a second year junior faculty, she received a U.S. Department of Education Fund for the Improvement of Postsecondary Education (FIPSE) grant focusing on developmental mathematics. Through these funds, pedagogical reform began to take place. Then, in 2007 she was chosen to co-chair the vertical team that wrote the mathematics Texas College and Career Readiness Standards (TX CCRS; THECB, 2008). This insight aided in creating curricular changes in developmental mathematics and entry-level credit-bearing courses such as College Algebra at Texas State and the state in general. For instance, she is currently advocating for a new General Education Course equivalent, College Statistics and

Algebra. She has served as principal investigator for several other related projects, including 2008 Summer Intensive Program, Math FOCUS: Fundamentals of Conceptual Understanding & Success. Dr. Mireles has written many scholarly articles about effective programs (Mireles, 2010; Vásquez, 2004) and has been commissioned to review programs throughout Texas including Texas A&M International University, Tarleton State University, and San Antonio College. She currently is chair of four dissertation committees that focus on college readiness issues and that employ mixed methods. As a leading expert in developmental mathematics and over ten years of experience in mixed methods research in mathematics education, Dr. Mireles is qualified to serve as co-principal investigator and will devote 25% of her time to this grant.

Dr. Taylor W. Acee has a strong background in quantitative methods, program evaluation, and experimental design as well as experience conducting research in educational settings and publishing scholarly research articles. He received his M.A. in Educational Psychology: Program Evaluation and his Ph.D. in Educational Psychology: Learning, Cognition, and Instruction from UT. As a graduate student at UT, he worked on a number of projects that involved program evaluation. In his masters and dissertation research, he developed and evaluated, using experimental research methods, motivation and self-regulation interventions aimed at helping students succeed in introductory statistics courses; a course known to be difficult for students (Acee & Weinstein, 2010). He also worked as a research assistant (RA) for the SeniorWISE study, a multimillion dollar study funded by the National Institute of Health (NIH), and helped evaluate the effectiveness of interventions designed to help train geriatric participants to improve their memory and health (McDougall, Becker, Pituch, Acee, Vaughan, & Delville, 2010). In addition, he worked as a Graduate Student Fellow for the Research and Evaluation Team in the Planning and Accountability Division at the THECB. Currently, he is

working as a program evaluator for the Fundamentals of Conceptual Understanding and Success (FOCUS) project that is funded through a Developmental Education Demonstration Project (DEDP) grant by the THECB.

In addition to Dr. Acee's experience and expertise as a researcher and program evaluator, his theoretical knowledge in the areas of learning, motivation, self-regulation and developmental education will be useful when generating research questions and interpreting findings for this project. Dr. Acee has co-written a number of book chapters with Dr. Claire Ellen Weinstein, his mentor and author of the Learning and Study Strategies Inventory (LASSI), on learning strategies and strategic and self-regulated learning (e.g., Weinstein, Acee, & Jung, 2010). He has also published theoretical research on academic motivation (Acee, et al., 2010; Acee & Weinstein, 2010). He taught (2 years) and co-coordinated (3 years) a 3-credit learning frameworks course at UT that draws on learning and motivation theory to help students become more strategic and self-regulated learners and increase their success in college. As Principal Investigator of a Research Enhancement Grant awarded from Texas State, he is currently investigating motivational influences on developmental education math student achievement and continued interest. His work with the FOCUS project and learning frameworks course have granted him opportunities to work in various capacities with diverse college student populations including developmental education students, adult basic education students, GED students, veterans, ESL students, and students on academic probation.

Dr. Acee's expertise in research and evaluation combined with his theoretical and applied knowledge in strategic learning and motivation of underprepared and at-risk students make him highly qualified to serve as co-investigator on this grant. Dr. Acee will serve as project co-principal investigator and will devote 25% of his time to this grant.

Dr. Emily Miller Payne, Associate Professor of Developmental Education, holds a doctorate in Curriculum and Instruction in Reading from New Mexico State University. She has served as Director of The Education Institute and Principal Investigator of externally funded projects of $20 million from 2001-present and has 20+ years experience procuring and directing adult education grants. She has 30 years experience teaching and researching in adult basic education and literacy, graduate instruction in adult education, and education program evaluation. Her primary research expertise is in qualitative methods, focusing specifically on grounded theory and phenomenological traditions. Dr. Payne has served in numerous capacities in national developmental education associations: Editor, Journal of College Reading and Learning; Member, Joint CRLA and NADE National Certification Committee; Editorial Board Member, Journal of College Reading and Learning ; Member, Media Advisory Board, College Reading and Learning Association; Member, Professional Development Committee, College Reading and Learning Association; Co-Chair, Professional Development Committee, National Association for Developmental Education; Member, International Reading Association Chartered Task Force for the Standards Project; Co-Chair Publications Committee, National Association for Developmental Education. Currently she serves on the Advisory Board of the Literacy Coalition of Central Texas. In addition, Dr. Payne teaches master's and doctoral courses in developmental and adult education. Dr. Payne will act as consultant to the evaluation team.

9.2 Prior Evaluation Experience

The key personnel collectively have over 40 years of consistent experience with evaluation. In addition, each key personnel holds a terminal degree, directs theses/dissertations, receives research funding, and evaluates multiple programs/interventions at higher education institutions with both quantitative and qualitative methodologies, and utilizes a wide variety of

small- and large-scale data sets involving multiple outcome measures including persistence and completion.

Dr. Eric Paulson has over 10 years of experience involving aspects of evaluation and data analysis, including both quantitative and qualitative, that ranges from overseeing doctoral student research to evaluating programs, program policy changes, and implementation at a variety of higher education institutions. He has chaired and served on a large variety of dissertation committees and guided research ranging from evaluation studies to basic research to the construction of assessment metrics. As the Director of Graduate Studies for the School of Education at the University of Cincinnati he was responsible for the interpretation of state and university policy at the program and degree level and evaluating the efficacy of those policies. As Academic Director of Kangnam English Language Institute in Seoul, Korea, Dr. Paulson was responsible for all aspects of the academic services of this English Language Institute, including program development, program evaluation, outcome assessment, and teacher development. In 2008, Dr. Paulson served as the Lead Evaluator for the Quality Enhancement Plan (QEP) of Edgecombe Community College's SACS Reaffirmation, and in 2009 he served as Lead Evaluator for the Quality Enhancement Plan of Robeson Community College's SACS Reaffirmation. He has multiple years of experiences teaching English as a Second Language to adult learners, and holds a lifetime community college teaching license for the state of Arizona with certification in English as a Second Language.

Dr. Selina Vásquez Mireles has over 10 years of experience with evaluation and over 13 years of experience with data analyses of large scale data sets from higher education institutions. She currently supervises four dissertations, has conducted book reviews, and has served on various editorial boards including the Journal of Developmental Education. She spearheaded the

National Association of Developmental Education (NADE) Certification process for the Developmental Mathematics Program at Texas State which is in its final stage of review. She has received over $2.5 million dollars in funded research initiatives. Moreover, Dr. Mireles has conducted extensive reviews of THECB-sponsored programs including Summer Bridge programs, DEDP - Community Colleges, and Intensive College Readiness Programs for Adult Education Students (IP-AES). Various colleges and universities such as Tarleton State University, San Antonio College, and Texas A&M International University/Laredo Community College, have requested that she evaluate their programs. These reviews and evaluation usually include a deep analysis of standards adherence especially the TX CCRS and including AMATYC's Crossroads, THEA Objectives, and Texas Adult Education Standards and Benchmarks for ABE ASE and ESL Learners. In an effort to promote research, she created a model for training individuals on research practices, the Research Apprenticeship Model, which is currently used to facilitate research activities with pre-service and in-service mathematics teachers. Similarly, she has guided collaborative teams of high school, college, and university instructors through action research projects. Dr. Mireles is accustomed to evaluation projects that include both quantitative and qualitative data collection, data analysis, and working with large data sets.

Dr. Taylor W. Acee has over 7 years of experience with evaluation in both higher education and geriatric health, and over 10 years of experience managing and conducting quantitative analyses (e.g., ANOVA, regression, HLM, and factor analysis) on large-scale datasets in the areas of higher education and geriatric health, plus over 6 years of experience conducting qualitative and mixed-methods research in higher education. He received his M.A. in Educational Psychology: Program Evaluation and his Ph.D. in Educational Psychology:

Learning, Cognition, and Instruction from the UT. As a graduate student at UT, he worked on a number of projects that involved program evaluation. In his masters and dissertation research, he developed and evaluated (using quantitative and qualitative methods) motivation and self-regulation interventions aimed at helping students succeed in introductory statistics courses (Acee & Weinstein, 2010). He also worked as a research assistant (RA) for the SeniorWISE study, a multimillion dollar study funded by the NIH, and helped evaluate the effectiveness of interventions designed to help train geriatric participants to improve their memory and health (McDougall, Becker, Pituch, Acee, Vaughan, & Delville, 2010). He also worked as a Graduate Student Fellow for the Research and Evaluation Team in the Planning and Accountability Division at the THECB. Currently, he is working as a program evaluator for the FOCUS project that is funded through a DEDP grant by the THECB. He also has extensive experiencing managing datasets and conducting statistical analyses. For example, he generated, managed, and conducted statistical analyses on large-scale datasets for the FOCUS project, the Community College Longitudinal Retention Study (CCLR), and the SeniorWISE study. He also has experience conducting mixed-methods research on college students' goals (Goals Study). Dr. Acee has published 13 articles in peer-reviewed research journals, 3 book chapters, and 1 monograph. He gave 37 research presentations at professional conferences, 2 of which were invited presentations. He also presented 10 workshops on strategic and self-regulated learning to academic instructors, administrators, counselors, advisors, practitioners, and students in post-secondary institutions. Dr. Acee belongs to a number of professional organizations including NADE, College Reading and Learning Association, and American Educational Research Association. He is also a member of the editorial review board for *Frontiers in Educational*

Psychology and has been a reviewer for *Learning and Individual Differences, Journal of College Reading and Learning,* and *Journal of Educational Psychology*.

Dr. Emily Miller Payne, Associate Professor of Developmental Education, holds a doctorate in Curriculum and Instruction in Reading from New Mexico State University. Dr. Payne has over 15 years experience in evaluating grant-funded programs in developmental and adult programs. The following is a selected list of her experience as external evaluator of state and federal grants: Dropout Recovery Pilot Project (2008-2010), Texas Education Agency project; Even Start Program Evaluations (2003-2007): Tuloso-Midway ISD, Avance El Paso, Weatherford ISD, Socorro ISD, Northside ISD, Dallas ISD, Laredo United ISD, San Marcos CISD, Middle Rio Grande, U.S. Department of Education; Even Start Family Literacy Program at Austin Community College. (1997-98), U.S. Department of Education; Workforce Instructional Network Adult Secondary Education Transition Project Grant, Community Action Inc. (1996-97), Texas Education Agency. She has published and presented her research on program evaluation at national and state developmental and adult education conferences. In addition, Dr. Payne developed and teaches master's and doctoral courses in program planning and evaluation.

9.3 Quality of Writing Samples

In Attachment C, writing samples for all key personnel are included. Note that all the writing samples are clear and concise, have been and/or are in the process of double-blind peer reviews, and employ rigorous research methods.

Dr. Eric Paulson's writing sample submission is a research study published in *Research in the Teaching of English*, the highest tier research journal in the field of English/writing. This article demonstrates Dr. Paulson's use of a sophisticated merging of methodologies that includes

eye-movement analysis and verbal responses from participants reported through both aggregate statistical and descriptive techniques as well as a single participant's outcome. This article is a good example of Dr. Paulson's ability to pursue complex research questions through novel and mixed methodologies, with clear communication of well-supported findings.

Dr. Selina Vásquez Mireles' writing sample submission, an article in the *Journal of College Reading and Learning*, the most selective peer-reviewed journal in developmental education, is an example of her knowledge and skills in developmental mathematics program reconfiguration. The sample demonstrates her command of the literature and her background in conducting and writing clearly and concisely about her research efforts.

Dr. Taylor Acee's submission, a manuscript he co-authored with Dr. Claire Ellen Weinstein that was published in the *Journal of Experimental Education,* is an excellent example of his command of the research process and his knowledge of the academic area of postsecondary student motivation. Dr. Acee, as demonstrated in this writing sample, writes skillfully for a range of readers that includes researchers and practitioners.

Dr. Emily Miller Payne's writing sample, an invited book chapter in a forthcoming tutor training handbook for use by practitioners in tutor and mentor training, exemplifies her command of the evaluation literature and process. Her prose style is clear, concise, and easily accessible to researchers, practitioners, and policy makers.

9.4 Quality of Management/Evaluation Plan

(a) Evaluation Plan

As identified by the 81st Texas Legislature, the ABE-IG program is such a crucial one for Texas—and for the field—in no small measure because of the need for, and popularity of, ABE programs in community colleges (Cohen & Brawer, 2008). Despite their prevalence, there is

ample room for an increase in creating and expanding evidence-based ABE programs (Comings, Beder, Bingman, Reder, & Smith, 2003) such as the I-BEST program in Washington state (Jenkins, Zeidenberg, & Kienzl, 2009).

The evaluation team—comprised of leaders in the field of developmental education and serving diverse student populations that include adult learners, veterans, English as a Second Language learners, GED students, and adult basic education students—is excited to play an evaluative role in identifying the evidence base of programs in the ABE-IG project. Some of the aspects of interest in this evaluation will include:

- Intensive advising, either in small groups or individually
- Workforce training models, such as I-BEST or Concurrent / Dual Enrollment Models
- Alternative assessments for English language learners
- Partnerships with local education and/or social service provider, and the Local Workforce Development board
- The creation or expansion of student support services as they relate to ABE students
- An increase in the availability of faculty development opportunities related to ABE students
- The integration of Texas College and Career Readiness Standards (CCRS)
- The inclusion of academic support activities as integral components of the program
- A dedicated individual or group that monitors ABE student progress throughout their enrollment in the program

- Student incentives
- Peer-to-peer academic support
- Long-term student support

The evaluation team is committed to understanding how well the ABE-IG program works for each individual ABE-IG project site as well as across all ABE-IG project sites overall. The evaluation focus is on process data, efficacy of ongoing implementation of project initiatives, and potential for scalability. Where appropriate, the evaluation team will work closely with ABE-IG project managers, as well as other external reviewers included in each ABE-IG project. In addition, the evaluation team will seek collaboration with evaluation teams related to DEDP initiatives (e.g., Texas State is a DEDP site).

The Program Evaluation Standards as outlined by the Joint Committee on Standards for Educational Evaluation (JCSEE, 2011) and discussed in more detail by Yarbrough, Shulha, Hopson, and Caruthers (2011) will be upheld by the evaluation team. Accordingly, the evaluation team will work to (a) "…increase the extent to which program stakeholders find evaluation processes and products valuable in meeting their needs," (b) "…increase evaluation effectiveness and efficiency," (c) "…support what is proper, fair, legal, right and just in evaluations," (d) "…increase the dependability and truthfulness of evaluation representations, propositions, and findings, especially those that support interpretations and judgments about quality," (e) "…encourage adequate documentation of evaluations and a meta-evaluative perspective focused on improvement and accountability for evaluation processes and products" (JCSEE, 2011).

The framework of this evaluation is based upon what is termed "collaborative evaluation" in the evaluation research literature (see Cousins, Donohue, & Bloom, 1996). This is especially

relevant in the current evaluation proposal because the aim is to conduct both an evaluation focused on individual institutions and a cross-site evaluation. In order to implement this dual focus, a detailed understanding of each institution's specific goals is necessary. Thus, the first step in this process is to work with each institution to understand their ABE-IG goals and/or objectives (see Attachment F-2 which presents the Program Component Identification rubric used to identify those goals and/or objectives). This dual focus allows useful feedback from the perspective of the individual contexts of each institution as well as for the ABE-IG program overall. Thus, the proposed evaluation project consists of an evaluation plan that measures the effectiveness of the ABE-IG program in two ways: within each institution and across all ABE-IG institutions. Pursuant to accomplishing these foci the evaluation team will undertake tasks that include: (1) providing technical assistance in research design–including methodology, IRB approval, data collection and analysis—to project sites; (2) developing research instruments and assisting sites with their use; and (3) conducting at least one site visit, including virtual pre- and post- site meetings, with each ABE-IG institution in order to collect data and provide research/evaluation assistance. Descriptions of the evaluation team's approach to conducting intra-site and inter-site evaluations of the ABE-IG program is outlined in the sections below, in addition to descriptions of major elements of the evaluation project (e.g., site visits, technical assistance, and report writing).

Assisting Project Sites With A Rigorous Evaluation Of Their ABE-IG Initiatives

Appendix C in the Adult Basic Education Innovation Grant RFA includes performance objectives that each ABE-IG project site will need to accomplish. The evaluation team builds on those performance objectives through constructing a Program Component Identification rubric that encompasses the wider array of goals and objectives included in the Adult Basic Education

Innovation Grant RFA. The evaluation team's first step in assisting project sites with their evaluation is to complete a Program Component Identification rubric collaboratively with each site to fully understand their ABE-IG initiatives, goals, and objectives. The rubric has two primary objectives. The first is to identify the interventions used by the ABE-IG institutions. The second is to guide aspects of ongoing implementation of those interventions. Those two objectives are reciprocal and recursive and the rubric will be further defined by each institution's needs and objectives. To achieve these purposes, the rubric is comprised of nine main areas: (a) Postsecondary and Workforce Training Models; (b) Partnerships; (c) Student Support Services; (d) Faculty Development Access and Participation; (e) Augmented Academic Support; (f) Monitoring, Mentoring, Counseling, and Case-management; (g) Data Collection; (h) Optional Program Components (student incentives, peer support groups, long-term support, etc.); and (i) Integration of Texas College and Career Readiness Standards. Each of those areas are based on the descriptions of the various parts of the Adult Basic Education Innovation Grant (Sections 10 and 11). Short descriptions of each Program Component Identification rubric are provided below, and an example of each is provided in Attachment F-2.

- **Rubric Focus A: Postsecondary and Workforce Training Models.** These include foci on advising (one-to-one or small group), workforce training models (e.g., I-BEST or Concurrent Enrollment), and alternative standardized English language assessments
- **Rubric Focus B: Partnerships.** These include foci on partnerships with local adult education or social service providers, and partnerships with the local LWDB.
- **Rubric Focus C: Student Support Services.** These include foci on the creation or expansion of the availability and quality of academic advising, counseling, and retention services for ABE students.

- **Rubric Focus D: Faculty Development Access and Participation.** These include foci on plans for increasing the availability of faculty development opportunities related to ABE transition to postsecondary contexts, workforce readiness, team teaching, and curriculum development and alignment.
- **Rubric Focus E: Augmented Academic Support.** These include foci revolving around academic support activities as integral components of the ABE-IG program.
- **Rubric Focus F: Monitoring, Mentoring, Counseling, and Case-management.** These include foci on the structure of ongoing student tracking and support.
- **Rubric Focus G: Data Collection.** These foci center on the program objectives and research questions of each ABE-IG project site, and will be completed collaboratively with each site.
- **Rubric Focus H: Optional Program Components.** These components can include incentives to students, peer academic support groups, long-term student support, and other promising components.
- **Rubric Focus I: Integration of Texas College and Career Readiness Standards.** These foci center on areas of the ABE-IG in which CCRS can be integrated.

In sum, the Program Component Identification rubric focuses on a method to involve the institution in identifying areas of concern and methods to objectively measure outcomes of activities specific to each institution's ABE-IG program plan. This series of guiding rubrics provides consistent and transparent scaffolds while collaboratively identifying and guiding the implementation of aspects of each institution's program activities. At the point at which the evaluation team has identified each institution's ABE-IG initiatives and what they want to

measure, the evaluation team will then assist in technical areas of IRB approval, and data collection and analysis, as noted in the "Providing Technical Assistance" section, below.

Using the data captured from the rubric completed with each institution, the evaluation team will identify two categories of evaluation measures. The first category is comprised of data that the rubric indicates that each institution will already be collecting. The evaluation team will assist each institution with the technical aspects of this data collection and analysis. The second category is focused on cross-site evaluation of the ABE-IG project. In both categories, focus will remain on process, efficacy of ongoing implementation of project initiatives, and potential for scalability of the ABE-IG program.

Cross-Site Evaluation

Through the Program Component Identification rubric completed with each ABE-IG institution, the evaluation team will identify the set of data that are not being targeted for collection; that is, the evaluation team will use the rubric to determine where a cross site evaluation will entail the use of measurement tools not already being used by each institution. The evaluation team will then construct those tools—for example, surveys, focus groups, and observational protocols—and will assist project sites with the implementation of those tools in order to collect the necessary data.

While assisting each institution with their own rigorous evaluation measure may entail a focus on either the integrated academic advising or the integrated VESL/ABE foci, the cross-site process evaluation will include evaluation on both of those foci. Depending on the type of data and questions that emerge through the completion of the Program Component Identification rubric, the cross-site evaluation can employ methodologies using survey instruments, focus groups, and observational protocols to collect process data, with a focus that includes qualitative,

quantitative, and/or mixed methods data sets. For example, quasi-experimental approaches may be considered, in which students are not randomly assigned to treatment or control/comparison groups but a control/comparison group is obtained by matching students on baseline characteristics of the treatment group. We will work with each institution to determine appropriate research approaches.

Site Visits

The evaluation team is committed to making at least one "site visit cycle" for each ABE-IG institution and believes that site visits should be designed to include pre- and post- virtual meetings. The purpose of the pre-site visit is to gather the necessary information to make the actual site visit effective and productive. The rubric to identify ABE-IG project aspects will be utilized and site visit expectations with agendas will be established. In addition, efforts to evaluate the effectiveness of the ongoing implementation of the ABE-IG project aspects will be discussed, with technical assistance provided for data collection and analysis. The site visit will include targeted observations, interviews, and focus groups of students, faculty, and counseling and administrative staff. In addition, there will be a question and answer session with the evaluators and meetings with stakeholders will occur to determine and address their questions and concerns. The post-site visit will also occur virtually and be used to convey constructive feedback, suggestions for practice, and another any other opportunity for technical assistance. See Attachment F-1.

Technical Assistance

The evaluation team will provide technical assistance in obtaining IRB permissions, data collection, analysis, and reporting to the ABE-IG project sites. This technical assistance will take place before, during, and after the site visits especially, as well as on an "as needed" basis. An

initial focus will be on assisting institutions with the design and implementation of a rigorous evaluation of their ABE-IG initiative, while later foci will include assistance with documentation and reporting. In terms of documentation and reporting, the evaluation team will guide ABE-IG project sites in developing standardized systems for disseminating results. This will include an online module that will be developed to guide institutions through common elements of report writing. These types of assistance will build the infrastructure that the ABE-IG project sites will need as they vie for other grants, will attempt to institutionalize the programs, and generate publications related to program outcomes. While some aspects of data collection will vary from institution to institution, the research and evaluation team will request that institutions administer a battery of identical measures to their students, instructors, and advisors. In addition, each institution will use uniform spreadsheets to enter these common data sets. In coordination with the THECB, the research and evaluation team will provide assistance to institutions as they enter these data. In addition, the research and evaluation team will provide assistance to the ABE-IG project sites with data analysis, interpretation, and reporting as the ABE-IG project sites conduct self-evaluations of these data. The research and evaluation team will also conduct inter- and intra-institutional analyses of this data and, with permission of the THECB, disseminate easy-to-understand and practical reports to institutions.

Reports

The evaluation reports will utilize the THECB Suggested Evaluation Report Template (Attachment F-3) and adhere to the THECB Style manual. Clear and concise research questions will be posed with specific attention to independent/dependent and control variables. The evaluation team will provide technical assistance with quantitative and qualitative data collection and analysis. Online materials will be available in addition to the planned site visit cycle

opportunities. Constructive feedback and recommendations will be crafted by the evaluation team with an eye towards including learning support (lead by Dr. Acee), mathematics (led by Dr. Mireles) and ESL and literacy (led by Dr. Paulson) and other areas of adult education. The evaluation team will also include references for professional development and exemplary models of practice. Furthermore, the evaluation team will construct a website that ABE-IG project sites can access that contains up-to-date reference materials as well as opportunities to conduct online discussions all in the spirit of building professional community.

(b) Implementation and Management of Evaluation Tasks.

Assisting Project Sites

The evaluation team will provide technical assistance in research design, obtaining IRB permissions, data collection, analysis, and reporting to the ABE-IG project sites. This technical assistance will take place before, during, and after the site visits, as well as on an "as needed" basis. The primary vehicle in assisting ABE-IG project sites with the design of a rigorous evaluation is in the collaborative completion of the Program Component Identification rubric. Based on the iterative and reflective processes implied in Stevens and Levi (2005) and Taggart (1998), completing the rubric involves a recursive process of construction that involves several stakeholders, including the THECB and the ABE-IG institutions. The framework of the rubric has been constructed to involve nine foci: (a) Postsecondary and Workforce Training Models; (b) Partnerships; (c) Student Support Services; (d) Faculty Development Access and Participation; (e) Augmented Academic Support; (f) Monitoring, Mentoring, Counseling, and Case-management; (g) Data Collection; (h) Optional Program Components; and (i) Integration of Texas College and Career Readiness Standards. Each of those areas is based on the description of the various parts of the Adult Basic Education Innovation Grant (Sections 10 and 11) and an

example rubric of each is provided in Attachment F-2. The first phase is to work with each institution on aspects of the rubric that involve identification of characteristics of the ABE-IG unique to their institutions. Working collaboratively with each institution, this phase will be completed by November 1, 2011. The next phase involves the use of the rubric to guide the evaluation focus each ABE-IG project site has identified, and to plan the type of data that need to be collected. This involves the rubric's use as a prompt and organizer for the institutions and, in addition, the rubric will be used as method of summarizing some of the results and communicating with each institution about areas still in need of development. The rubric segment of this evaluation grant will be overseen by Dr. Paulson, with each team member assigned as point person for communication with one of the ABE-IG project sites. Through the use of the rubric as a way to identify foci and plan approaches, the evaluation team will be able to provide technical assistance in a structured manner as well as on an "as needed" basis.

Cross Site Evaluation

The first phase of the cross-site evaluation coincides with the completion of the Program Component Identification rubric by each of the ABE-IG project sites, as the rubric allows for identification of data that need to be collected across all project sites. The tools needed for collection of those data—surveys, focus group protocols, and observational protocols—will then be developed, and the evaluation team will work with each project site to implement those tools. The cross-site evaluation will include a focus on both the integrated academic advising and the integrated VESL/ABE initiatives, including the success, support, and professional development aspects of the performance measures description found in Appendix C of the Adult Basic Education Innovation Grants RFA. The evaluation focus will be on process, efficacy of ongoing implementation of project initiatives, and potential for scalability.

Site Visits

The pre-site visit will be virtual and attended and facilitated by all key personnel. Through the pre-site visit and rubric completion information, the evaluation team will then determine who is to lead the site visit for that particular institution. All key personnel will attend the post-site visit. See Attachment F-1 for the site visit protocol.

Technical Assistance

The evaluation team will provide technical assistance in research design, obtaining IRB permissions, data collection, analysis, and reporting to the ABE-IG project sites. This technical assistance will take place before, during, and after the site visits, as well as on an "as needed" basis. The Program Component Identification rubric will help identify what kinds of assistance are useful to each project site, and when that assistance is most useful.

Reports

The evaluation team will collaborate to write all evaluation reports. The team will meet weekly, and through a formative process will produce monthly status reports. In addition, the team will work together to develop the preliminary report and the final report. The team has specialized content expertise that includes English as a Second Language, adult literacy, mathematics, learning frameworks, developmental education, and other areas of adult education, and this expertise will be aligned to the needs of the ABE-IG project sites. These alignments will serve to yield effective technical assistance, constructive feedback, and recommendations that inform practice. Reporting will begin as early as July, 2011 with baseline outcome data and continue throughout the time span of this evaluation project. Grant funds will help compensate for time spent by each member of the evaluation team on reporting.

(c) Alignment of Tasks with Evaluation Goals and Objectives

The use of the Program Component Identification rubric described in this proposal ensures that the proposed tasks are directly linked to the goals and objectives of the evaluation. The overall goal of the proposed project is for the Texas State evaluation team to collaborate to conduct the external evaluation of ABE-IG project sites and cross-site program evaluation of the ABE-IG project. The evaluation focus is on process data, efficacy of ongoing implementation of project initiatives, and potential for scalability. The aforementioned tasks are all clear efforts to accomplish this goal. The evaluation task will create insight into the aspects of the objectives while providing the ABE-IG project sites with activities and outcomes that expand their knowledge and skills in their fields in addition to research.

(d) Timeline

The proposed project timeline is included in Attachment A. It is complete, appropriate and reasonable for successful performance of the evaluation of the ABE-IG project sites and the cross-site evaluation. Specifically, the timeline provides both the ABE-IG project sites and the evaluation team with flexibility with structure and options that capitalize on expertise and institutional culture. The timeline presents a well-paced plan of pre-site visits, site-visits, and post-site visits that allows for a progression of understanding each institution’s evaluation needs and how to assist them in data collection and analysis. Report writing and technical assistance will be timely and adhere to the reporting requirements of THECB. The Evaluation Timeline includes scheduled routine tasks such as weekly meetings and accounts for the time needed to accomplish tasks such as scheduling for time to write reports in addition to when reports are due.

(e) Budget

The proposed budget of $99,895.39 is appropriate and reasonable. The budget allocates 32.10% to personnel who are instrumental in the evaluative aspects of the proposed project. In addition, there are monies, 10.66%, that will be used to support student contributions including doctoral-level research perspectives. Note that the proposed budget includes monies for ABE-IG sites to assist in accomplishing the objectives of the proposed evaluation project. For example, SPSS for Windows Step by Step: A Simple Guide and Reference 18.0 Update (11th Edition) could be purchased for ABE-IGs to begin their professional libraries, utilize a training of trainer's model, and to conduct further research. The Department of Curriculum & Instruction and the College of Science have each agreed to supplement a student worker position (see Attachment D).

(f) Agreement Acknowledgement

The Applicant acknowledges agreement with the THECB requirement for a minimum of one status meeting monthly, by telephone or in person, with the THECB Research and Evaluation designated contact, and submission of a monthly, written progress report.

Attachments

Attachment A: Evaluation Timeline

Attachment B: Curriculum Vitae, Resumes, Job Descriptions

Attachment C: Writing Samples

Attachment D: Evaluation Budget

Attachment E: Letters of Support

Attachment F: Sample Instruments

Attachment G: Tables

Attachment H: References

Attachment A: Evaluation Timeline

Month Year	Objective 1	Objective 2	Objective 3	Reports	Routine
July 2011	Establish relationships with ABE-IG project sites.	Create and calibrate Program Component Identification rubric for use with ABE-IG project sites.	Collect baseline data.	Write and submit monthly progress report.	Accomplish administrative start-up tasks such as course releases and purchasing of materials. Host evaluation team planning meeting to clarify tasks and assignments (weekly evaluation team meetings will continue for the duration of the project). Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
August 2011	Draft site visit protocol.	Formalize Program Component Identification rubric.	Verify baseline data.	Write and submit monthly progress report.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.

Month Year	**Objective 1**	**Objective 2**	**Objective 3**	**Reports**	**Routine**
September 2011	Revise site visit protocol.	Collaborative work on Program Component Identification with each institution.	Guide institutions in drawing appropriate samples.	Write evaluation report on Objectives 1, 2, 3 Write and submit monthly progress report.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
October 2011	Host pre-site visit: Alamo Colleges and El Paso Community College.	Collaborative work on Program Component Identification with each institution.	Assist institutions in formalizing research tools.	Write and submit monthly progress report. Host pre-site visit: Alamo Colleges and El Paso Community College.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
November 2011	Conduct site visit – Alamo Colleges and El Paso Community College. Host pre-site visit: Lonestar Colleges and San Jacinto College.	Use Program Component Identification rubric to guide decisions about data collection and evaluation foci.	Assist institutions in implementing research tools.	Write and submit monthly progress report. Conduct site visit – Alamo Colleges and El Paso Community College. Host pre-site visit: Lonestar Colleges and San Jacinto College.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.

Month Year	Objective 1	Objective 2	Objective 3	Reports	Routine
December 2011	Conduct site visit: Lonestar Colleges and San Jacinto College. Host post-site visit: Alamo Colleges and El Paso Community College.	Continue to use Program Component Identification rubric to guide data collection.	Assist institutions in implementing research tools.	Write and submit monthly progress report. Conduct site visit: Lonestar Colleges and San Jacinto College. Host post-site visit: Alamo Colleges and El Paso Community College.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
December 2011	Host pre-site visit: Tarrant County College District and Austin Community College. Host post-site visit: Lonestar Colleges and San Jacinto College	Continue to use Program Component Identification rubric to guide data collection.	Assist institutions in implementing research tools. Collect and verify process data. Report on short-term outcomes.	Write preliminary report. Write and submit monthly progress report. Write evaluation report on Objectives 1, 2, 3. Host pre-site visit: Tarrant County College District and Austin Community College. Host post-site visit: Lonestar Colleges and San Jacinto College	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.

Month Year	**Objective 1**	**Objective 2**	**Objective 3**	**Reports**	**Routine**
January 2012	Host pre-site visit: Houston Community College and Texas State Technical College-Harlingen. Hose site visit: Tarrant County College District and Austin Community College.	Evaluate use of Program Component Identification rubric to guide implementation of data collection.	Assist institutions in implementing research tools. Collect and verify process data. Report on short-term outcomes.	Submit preliminary report (1/20/2012). Write and submit monthly progress report. Host pre-site visit: Houston Community College and Texas State Technical College-Harlingen. Hose site visit: Tarrant County College District and Austin Community College.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.

Month Year	Objective 1	Objective 2	Objective 3	Reports	Routine
February 2012	Conduct site visit: Houston Community College and Texas State Technical College-Harlingen. Host post-site visit: Tarrant County College District and Austin Community College.	Continuous use of Program Component Identification rubric to evaluate and summarize aspects of the ABE-IG program.	Assist institutions in implementing research tools. Collect and verify process data.	Write and submit monthly progress report. Conduct site visit: Houston Community College and Texas State Technical College-Harlingen. Host post-site visit: Tarrant County College District and Austin Community College.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
March 2012	Host post-site visit: Houston Community College and Texas State Technical College-Harlingen.	Continuous use of Program Component Identification rubric to evaluate and summarize aspects of the ABE-IG program.	Assist institutions in implementing research tools. Collect and verify process data.	Write and submit monthly progress report. Host post-site visit: Houston Community College and Texas State Technical College-Harlingen.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
April 2012		Continuous use of Program Component Identification rubric to evaluate and summarize aspects of the ABE-IG program.	Assist institutions in implementing research tools. Collect and verify process data.	Write and submit monthly progress report.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.

Month Year	Objective 1	Objective 2	Objective 3	Reports	Routine
May 2012		Continuous use of Program Component Identification rubric to evaluate and summarize aspects of the ABE-IG program.	Assist institutions in implementing research tools. Collect and verify process data.	Write and submit monthly progress report. Write evaluation report on Objectives 2, 3.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
June 2012		Continuous use of Program Component Identification rubric to evaluate and summarize aspects of the ABE-IG program.	Report on short-term outcomes. Summarize fall 2011 and spring 2012 short-term outcomes.	Write and submit monthly progress report.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
July 2012		End use of Program Component Identification rubric to evaluate and summarize aspects of the ABE-IG program.		Write final report. Write and submit monthly progress report.	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.
August 2012				Submit final report (8/1/2012). Write and submit monthly progress report. Write evaluation report on Objectives 1, 2, 3	Host weekly evaluation team meetings. Monitor expenditures and reconcile budget. Meet/call THECB evaluation staff to discuss project status.

Attachment B: Curriculum Vitae, Resumes, Job Descriptions

Attachment B-1: Curriculum Vitae of Dr. Eric J. Paulson

Attachment B-2: Curriculum Vitae of Dr. Selina Vásquez Mireles

Attachment B-3: Curriculum Vitae of Dr. Taylor Acee

Attachment B-4: Curriculum Vitae of Dr. Emily Miller Payne

One-Page Curriculum Vitae

Principal Investigator: Eric J. Paulson, Professor, Graduate Program in Developmental Education

GRADUATE EDUCATION			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of Arizona, Tucson, Arizona	Ph.D.	2000	Language, Reading, & Culture
Florida State University, Tallahassee, Florida	M.S.	1993	Multilingual/Multicultural Education

A. Positions

Professor, Texas State University-San Marcos, 2010-Present
Visiting Scholar, National Center for Developmental Education, 2010
Director of Graduate Studies for the School of Education, University of Cincinnati, 2007-2010
Coordinator, Graduate Certificate in Postsecondary Literacy Instruction, University of Cincinnati, 2006-2010
Coordinator, TESOL Endorsement, University of Cincinnati, 2006-2007
Vice President, Board of Directors, Literacy Volunteers of Pima County, 1998-1999
Member, Board of Directors, Literacy Volunteers of Pima County, 1997-1999
Basic Literacy and English as a Second Language Training Workshops Organizer and Presenter, Literacy Volunteers of Pima County, 1997- 1999
Adjunct Instructor, English as a Second Language, University of Arizona,1997
English as a Second Language Audio Tape Development, ELS International Kangnam, Seoul, Korea, 1995
English as a Foreign Language Teacher Training Workshop , ELS International Kangnam, Seoul, Korea,1994-1996
Academic Director, ELS International Kangnam, Seoul, Korea, 1994-1996
English as a Foreign Language Instructor, ELS International Kangnam, Seoul, Korea, 1993-1994
English Language Program Developer and Instructor, Rotary International English Language Program, Izamal, Mexico, 1991

Lead Evaluator, Quality Enhancement Plan, SACS Reaffirmation for Robeson Community College, North Carolina, 2009
Lead Evaluator, Quality Enhancement Plan, SACS Reaffirmation for Edgecombe Community College, North Carolina, 2008

B. Selected peer-reviewed publications (in chronological order).

Books:

Flurkey, A. D., Paulson, E. J., & Goodman, K. S. (Eds.) (2008). *Scientific Realism in Studies of Reading*. Mahwah, NJ: Erlbaum
Paulson, E. J. & Freeman, A. E. (2003). *Insight from the eyes: The science of effective reading instruction.* Portsmouth, NH: Heinemann.
Paulson, E. J., Laine, M., Biggs, S. A., & Bullock, T. B. (Eds.) (2003). *College reading research and practice*. Newark, DE: IRA
Paulson, E. J. (1995). *Entrance, A Communicative Text for Learners of English.* Los Angeles, CA: Young & Son Media, Inc.

Refereed Journal Articles, Past Four Years:

Armstrong, S. L., Davis, H., & Paulson, E. J. (In Press). The subjectivity problem: Improving triangulation approaches in metaphor analysis studies. *International Journal of Qualitative Methods.*
Paulson, E. J. & Bauer, L. (In Press). Goal setting as an explicit element of metacognitive reading and study strategies for college readers. *NADE Digest*.
Paulson, E. J. & Armstrong, S. L. (2011). Mountains and pit bulls: Students' metaphors for college reading and writing. *Journal of Adolescent & Adult Literacy, 54*(7), 494-503.
Paulson, E. J. & Armstrong, S. L. (2010). Postsecondary literacy: Coherence in theory, terminology, and teacher preparation. *Journal of Developmental Education, 33*(3), 2-13.
Paulson, E. J. & Armstrong, S. L. (2010). Situating reader stance within and beyond the efferent-aesthetic continuum. *Literacy Research & Instruction*, *49*, 86-97.
Strauss, S. L., Goodman, K. S., & Paulson, E. J. (2009). Brain research and reading: How emerging concepts in neuroscience support a meaning construction view of the reading process. *Educational Research & Reviews, 4*(2), 21-33.
Sanchez, D. & Paulson, E. J. (2008). Critical language awareness and learners in college transitional English. *Teaching English in the Two-Year College, 36*(2), 164-176.
Armstrong, S. & Paulson, E. J. (2008). Whither 'peer review'?: Terminology matters. *Teaching English in the Two-Year College, 35*(4), 398-407.
Paulson, E. J. & Mason-Egan, P. (2007). Retrospective Miscue Analysis for struggling postsecondary readers. *Journal of Developmental Education, 31*(2), 2-13.
Paulson, E. J., Alexander, J., & Armstrong, S. (2007). Peer review re-viewed: Investigating the juxtaposition of composition students' eye movements and peer-review processes. *Research in the Teaching of English*, *41*(3), 304-335.

Selina Vásquez Mireles, Ph.D.
Professor, Department of Mathematics, Texas State University – San Marcos

TEACHING

Dissertation Committee Chair: Thersa Westbrook; Lindsey Gerber; Debra Ward; Robert Jaster

SCHOLARLY/CREATIVE

Articles (selected)

Mireles, S. V. (2010, Spring). Developmental mathematics program: A model for change. *Journal of College Reading and Learning, 40*(2), 81-90.

Vásquez, S. (2004, Spring). A report on the effectiveness of the developmental mathematics program M.Y. Math Project – Making your mathematics: Knowing when and how to use it. *Mathematics and Computer Education, 38*(2), 190-195.

Editor

Editorial Board of the Journal of Developmental Education (Fall 2004) Volume 28 - Present

Papers Presented at Professional Meetings (selected)

"Current Learning Theories in a Developmental Mathematics Classroom." College Academic Support Programs 2010. El Paso, TX. October 12-15, 2010.

"Understanding the Texas CCRS." 6th Annual Mathematics for English Language Learners Conference. San Marcos, TX. July 9-10, 2010.

"The College Readiness Standards and Developmental Mathematics Curriculum." (Presentation and Poster Session) College Academic Support Programs 28th Annual Conference. San Antonio, TX. October 21-23, 2009.

Invited Talks, Lectures, and Presentations (selected)

"Developmental Mathematics." Texas Higher Education Coordinating Board Bridging Programs Professional Development Training. March 1, 2010.

"College and Career Readiness Standards – Next Step." College and Career Readiness Initiative Faculty Collaborative: Mathematics/Science Symposium. September 25, 2009.

Consultancies (selected)

Statewide College Readiness Initiative - Post-Secondary Mathematics Expert - Region XIII Service Center (Spring 2011)

Intensive Programs for Adult Education Students – Texas Higher Education Coordinating Board (Spring 2011)

Success Initiative in Developmental Education – Mathematics (SIDE-M) – College and Career Readiness Initiatives Faculty Collaboratives and Texas Higher Education Coordinating Board (Spring 2011)

Developmental Education Demonstration Project – Community Colleges – Texas Higher Education Coordinating Board (Spring 2011)

Grants and Contracts (selected)

Texas Higher Education Coordinating Board – Developmental Education Demonstration Project - $399,293.66. "FOCUS: Fundamentals of Conceptual Understanding & Success" (PI). Summer 2010 – Fall 2011.

The College and Career Readiness Initiative: Mathematics Faculty Collaborative – Advancement of the College and Career Readiness Standards in Teacher Preparation Programs - $10,000. "Ready, Set, Go: The Top Ten Things You Should Know About CCRS" (PI). Fall 2009 – Fall 2010

Texas Higher Education Coordinating Board – Intensive Summer Program - $98,059. "Math FOCUS: Fundamentals of Conceptual Understanding & Success" (PI and Key Personnel). Summer 2008

SERVICE

Developmental Mathematics Program – Director. Fall 1998 – Present

CASP Listserve Committee – Member. Fall 2010

TEA/THECB College Readiness Assignments Design Team: Phase 1 – Member. Spring 2009 - Fall 2009

TEA/THECB Internal Review Team – Coordinating College Readiness – Member. Spring 2009

Commission for College Ready Texas – Member. Spring 2007 – Fall 2007

College Readiness Standards – Math Vertical Team – Co-Chair. Spring 2007 – Summer 2008

CURRICULUM VITA

Name: Taylor W. Acee	**Address**: 601 University Drive San Marcos, TX 78666
Title: Assistant Professor of Developmental Education, Department of Curriculum and Instruction	**Email**: aceet@txstate.edu
Affiliation: Texas State University – San Marcos	**Phone:** (512) 228-6013

Educational Background

Degree	*Year*	*University*	*Major*
Ph.D.	2009	University of Texas at Austin	Educational Psychology: Learning, Cognition, and Instruction
M.A.	2007	University of Texas at Austin	Educational Psychology: Program Evaluation
B.S.	2001	University of Pittsburgh	Psychology

University and Professional Experience (selected)

Position	*Entity*	*Dates*
Assistant Professor, Department of Curriculum and Instruction	Texas State University – San Marcos	08/09-present
Program Evaluator, Fundamentals of Conceptual Understanding and Success project (FOCUS)	Texas State University – San Marcos	6/10-present
Graduate Student Fellow, Research and Evaluation Team, Planning and Accountability Division	Texas Higher Education Coordinating Board	5/08-8/08

Grants

Acee, T.W. (2010). *Motivational Influences on DE Math Student Achievement and Continued Interest in Math.* Research Enhancement Grant, Texas State University – San Marcos, San Marcos, TX. $7,946.

Scholarly Publications and Grants (selected)

Acee, T.W., & Weinstein, C.E., (2010). Effects of a value reappraisal intervention on statistics students' motivation and performance. *Journal of Experimental Education, 78,* 487-512. doi:10.1080/00220970903352753

Acee, T.W., et al. (2010). Academic boredom in under- and over-challenging situations. *Contemporary Educational Psychology, 35,* 17-27. doi:10.1016/j.cedpsych.2009.08.002

McDougall, G.J., Becker, H., Pituch, K., **Acee**, T.W., Vaughan, P., & Delville, C. (2010). The SeniorWISE study: Improving everyday memory in older adults. *Archives of Psychiatric Nursing*, *24*(5), 291-306. doi:10.1016/j.apnu.2009.11.001

Weinstein, C.E., **Acee**, T.W., & Jung, J. (2010). Learning strategies. In B. McGaw, P.L. Peterson, & E. Baker (Eds.) *International Encyclopedia of Education* (3rd ed., pp. 323-329). New York, NY: Elsevier.

Professional Service (selected)

10/10 **Member**, Review Editorial Board of *Frontiers in Educational Psychology*

8/10 **Reviewer**, *Learning and Individual Differences*

08/09 **Panel Reviewer**, Studying and Self-Regulated Learning Special Interest Group, American Educational Research Association

CURRICULUM VITA

Emily Miller Payne
Title: Director, The Education Institute
Associate Professor, Developmental & Adult Education
E-mail:emily.miller.payne@txstate.edu
Address: ED 2112,
601 University Dr.
Texas State University
San Marcos, TX 78666

Academic-Professional Background

EDUCATION

EdD 1984 Curriculum and Instruction: Reading, New Mexico State University.
Dissertation: *The Written Vocabulary of the Adult Basic Writer*
MAT 1977 Reading, New Mexico State University
BA 1970 English, The University of Texas at Austin

ACADEMIC EXPERIENCE

Texas State University, San Marcos, TX
Director, The Education Institute, 2001-present
Associate Professor, Developmental and Adult Education, 1997-present
Assistant Director for Programs, The Education Institute, 2000- 2001
Assistant Professor, Developmental and Adult Education, l992-1997

NATIONAL SERVICE (selected)

- Editor, Journal of College Reading and Learning (2005-2008)
- Member, Editorial Review Board, Journal of College Reading and Learning (2003-2005, 2008-present)
- Co-Chair, Professional Development Committee, National Association for Developmental Education (1998-2001)

RESEARCH AND PUBLICATIONS (selected)

Articles in Refereed Journals

Hand, C. & Payne, E.M. (2008). Factors affecting the academic persistence of Appalachian first-generation college students. *Journal of Developmental Education.*

Morrison, K.D. & Payne, E.M. (2000). Parental and teacher mathematics attitudes affects on attitudes of adults as mathematics students: A review of the literature. *Research in Developmental Education, 16* (1), 1-4.

Edited Books

Higbee, J.L., MacDonald, L., Van Blerkom, D, Payne, E.M., & Smilkstein, R. (Eds.). (2007*). Best practices in college reading and learning: In Memory of Cynthia L. Peterson.* College Reading and Learning Association.

Chapters in Refereed Edited Books

Payne, E.M. & Lyman, B.G. (1996). Issues affecting the definition of developmental education. In P. Dwinnell and J. Higbee (Eds.), *Defining Developmental Education: Theory, Research and Pedagogy*. Athens, GA: National Association for Developmental Education Monograph.

Payne, E.M. & Lyman, B.G. (1995). Adult literacy models: Incorporating creative and critical thinking development. In J. Higbee & P. Dwinnell (Eds.), *Proceedings of the 18th Annual Conference of the National Association for Developmental Education.* North Suburban, IL: NADE

Funded External Grant Activity

- Texas GREAT Center (2004-2010). Texas Education Agency. ($2,608,000).Principal Investigator.
- Texas Adult Education Credential Project (2004-2010). Texas Education Agency. ($1,848,000). PI.
- Texas Family Literacy Resource Center (2007-2008). Texas Education Agency. ($2,137,000). PI
- High School Equivalency Project Grant. U.S. Dpt. of Education. (2001-2009).($2,916,000). PI
- Texas School Safety Center Grant. (2001-2004). Texas Governor's Office, ($2,490,000) PI.

Scholarly Work – Other

- National Adult Education Standards Committee Review Panel, (2004-2005). American Institutes for Research.
- College Board Standards Project, (2003). Washington, D.C.: American Institutes for Research and College Board.

Attachment C: Writing Samples

Attachment C-1: Writing Sample of Dr. Eric J. Paulson

Attachment C-2: Writing Sample of Dr. Selina Vásquez Mireles

Attachment C-3: Writing Sample of Dr. Taylor Acee

Attachment C-3: Writing Sample of Dr. Emily Miller Payne

Peer Review Re-Viewed: Investigating the Juxtaposition of Composition Students' Eye Movements and Peer-Review Processes

Eric J. Paulson
University of Cincinnati

Jonathan Alexander
University of Cincinnati

Sonya Armstrong
University of Cincinnati

While peer review is a common practice in college composition courses, there is little consistency in approach and effectiveness within the field, owing in part to the dearth of empirical research that investigates peer-review processes. This study is designed to shed light on what a peer reviewer actually reads and attends to while providing peer-review feedback. Fifteen participants peer reviewed a student's essay that had both holistic and surface-level errors. Using eye-tracking technology, we collected detailed and informative data about which parts of the text the peer reviewer looked at, how long the peer reviewer looked there, and where the peer reviewer looked next. These data were analyzed according to eye-movement research methodologies and juxtaposed with each peer reviewer's comments and suggestions about the essay being reviewed during a typical peer-review exercise. Findings include an unexpected mismatch between what peer reviewers focus on, spend time on, and examine multiple times when reading and peer reviewing an essay and what they choose to give feedback about during the peer-review session. Implications of this study include a rethinking of the composition field's widespread use of a global-to-local progression during peer-review activities.

Peer review is one of the most widely used and pedagogically vexed practices in first-year college composition courses. Many compositionists feel that it is theoretically and pedagogically sound to have students serve as reviewers and editors for each other for a number of reasons: It potentially increases student involvement in the revision and editing processes, it may alert students to the importance of considering a "real live" audience or body of readers as they compose and revise, and it should help students see in others' writing some of the common errors or patterns present in their own compositions (e.g., Berkenkotter, 1983). Numerous textbooks designed to train new writing teachers, such as *Preparing to Teach Writing: Research, Theory, and Practice* (Williams, 2003) and

The St. Martin's Guide to Teaching Writing (Glenn, Goldthwaite, & Connors, 2003), offer examples and prompts for peer-review activities, arguing that such review can serve as one of the central components of the writing process. According to Glenn et al. (2003), "peer-review groups . . . allow writers control over their work but give them the benefit of several readers' responses" (p. 63). Williams (2003) offers an entire chapter on "The Classroom as Workshop," and argues that "the process model led to an important change in the structure of writing classrooms. It transformed them into *workshops*" (p. 131). Peer review is one of the chief features of the workshop model.

However, some compositionists also argue that peer review, whether scheduled as an in-class, electronically enabled, or out-of-class activity, generally falls flat (e.g., Broman, 2005). Instructors frequently point out the tendency of many students to focus on less-than-significant aspects of their peers' papers, creating a mismatch between the instructor's intentions and student outcomes (e.g., Danis, 1988; George, 1984; Neubert & McNelis, 1990). Additionally, students may rely on patterns of evaluation and critique from earlier educational experiences—a reliance that does not suggest further development of writing skills (e.g., Schaffer, 1996).

Given the wide usage of peer review in composition classrooms, as well as the fairly mixed reviews that it receives at times from both instructors and students, it is important to understand as fully as possible what aspects of peer review are useful, how it can be structured productively for students, and why it sometimes does not seem to work very well. Unfortunately, while much anecdotal and theoretical (i.e., what *should* take place) support for peer review exists, few scholars have undertaken empirical studies to explore what actually happens during a peer-review session and how such activities contribute to the development of writing skills.

To generate data that may be useful in understanding the potential—and limitations—of peer review, we used eye-tracking technology to examine what students were attentive to during a fairly typical peer-review exercise. This technology allowed us unobtrusively to observe exactly where and for how long students were focusing on any part of a text being read, including whether they read an item once or re-examined it multiple times. In undertaking this study, we believed that, through an analysis of the kinds of items peer reviewers concentrated on during a peer-review session, we might have a better understanding of how to structure peer-review activities, both to take advantage of what students are already focusing on and to prompt students to consider other composing issues. An empirical approach to studying peer review is vital, we believe, because of the dearth of research on whether students are utilizing peer review in the ways that their instructors intend. Because eye-movement analysis provides a reliable method of inferring readers' moment-by-moment processing activities (Rayner, 1997), it

would appear to be a powerful tool in investigating whether composition students are indeed attending to the parts of the text that their instructor intended, as well as illuminating the relationship between what composition students focus on and spend time on in the text and what they choose to talk about during the peer-review process. Additionally, through analysis of the kinds of textual items peer reviewers attend to, we will be able to provide research-supported pedagogical implications for this nearly ubiquitous composition-class activity.

Our approach of examining readers' attention to aspects of the essay they are peer reviewing, as a method of informing our understanding of those readers' peer-review responses, is a departure from the norm of current approaches to composition research, which have focused primarily in the last decade on the social dimensions of language. However, we are convinced that information gathered through eye-tracking technology may greatly assist compositionists in reconsidering and developing effective peer-review pedagogies. Further, our perspective is that peer-review is *not* a behavior that can be observed outside of a pedagogical and social context. Ultimately, what we hope to model in this essay is a form of *empirical constructivism,* situating empirical data in a rich description of a common classroom practice. Indeed, given the wide usage of peer review in composition classrooms, as well as its potential to assist students in becoming more familiar with composing as a largely audience-focused process, peer review should be understood as fully as possible. In our view, this means examining as many aspects of the process as possible, in as authentic a way as possible; this study approaches such an examination from the perspective of a juxtaposition of participants' reading of an essay with their peer-review responses about that essay. We believe that such approaches can have wide-ranging ramifications if research can inform adjustments to writing pedagogies that may facilitate students' progress through the first-year writing sequence and prepare them for success as they meet writing challenges in other courses.

History and Background of Peer Review

Nearly all first-year college composition instructors employ peer review in some form as an instructional tool. Despite its widespread usage, however, in practice, much confusion exists about what it is and what it should do, as well as how it is most effectively approached and why (e.g., Holt, 1992; Topping, 1998). Most literature about peer review simply recommends it, or gives suggestions for its implementation, without providing empirical research that supports its use (e.g., Schaffer, 1996; Spigelmire, 1981; Vatalaro, 1990). Research-based approaches to peer review have explored differences between oral and written peer review (McAlexander, 2000), peer review and writing anxiety (Murau, 1993), and ESL variations on peer review (Mendonca & Johnson, 1994). The available scholarship

on peer review provides some insight into the numerous inconsistencies that have led to the existing confusion.

Peer Review Scholarship

A variety of theoretical concerns and positions permeate the scholarship in this area, which generally falls into two categories: practical and empirical.

Practical Texts

The largest category encompasses the practical texts, which are primarily how-to texts written for and by practitioners with the goal of describing and endorsing a particular method of doing peer review (Berkenkotter, 1984; Dossin, 2003; Elbow, 1973, 1981; Holt, 1992; Johnson, 2001; Kastman-Breuch, 2004; Paton, 2002; Sitko, 1992; Topping, 1998). These methods vary considerably, but most focus on making peer review less daunting for students. In order to alleviate problems arising as a result of peer pressure or intimidation, for example, several scholars have recommended anonymity in peer-review situations (Bean, 1979; Johnson, 2001). Others have noted that the evaluative comments expected of most peer reviewers are not beneficial for either writers or reviewers. Instead, these scholars have argued that students should provide objective observations (Danis, 1988), write questions instead of comments (Schaffer, 1996), or summarize and discuss their papers (George, 1984). To develop students' understanding of their audience's expectations for and reactions to their texts, Sitko (1992, 1993) has suggested that writers listen as peer readers think aloud while reading their papers. Finally, several scholars have commented on more practical aspects, such as the time involved in a peer-review session. Although most peer-review methods are described as being intended for a single class period, some have suggested that students would benefit from being in their peer-review groups longer or more frequently (Paton, 2002; Schaffer, 1996). Even though the practical scholarship amounts to the largest category on peer review, the numerous different methods, topics, and issues explored make it difficult to reach any conclusions about a "right" or "best" way to do peer review in practice.

Empirical Research

The studies in the empirical category primarily investigate the effects of a particular peer-review method, specifically effects on students' revising practices (e.g., Berkenkotter, 1983; Freedman, 1992; Harris, 1986; Karegianes, Pascarella, & Pflaum, 1980; Mendonca & Johnson, 1994; Neubert & McNelis, 1990; Newkirk, 1984; Sherrard, 1994; Thomas, 1986; Zhu, 1995). Most often, these are case studies that follow a handful of students, and frequently, the purpose of the research is either to determine whether peer-review sessions are useful for students' writing (Berkenkotter, 1983) or to investigate the effects of peer review on students' composing and revising processes (Nystrand & Brandt, 1989). Others have

focused on student preferences, that is, whether peer review was preferred over self-evaluation (Harris, 1986) or instructor evaluation (Karegianes et al., 1980). Another strand investigated students' verbal interaction during peer-review sessions (Freedman, 1992; Thomas, 1986). The last significant strand of empirical research on peer review examined its benefits for ESL students (Mendonca & Johnson, 1994; Zhu, 1995). As is the case with the practical scholarship, the literature in the empirical category is widely divergent, and we found no studies that actually investigate *what* students do during peer review.

Peer Review Themes in the Literature

We found two dominant themes running throughout this body of research that reflect two different theoretical orientations in the field of composition: the ongoing prevalence of social-epistemic approaches and a growing call for empirical studies.

Emphasis on Social Constructionism

First, many scholars recognize Vygotsky's (1978) theories of development by emphasizing the socially constructed aspects of peer review; often such activities involve a mixture of written and verbal peer-review methods (e.g., Danis, 1982; Gere & Stevens, 1985; Hewett, 2000; Thomas, 1986; Wixon & Stone, 1977). Instead of limiting a peer-review session to a questionnaire-style worksheet, these scholars encourage more discussion-based sessions. In their study of student discussion in writing groups, for example, Gere and Stevens (1985) suggested that the benefit of oral response in peer-review sessions is its simplicity; because written comments are more structured, time-consuming, and elaborate, oral response tends to encourage more specific responses. Across the scholarship, in theoretical texts (e.g., Gere, 1990), empirical studies (e.g., Hewett, 2000), and practical texts (e.g., Wixon & Stone, 1977), another often-noted benefit to using discussion in peer-review groups is that it allows students to socially construct a much-needed language for talking about writing and a shared understanding of what that means (see Bakhtin, 1981).

Other scholars see additional pedagogical benefits ensuing from peer-review activities. In addition to helping students develop metadiscourses about writing, peer review might also assist students in taking ownership of their learning and becoming more effective agents in their own and others' learning (e.g., Brooke, 1991; Wallace & Ewald, 2000). For instance, Wallace and Ewald (2000) argue for redesigning composition classrooms so that both teachers and students share power and input and students can find more rhetorically effective and empowering ways of voicing their concerns, issues, and ideas. One particular venue that Wallace and Ewald examine briefly is peer review, in which students have the opportunity to practice articulating their own thoughts and critiques. The authors assert that peer review can become more effective if it is part of a classroom architecture that

already favors "student input" and thus makes room for "student agency" (p. 84). Conversely, Tobin (1993) asserts that peer reviewers may hold back on their comments because they don't want to hurt their classmates' feelings and because they want to protect their own interests.

Call for Research

The other common theme is a nearly universal call for further research on peer review. Most scholars have recognized that, although the body of literature on this topic is immense, very few aspects of peer review have been investigated empirically. Topping (1998), for instance, has commented that more research is needed "with improved methodological quality and fuller and more detailed reporting of studies" (p. 269). Likewise, DiPardo and Freedman (1988) have noted the absence of any research on *what* students do during peer review and have suggested investigations of the social dynamics at work within peer-review groups and how these dynamics affect the learning situation:

> Although practitioner endorsements commonly share the assumption that the writing process is somehow supported by having students gather together for the purposes of providing one another with feedback on writing, response groups have been seldom studied to illuminate just what processes are thereby supported, or how. Thus, although writing groups have assumed an important place in educational practice, teachers are left to reflect upon them mostly in light of their own experiences or those of colleagues. (pp. 119-120)

Beyond these two commonalities, however, there is very little consistency or agreement in the available literature on peer review. In fact, even the terminology used to describe peer-review activities is widely divergent. At least five different terms can be found in the scholarship to describe the act of having students examine each other's writing: peer review, peer response, peer editing, peer critiquing, and peer evaluation (e.g., Harris, 1986; Holt, 1992; Karegianes et al., 1980; Neubert & McNelis, 1990; Rubin, 2002). Because these terms are neither defined nor distinguished from one another in the literature, it appears that they are randomly assigned and considered synonymous. This lack of consistency in terminology is reflected in the widespread variation in philosophies, strategies, theoretical frames, and research methods. As one scholar mentions, "The literature on peer assessment between students in higher education is at an early stage of development, very variable in type and quality, and scattered and fragmentary in nature" (Topping, 1998, p. 267).

With respect to research on peer-review activities, Smit (2004) asserts that "there is not a great deal of research being published on composing processes, and the reason may very well be that researchers do not know where to go from here" (p. 75). If peer review is an integral part of the composing process, then it deserves

our scholarly and critical attention—particularly given its widespread use in composition classrooms and the call for further research into it. Until relatively recently, we have been limited to research practices and methods that have focused on direct observation, studies in context, and case studies, the practices that Smit (2004) points out. By utilizing eye-tracking technology, however, we can be more attentive to what students are actually examining when they undertake peer-review activities.

The Possibilities of Eye-Movement Research: Some History and Background

For more than a century, the recording and analysis of readers' eye movements have been a powerful research tool in literacy and reading studies that has revealed enormous amounts of information about, and insight into, the reading process (e.g., Huey, 1908/1968; Rayner, 1998). One reason eye-movement research has been such a fruitful line of inquiry revolves around its ecological validity; recording and analyzing a reader's eye movements demands no extra task to be undertaken by the reader. Other common reading-research techniques, like think-alouds, response-time tasks, cloze activities, or comprehension tests, all add an additional non-reading element to the reading process in order to provide data about the reading process. In contrast to these somewhat artificial additions to the process, an eye-tracking apparatus collects data about reading while the participant is doing nothing but reading.

How Eye Movements Reveal Reading Processes

Eye-movement research is an ecologically valid research tool, but importantly, it also reliably yields valid information about reading processes. The following section outlines the type of information eye-movement research provides.

Physiological Limitations

Understanding what the eyes can reveal about reading processes requires first understanding the physiological limitations of the eyes as an information source. Although we may have the perception that our eyes smoothly glide across the page as we read, our eyes actually make a series of very short pauses, called *fixations*, throughout the reading process. This phenomenon was first observed by Emile Javal in 1879 (reported in Huey, 1908/1968), and further research would demonstrate that the purpose of a fixation is to provide the reader with in-focus graphic information.

What is physiologically in focus during a fixation is much smaller than what might be expected. Of the three regions of viewing information to which the eye has access during a fixation—the foveal, parafoveal, and peripheral regions—in-focus information is limited to the foveal region. This small area of vision subsumes 1-2 degrees of visual angle, or about 3-6 letter spaces around the point of

fixation. The parafoveal region extends about 24-30 letters around the point of fixation, and the peripheral region includes everything in the visual field beyond the parafoveal region (Just & Carpenter, 1987). The fovea is concerned with processing detail, and the farther away from the fovea an object is viewed, the more difficult it is to identify it.

In terms of reading, when letters are viewed within the fovea, they are distinguishable. When a random string of letters is viewed outside of the fovea but within the parafovea, it is much more difficult to distinguish letter information. In other words, what is physiologically in focus during a fixation is for the most part the word that is being fixated. Note that this is a *physiological* limitation, not a perceptual one. When letters in the parafoveal field are presented in context, as they are in a normal reading situation, they can be distinguished sufficiently to be useful under certain conditions. Nevertheless, it is because the in-focus viewing area is so small that one important function of eye movements during reading is to move words into this viewing area where they can be clearly seen by the reader.

In addition to a small in-focus viewing area, the eye is also limited as an information source by the fact that during reading it must be stationary to deliver usable data to the brain. Following each fixation, there is a *saccade*, or movement, that is extremely short and so fast that it allows no useful information to be gained from it (Just & Carpenter, 1987). That is why readers' eyes make fixations instead of simply gliding over the text—no usable information is gained during the movement of the eyes, an early finding in the eye-movement field that has been replicated many times since (e.g., Dodge, 1900; Rayner, 1997; Wolverton & Zola, 1983). The combination of the eye having a small in-focus viewing area with the fact that the eye must fixate in order to retrieve usable information means that, physiologically, in order to "see" a word, it is usually necessary to pause and look right at it. However, strong syntactic and semantic contexts allow readers to perceive words that are in the parafovea, so that a portion of the words in the text, especially function words, do not need to be directly fixated. For this reason, readers typically fixate between two-thirds and three-quarters of the words in a text (Fisher & Shebilske, 1985; Just & Carpenter, 1987; Paulson, 2002; Rayner, 1997). During normal reading, the combination of reader expectation and prediction, and the context implicit in the text they are reading, allows readers to visually skip words but still feel as though they have seen and read every word (Ehrlich & Rayner, 1981). In terms of the present study, an important finding about word fixations from eye-movement research is that readers fixate problem areas of the text—ambiguous words, misspelled words, and so on—more frequently and for a longer duration than other areas of the text (Ehrlich & Rayner, 1981; Frazier & Rayner, 1982; Zola, 1984).

Readers make rapid decisions about where to move their eyes next and how long to keep them there, based on moment-by-moment attention allocation and

information processing. That is, where a reader fixates during reading is a reflection of the part of the text to which the reader is attending (Just & Carpenter, 1987; Morrison, 1984), and eye-movement data reflect "moment-to-moment processing activities of readers" (Rayner, 1997). So while eye movements cannot perfectly reveal whether a reader has comprehended a given word, "the time a reader spends on a word or a phrase can indicate when a process occurs and how its duration is influenced by characteristics of the text, the reader, and the task" (Just & Carpenter, 1987, p. 5). There is a strong link between where a reader fixates and moment-by-moment attention (Chaffin, Morris, & Seely, 2001), although this should not be interpreted as revealing what the reader is thinking. However, in terms of reading processes, "by examining where a reader pauses, it is possible to learn about the comprehension processes themselves" (Just & Carpenter, 1980, p. 329).

Readers Look Longer at Difficult Words

As mentioned previously, eye-movement research has found that readers skip a portion of the words in a text. However, that does not mean that readers simply skip every second, third, or *n*th word; on the contrary, the words that are actually looked at by a reader show a focus on gaining information from the most useful parts of a text. For example, content words, which carry much of the semantic meaning of the sentence, are looked at more often than function words, which have a more syntactic, grammatical role. The difference can be great: Carpenter and Just (1983) found that participants fixated 83% of the content words and 38% of the function words in their study. In short, readers tend to fixate words that provide the most information and are of the most use to them while reading. In general, readers' fixations last around a quarter of a second, or approximately 200-250 milliseconds (msec) (Rayner, 1998).

Class of word (e.g., content vs. function) is not the only variable in determining whether a word gets fixated by a reader. An important aspect of reading processes that eye-movement analysis can reveal is that of *difficulty*. That is, eye movements are very good indicators of whether a reader found a word (or phrase, or sentence, etc.) difficult to process. A widely reported finding in eye-movement research is that low-frequency words receive longer fixations than high-frequency words (Rayner & Pollatsek, 1989), which simply means that the more unfamiliar a word is, the longer a reader has to look at it in order to process its meaning. The same thing happens when a reader reaches an ambiguous word in a sentence (Frazier & Rayner, 1982). Importantly, for the purposes of this project, eye-movement research has shown that readers look longer, and more often, at misspelled words (Ehrlich & Rayner, 1981; Zola, 1984). Note that this does not mean that a researcher can know for certain whether a given word was difficult for a reader to process. In general, however, eye-movement research has shown that anomalous,

ambiguous, or misspelled words receive more and longer eye fixations because of the heavier processing load associated with making sense of that portion of the text—in short, anything a reader notices as being difficult or wrong is apt to receive longer and more frequent eye fixations.

Because we are interested in what the peer reviewers actually pay attention to while reading, eye movements provide an important source of data. By examining our participants' eye movements on the student essay they were peer reviewing, we were able to understand what parts of the essay they focused on and examined; whether the surface errors that are in the essay received more attention than other, non-error parts of the essay; and how their reading processes paralleled, detracted from, or otherwise reflected their peer-review processes.

Methods

Apparatus

Eye-movement data were collected with an Applied Science Laboratories Model 504 eye tracker that sits in front of a typical computer work station. The 504 uses a remote pan-tilt camera, which negates the need for a chin rest or bite bar, though a forehead rest was used to insure accurate data recording. This unit is unobtrusive to the degree that if readers were not told that they were being eye tracked, they would not be aware of the process. The eye tracker records eye movements by tracking a reader's pupil and corneal reflections with an infrared reflection source and is accurate to within .5 degrees of visual angle. Spatial and temporal aspects of readers' eye movements were analyzed using Fixplot and Eyenal software supplied by Applied Science Laboratories. In addition to having access to the data in statistical form, fixations and saccades are plotted directly on digital reproductions of the text and include fixation duration, fixation number, fixation location, saccade direction, and saccade length.

Texts

All texts that students read were displayed on a 19-inch, flat-screen monitor with normal text size and ratio. Participants sat in front of the computer screen and keyboard as they would when normally reading from a computer monitor in a computerized classroom. We chose the student text and peer-review assignment texts so that they would resemble as closely as possible the kinds of texts that students in first-year composition courses would encounter at our university.

To develop a typical peer-review assignment prompt, we surveyed approximately 20 in-print, first-year composition textbooks, paying particular attention to the peer-review activities described in each. In almost all cases, students are encouraged to first read their colleague's work globally, commenting on major issues of content and organization. Texts that prepare new instructors to teach

writing recommend much the same approach. For instance, Glenn et al. (2003) offer new composition instructors a list of 14 types of questions that can be used to structure peer-review sessions. The list begins with questions focusing attention on how well a draft meets the aims of the assignment, how evident its thesis and main purpose are, and how clearly it is organized. At the end of the list, questions about sentences, words, and tone ask students to pay attention to surface-level errors and comparable issues. Interestingly, based on our conversations with instructors both at our home institution and at a national writing conference, such a movement—from global to local or surface-level issues—often parallels many instructors' grading priorities, with more weight often given to content as opposed to mechanical issues. With such an emphasis in mind, we ultimately decided to draw our peer-review activity from our university's English Composition Program's self-published Student Guide, which itself has a very similar approach—prompting students to focus first on global issues before moving to mechanical and grammatical issues. Based on such directions, we devised the following peer-review questions to ask our participants:

1. What advice would you give the author to help him or her improve the introduction?
2. Does the introduction seem to meet the requirements of the assignment?
3. Does the writer clearly express how or why this experience was significant?
4. Are there any problems with this paper that you would want to point out to the author?

Before beginning the peer-review session, these questions were introduced to the participants so they would have an idea of the focus of the peer review. During the peer-review session, these questions were then asked directly of the participants in addition to any other participant-generated questions or feedback that arose.

The essay text, which was the focus of the peer-review session, is the introductory section of a larger essay (hence the use of the word "introduction" in the first peer-review question, above). This introductory section is comprised of two paragraphs and is 366 words in length (see Appendix). Using the two-paragraph introduction as the text the participants peer reviewed allowed us to focus on both surface-level issues as well as holistic issues (holistic mismatches between the prompt and the essay being more pronounced in the introduction than in the body of the essay, for example). The essay is an actual student's essay that we solicited from an experienced composition instructor with the student's permission; in addition to the introductory paragraphs, we provided an essay assignment prompt, set off in italics at the top of the text to be peer reviewed. The assignment prompt read as follows:

> Write a narrative essay about a single experience or event that has had a significant impact on you. Be sure to focus on just one moment or occasion; don't try to recall a series of events in an essay of this length.

The essay itself was left unaltered and included a holistic mismatch between the prompt and the essay, as explained in detail in the Data Analysis section. Essentially, the assignment prompt we provided called for a narration of a single experience; the essay, however, did not quite follow that prompt and instead related numerous experiences. In addition, there were 10 surface-level errors in the essay, including errors of capitalization, spelling, and incorrect word forms. For example, in the following sentence from the essay, the author wrote the word "were" instead of "where": "My days and nights at the Quarry are some of the best memories, and it is the place were we all watched each other grow up and this summer we watched everyone move away from the small town."

Participants

Seventeen students (eleven females and four males) from a first-year composition course at a Midwestern university volunteered for this project and were paid an honorarium of a $25 gift card to the university bookstore. All participants had prior experience with college-level peer review and had successfully completed other composition courses at the college level. These students were all native English speakers and were traditional college-age students. Two participants were unable to be eye tracked with sufficient accuracy and were not included in the pool of participants; a total of 15 students were thus eye tracked and analyzed. Peer-review sessions were done individually and lasted less than one hour.

Procedure

When participants arrived for their session, the project was explained to them, including a familiarization with the four broad peer-review questions (above). The eye tracker was introduced and then calibrated to their eyes, a process that insures reliable and accurate data collection. Participants then read two practice texts while being eye tracked in order to make them comfortable with the set-up. After the practice texts, the student essay that participants were to peer review was put on the computer screen, and participants were encouraged to read the essay one time through before beginning the peer-review session.

When participants were ready to begin the verbal peer-review session, this article's third author and an experienced composition instructor, asked them the open-ended questions described above, in addition to follow-up questions and anything else the participants wanted to talk about regarding the essay. The text remained on the screen, and participants' eye movements were tracked during this portion of the peer-review session; participants were encouraged to refer to the essay throughout. This portion of the peer-review session was designed to

parallel an in-class verbal peer-review session, where the peer reviewer reads the student's essay and then has a discussion with that student about the essay. This was an organic discussion that followed up paths of inquiry suggested by the peer reviewer, using the four questions as guides. In addition, each participant had an opportunity to add additional comments or to converse in general about peer review at the conclusion of the session. While this project took place outside of the classroom environment, every effort was made to replicate an actual peer-review activity and to make the experience as authentic as possible for the participants.

Data Analysis and Results

This section combines information about data analysis with the results of that analysis. Aggregate eye-movement and peer-response data are presented first with an emphasis on places where the two types of data intersect. Following this overview of all the participants' data, we provide an in-depth analysis of one of the participants, using thick description and qualitative analysis as means of presenting the data and findings.

Aggregate Data

As noted earlier, participants responded to four basic peer-review questions verbally during the peer-review session. Before they began reading the essay, participants had the questions read to them; they then responded to these same questions during the peer-review session itself. The questions asked of these peer reviewers lent themselves to two overall types of feedback: feedback that focused on holistic issues and feedback that focused on surface-level or mechanical issues. Because participants were providing peer-review feedback verbally in a discussion-type environment with the interlocutor, questions were also followed up with more questions and requests for more feedback as the peer-review session progressed. That is, while the participants had access to broad, guiding questions before and during the peer-review session, the peer-review session was also organic in that all participants' questions and comments were part of a larger dialogue with the interlocutor.

The text to be reviewed contained 10 specific surface-level problems ranging from capitalization errors to misspellings, as well as two holistic issues stemming from the mismatch between the assignment prompt and the essay. The first holistic issue revolved around the question of whether or not the writer focused "on just one moment or occasion." The other issue was a question of whether or not the writer "clearly expresses how or why this event was significant."

Because we were interested in collecting and analyzing eye-movement data during the entire verbal peer-review process, the eye-movement record of each reader spans not only the initial reading of the essay—each reader read the essay

once through before beginning to give peer-review feedback—but also what parts of the essay the participant examined while giving feedback about the essay. While the totality of each reader's eye-movement record was considered for most aspects of the analysis, some parts of each eye-movement record were separated out for additional analysis where doing so would illuminate aspects of the participants' peer-review feedback.

Eye Movements during the Initial Reading

The participants in this study were asked to read the essay one time through before beginning peer review, and this initial reading is analyzed here in order to provide information about the participants' reading processes. The average percentage of words all readers fixated in the initial reading of the essay was 62.09% (SD 9.21%), and the average duration of all readers' fixations on the initial reading of the essay was 209 milliseconds (msec) (SD 18 msec). Both of these figures are well within the normal fixation percentages found in existing eye-movement literature, as described previously. Based on eye-movement measures, the initial reading of this essay appears to have been read normally—that is, reading the essay for the purposes of subsequent peer review did not appear to alter or disrupt what are usually considered to be normal reading processes.

Eye Movements during the Peer-Review Process

In "normal" reading, readers fixate about two-thirds of the words throughout a given text, and this is approximately the number of words participants fixated when they read the essay one time through (as described in the previous section). During the subsequent verbal peer-review process, however, a completely different reading process was observed, as participants examined the essay, searched for problems, thought about what advice to give the reader, and so on. During this aspect of the peer-review process, participants fixated many words multiple times in an atypical eye-movement pattern. The fixations were short—averaging 177 msec (SD 13 msec)—and instead of a fairly regular spacing of fixations across the text, participants would look at a given word or phrase several times, and then skip to another word or phrase in a different area of the text that would then again be fixated multiple times, and so on. This is a different eye-movement pattern overall than the *initial* reading of the essay—and what we usually think of as "normal" reading—but it is reasonable to expect this type of pattern of eye movements since participants were reading the text multiple times while examining it for items on which to provide peer-review advice.

Below, we begin to weave in our participants' peer-review feedback to the data presentation. Although our inclination is to begin our presentation of participants' peer-review feedback with holistic issues and move from there to more surface-level issues, we instead follow our participants' overwhelming predilection for foregrounding surface-level issues. As will become evident, our partici-

pants were more likely to center their comments around word-level errors in the text as opposed to overarching mismatches between the prompt and the essay.

Surface-Level Issues

According to eye-movement research, anomalies or misspellings in text should result in more fixations and longer durations on those misspelled words relative to other words in the text (Ehrlich & Rayner, 1981; Zola, 1984). Indeed, in this study, the average number of fixations readers made on error words was significantly higher than the average number of fixations readers made on all other words in the text (paired *t* test, (14) p=.0124). Likewise, comparing readers' fixation *durations* on error words versus all other words in the text demonstrated that fixations on error words were significantly longer (paired *t* test, (14) p=.0005). In other words, participants made more and longer fixations on words in the text that were misspelled or otherwise not used correctly than they did on all the other words in the text, as the eye-movement literature would predict. However, while the study participants visually examined the errors in the text thoroughly and repeatedly, their peer-review feedback did not reflect this level of attention. Typically, despite the majority of participants beginning the peer-review session by commenting in general on surface-level errors, only one or two participants would comment on a given error, even when prompted for specifics.

This is not to say that participants ignored surface-level errors; in fact, they foregrounded them. However, they tended to talk about surface-level issues in broad terms rather than by identifying specific errors, even when directly prompted. In fact, more than half of these peer reviewers began the verbal portion of the peer review by commenting on general mechanical concerns without specifically naming any errors. Nine of the 15 participants responded to the first question, "What advice would you give to help the writer improve the introduction?," by offering suggestions on such general surface-level concerns as grammar, punctuation, spelling, and mechanics. A representative response by one of our participants to that first question is, "I'd tell them to look at their spelling and punctuation."

However, even when they initially suggested revision to "spelling and punctuation," as the above participant did, they chose to point out a capitalization error instead: either the lowercased "the" at the beginning of a sentence, or the all-capitalized "LOVE" in the last sentence.[1] This focus on capitalization errors was typical of all the peer reviewers during the verbal portion. Of the 10 surface-level errors, the two most commonly identified were these same two capitalization "errors." Spelling, punctuation, and grammar—the most frequently named general problems—were rarely, if ever, identified as specific examples of surface-level errors. Even though these peer reviewers were commenting on the general "spelling and punctuation" concerns, they were mostly limiting themselves to feedback about capitalization errors when they were asked to identify specific errors.

Because of the mismatch between what participants paid attention to in the text, as reviewed by eye-movement analysis, and what they articulated during the verbal peer review, we added another level of analysis to the initial eye-movement analysis of the error words. In addition to the above contrast of error words to the other words in the text, we also chose a "comparison" word for each error word that was similar to the error word in order to examine whether there was some aspect of the word itself (or its features) that was attracting attention by the participants but not being viewed as an error. For example, the comparison word for the error word "play" is another instance of the word "play" in the essay, but where it is used correctly:

> Error word "play": *We grew up outside* play *sports, games, swimming, and just sitting outside and talking.*
>
> Comparison word "play": *the sand pit is close to the house and is soft beneath our feet when we* play *late night games of vollyball.*

This gave us another dimension of comparison for each error word where we were able to directly compare how participants responded to an error word by examining it in contrast to a similar, "control" word that is used correctly in the essay. In comparing how each reader viewed the "error" words and the "comparison" words, we found that the *number* of fixations on error words was significantly higher than the number of fixations on comparison words (paired t test (14) p=.0020). Similarly, the *duration* of fixations on error words was significantly higher than the duration of fixations on comparison words (paired t test (14) p=.0029). Therefore, as a whole, readers spent more time and attention on errors than they did on comparable, non-error parts of the text. This further supports the eye-movement supposition that mistakes will garner more and longer fixations than other parts of the text, as well as our original analysis that readers were responding to the error words as errors. The amount of time and attention participants gave the errors in the essay while reading is reflected in their foregrounding surface-level issues in their peer-review responses; they did not, however, articulate many specific errors. That participants were spending so much time attending to these errors during their reading, then voicing general concerns about errors in the text, but were not able, or willing, to discuss specific errors may be an indication of a lack of ownership in the peer-review process or uncertainty about their abilities to respond in general. This issue is revisited in subsequent sections.

Holistic Issues

While several participants responded generally about the writer's description of the setting, less than one third of the participants began the peer-review session by

suggesting holistic revisions; that is, identifying their concerns with how the writer handled the assignment prompt. As described above, the assignment prompt appeared in italics directly above the body of the essay so that participants could refer to the prompt during the entire peer-review session. This was particularly important because there is a holistic mismatch between the prompt, which the researchers provided, and the essay in that the prompt calls for a single experience and the essay relates numerous experiences and memories. Only two of the participants immediately identified a mismatch between the assignment prompt and the essay. However, even when participants didn't begin their peer-review discussion by identifying such holistic concerns, these concerns did eventually come up during the course of the peer-review session, usually in response to the peer-review questions that directly addressed holistic issues: "Does the introduction seem to meet the requirements of the assignment?" and "Does the writer clearly express how or why this event was significant?"

Only four of the 15 participants initiated some sort of discussion of the assignment prompt and text mismatch, while six other participants were able to identify the mismatch between the prompt and the essay when directly asked. Five participants neither initiated a response nor offered a supported response to the holistic questions. With two-thirds of the participants noticing the problem, it is interesting that they chose not to pursue the topic in their discussion unless directly prompted for that information.

One possibility for this lack of discussion may be that these peer reviewers were simply unsure about how to revise such a global problem, so they opted not to discuss it in any kind of depth. Indeed, these global concerns triggered uncertainty for the participants. Nearly half of the participants changed their minds when asked the two questions that dealt with adherence to the assignment prompt; for example, the peer reviewers would respond to the first question with a yes-or-no response, but would later change that response, either after being prompted to explain their responses or after being asked the second question. One participant, when asked "Do you think this introduction meets the requirements of the assignment?" exemplified this trend by responding, "for the most part." She then continued by commenting on the writer's focus on more than one situation or occasion in the essay: "She's [the writer] combining on the times they went there, so it's not really just one moment or occasion, it's kind of many." While it would appear that she was still a bit unsure of her response at that point—especially with her use of phrases like "not really" and "kind of"—in the next sentence, she commented more confidently that the writer instead focused on "a series of events in the sense that she used all the different times that correlate all these memories." At that point, it appears that this participant had convinced herself of the problem, and she therefore changed her initial response to the question about the essay meeting the requirements of the assignment: "So, I guess not." A similar approach

to the holistic-mismatch questions was identified in other participants as well; five others had similar patterns in which their initial responses were amended as they talked through their reasoning. Indeed, it should be noted that these students, based on previous experiences with peer review in the classroom, *may* have felt that the original prompt for the peer-review exercises was not particularly important—hence their seeming lack of attention to it initially. That is, they may have felt that their advice as readers was more significant than adhering to a particular prompt—a point that should be kept in mind by instructors when developing peer-review exercises with particular rhetorical or content issues in mind.

The participants' eye-movement patterns lend some explanation to the participants' tendency to avoid initiating discussion of the assignment prompt/essay mismatch. In contrast to the *essay* itself, in which participants fixated an average of 62.09% of the words, only 35.4% (SD 22.38) of the words in the *prompt* were fixated during the initial reading, a significant difference (paired t test, (14) p=.0002). Interestingly, the fixation percentages of the prompt ranged from zero to 71%, with 11 participants fixating less than 50% of the words in the prompt and three of those fixating less than 1%. This type of eye-movement pattern is generally not found during normal reading and is more indicative of a skimming or scanning approach overall. In short, participants did not read the prompt in the same way they read the essay during the initial reading of both.

After the initial reading, during the verbal peer-review part of the session, there was a marked rise in interest in the prompt. Throughout the peer-review process, participants fixated aspects of the prompt an average of 69.07 times (SD 53.55). In addition, they "entered" the prompt—made a fixation on one of the words in the prompt from a location elsewhere in the body of the essay—an average of 30.07 (SD 13.27) different times. This indicates that an average of 30 different times during the peer-review process, participants decided to get information from the prompt, presumably to assist in evaluating holistic aspects of the essay. That this amount of activity in the prompt during the peer-review process was so markedly different than the amount of activity in the prompt during the initial reading suggests that peer reviewers may approach a peer-review situation from a perspective that does not foreground holistic issues, as we take up in the Discussion section, below.

Issues of Ownership

Nearly all of the participants in the study expressed uncertainty about their peer-reviewing abilities on both surface and holistic levels of feedback. For example, three participants mentioned that they had concerns about punctuation, but were unsure what the problem was. In fact, not only were participants uncertain about how to correctly identify specific examples of a broad problem they had identified—"punctuation," for example—but they also seemed reluctant to take

ownership for their recommendations. Few peer reviewers used directive, unapologetic comments like "this writer needs to . . . ." Even though the actual writer was not present during this session, these participants' responses were cautious and reflected a consideration of the effects on the writer's ego. For example, a few participants carefully phrased their responses to focus on what "I would do" instead of what "the writer should do." This strategy could be a way for peer reviewers to make clear that they are not providing "the answers," but only advice. In that way, these participants may have been enacting a form of the tacit cooperation that allows for both saving one's own face and protecting the face of others (Goffman, 1967). Along those same lines, many participants chose to talk mostly about right-or-wrong issues such as the emphasis on capitalization errors discussed previously. While a third of the participants used "right-or-wrong language" when they discussed spelling concerns, other participants used this language when moving beyond spelling errors to imply that there is a right way and wrong way to write; in the section that follows the summary, below, we focus on a participant who exemplifies these trends and provides examples of these issues.

Summary of Eye-Movement and Peer-Feedback Data

When participants read this essay one time through, before beginning to give peer-review feedback, the process was typical by eye-movement standards for reading at the college level. That is, participants fixated on just under two-thirds of the words in the text for an average of a little under one-quarter of a second per fixation—typical eye-movement measures for reading. When they read the text during the peer-review part of the session, however, participants examined the text extremely thoroughly, looking at the vast majority of words multiple times. As eye-movement analysis would predict, participants looked at the errors in the essay far more often, and for far longer, than any other words in the essay. This level of scrutiny reflects the participants' focus on surface-level errors in the text. However, although these peer reviewers foregrounded surface-level errors in their feedback, and spent large amounts of time and attention on the errors compared to other words in the text, they were still reluctant or unable to draw out specific errors. While they typically only glanced at the assignment prompt before beginning to read the text (looked at one-third or fewer of the words), while offering peer-review advice, they tended to look at the assignment prompt an average of 30 different times. That is, they would read part of the essay, look at the prompt, look back at the essay, re-read the prompt, and so on. In most cases, participants did not pay attention to the prompt, or discuss holistic issues, until well into the peer-review session when they began the essay-prompt-essay pattern of eye movements; this aligns with the participants' peer-review feedback regarding holistic issues and reflects the participants' approach as one that does not foreground holistic issues. These findings are discussed in the focus on one of the participants, below, as well as the Discussion section that follows the case study.

Carla's Peer-Review Approach

In this section, we focus on one of the participants, Carla,[2] whose peer-review processes exemplify the strategies, approaches, and struggles typical of most participants in this study, and, perhaps, most students in peer-review situations.

First, Carla provides a good example of a student who may not have a clear understanding of the goals of peer review. Her comments during the peer-review session implied a belief that peer review should focus primarily on surface-level concerns and right-and-wrong notions of writing. Also, perhaps because she was unclear about the goals, the uncertainty she demonstrated about her peer-reviewing (and writing) abilities—an uncertainty that was noticeable in nearly all of the peer reviewers studied—was even more pronounced.

Carla began the peer-review discussion by asking for clarification on what kind of advice to offer, though her question clearly limited the possibilities to two equally surface-level options: "Like grammatically, or like punctuation and stuff?" Without waiting for the clarification, though, she quickly moved on by identifying some specific examples. In this regard, Carla's peer-review response was unique: Of the 15 participants, Carla was the only one who responded to the first question by identifying a specific surface-level error, while others began by talking in generalities about surface-level errors. Even so, Carla's emphasis on surface-level issues exemplifies the trend noted in most other participants.

Surface-Level Issues

First, Carla said that she "noticed" a capitalization problem: the "the" capitalization error, a word she fixated 14 times for 3,225 msec, which is more than six times the average duration for all non-error words. In contrast, Carla fixated another "the" in the text (one that was correctly capitalized) near her average fixation duration. These data indicate that Carla did more than merely *notice* this error. In fact, not only was her attention drawn to that error for a much longer time than it was with other words, but it was also drawn there much more frequently. Carla only fixated twice on the comparison word, but fixated the error word 14 times, a clear indication of continued cognitive attention. Carla's increased attention to the "the" error is not unusual, however, and is, in fact, predicted by eye-movement research as outlined previously and as observed in the other participants.

Carla's eye-movement pattern with the "the" error was not an anomaly; in fact, she had very similar patterns on half of the other errors. For example, she fixated the misspelled word "vollyball" 10 times for a total of 2,624 msec, which is far longer than other, non-error words in the text. Like the "the" error, she spent a significantly longer time attending to this word, including returning to the word from other parts of the text multiple times, which indicates that it bothered her at least enough to distract her when she tried to move on to other parts of the text. However, unlike the "the" error, she chose not to say anything about the "vollyball" error. While multiple re-examinations for long periods of time did not necessarily

mean that Carla had identified the item as an "error," the peer-review discussion was designed to allow participants the opportunity to talk about any and all questionable areas they found. Carla understood this, as her verbal feedback about the "the" error indicates. However, even when directly asked, she expressed her belief that there were no more problem areas to discuss, which reflected the approach taken by most of the other participants as well.

Like the "the" and "vollyball" errors, Carla re-examined other error words multiple times for long durations as well. Table 1, below, depicts the number of fixations and amount of time Carla spent on five of the errors in the text, compared with the number of fixations and amount of time she spent on the error comparison words (the words used for intratextual comparisons of eye-movement measures during analysis).

Table 1: Carla's Examination of Error Words Versus Comparison Words

Error	Number of Fixations		Length of Fixation Duration (msec)	
	Fixations on Error	Fixations on Comparison	Duration on Error	Duration on Comparison
play	8	1	1,703	251
were	5	2	710	271
the (cap.)	14	2	3,225	572
vollyball	10	1	2,624	80
the (that)	4	2	971	572

Table 1 illustrates Carla's much longer durations and more frequent rate of examination on the error words as compared to the non-error comparison words. Clearly, Carla found the error words problematic, yet did not mention any of these errors beyond the capitalization of "the," even when directly asked if there were any more errors to discuss.

Carla also identified a punctuation concern, but she expressed some difficulty when explaining it: "There's a lot of semicolons, but I don't know if that's supposed to be there." It appears that she was struggling with the language of writing critique at that point; in fact, she identified it as the language of "other" when she confirmed her response: "A lot of semicolons, or commas; however *they* call them, the period and the comma" (emphasis added). In this way, Carla seemed to be distancing herself from the more specific language likely to be used by composition instructors, who are, presumably, the "they" she mentions. Perhaps this distancing was simply a result of her uncertainty or lack of knowledge about the specific grammatical rules involved in semicolon usage. Alternatively, perhaps Carla was attempting to adopt the persona of teacher—or at least what she perceived as

that persona based on her prior experiences—a possibility that we raise again in the Discussion section of this article.

Additionally, Carla's attention to the semicolons in the text made it clear, too, that, like most of the other participants, she was focused on surface-level, right/wrong issues: "I noticed that there were a lot of them. I mean, maybe they're not *incorrect* but . . ." (emphasis added). She revisited this point later when she added, "Also, there is a significant number of semicolons and although they may be correct they are something that catches the reader's attention." Interestingly enough, there were only two semicolons in the peer-reviewed text. This fact offers a strong indication that Carla was indeed being a careful peer reviewer in the sense that she was not merely glossing over the text looking for blatant misspellings or other surface-level errors, a complaint frequently reported by the participants of this study about their own experiences with classmates peer reviewing their papers; rather, she was considering the kinds of surface-level errors that the writer may have missed and that the teacher would likely acknowledge.

Holistic Issues

Carla also exemplified a trend noticed in many of the participants for offering quick and possibly ill-considered responses to the closed question, "Does this introduction seem to meet the requirements of the assignment?," by responding "Yeah." Not until she was further prompted to explain, "In what way?" did she continue to explain, and, in the process, change her initial response. She added, "It talks about it. Well, no I guess it really doesn't. It says a single experience or event, but it's not really talking about a single one. It's talking about all the times that they went to the quarry and how it impacted them all the time that they went." Of course, it's possible that she simply needed more time to respond, or that she only came to understand the mismatch by talking herself through it. In any case, just as the capitalization error she introduced at the beginning of the peer-review session, this holistic mismatch prompted considerable attention. For example, during the course of the session, Carla looked back and forth between the essay and the prompt 40 times, above the average number of entrances made by the other participants (30.07). Her continued attention to the assignment prompt indicates that she was actively and deliberately seeking out and comparing the information in the prompt with the text throughout the peer-review session, as was the norm with this group of participants.

Safety Language

Although she never offered any overly critical or harsh comments, when the discussion started to wind down, she returned to a more emotion-driven approach, making it seem as though she were trying to soften the blow for the writer's ego. When asked, "Would you say anything else to this writer?" she commented, "I liked it. I thought it was good." Carla's affirmation was not unusual;

in fact, several participants made such approving comments. There seems to be both a sort of safety net as well as a built-in disclaimer in these kinds of responses. For Carla, this comment seemed to be positioned as a way to conclude the peer-review discussion. In that way, "I liked it" seemed to be a safety net or a way to maintain a friendly relationship despite the "criticism." Carla may have felt that writing is such a personal act that any criticism of it, however constructive or warranted, may be taken personally, and her comment seems strategically placed toward the final words of the discussion in order to "apologize" for any hurt feelings.

These "like" comments also seem to have a built-in disclaimer. In short, this appears to be code for dismissing the language of the "other" (the teacher-language). "I liked it" might mean, simply, "I'm only criticizing because I have to, but if it were up to me, I would keep your writing the way it is," which could be a direct example of the kind of tacit cooperation in face-saving that Goffman (1967) discusses. When Carla said she liked it, she also added, "I thought it was good." When prompted to explain further—"What's good about it?"—Carla explained, "It's very descriptive. It makes you see things, surrounded by a small forest and large rocky walls rise from the surface. It gives you a picture. I like that." This may be more instances of safety language, or possibly that she is actively searching for something positive to say about the writing.

What is most interesting about Carla's comments is that despite her hesitancy to claim ownership over her suggestions, many of her comments suggest that she was offering sound advice. For example, when asked what other advice she might give the writer, she began, "I don't know." She continued by evaluating the effectiveness of the introduction as an attention-getter, though, which indicates that she understood the purpose of an introduction: "Nothing really like makes me want to care; most introductions start with something that grabs somebody." Immediately following this point, though, she seemed to lose confidence again, and returned to her self-questioning comment, "I don't know. Something that would make them—the readers—want to keep reading." Even though she was making an insightful observation about the purpose of introductions that most composition instructors would encourage, she was still hesitant to own her comment. This may reflect more "safety language" intended to protect the feelings of the writer, or it may offer further evidence that Carla was struggling to adopt the kind of persona needed to be a successful peer reviewer.

Discussion

Our findings suggest that students are tentative about offering commentary, frequently doubting their ability to provide feedback about the essay despite the fact that eye-movement analysis demonstrates that students clearly identified areas of the text rich with feedback opportunities where the surface-level errors

were. These participants' hesitancy, coupled with what eye-movement analysis revealed as marked attention to both surface-level errors and the assignment prompt *during* (though not necessarily before) the peer-review situation, suggest some general ways in which we can understand how students might approach a peer-review activity. Interestingly, it was the analysis of eye-movement data that revealed students' multiple examinations of and attention to both the surface errors and the prompt. And while eye-movement analysis cannot provide evidence of comprehension for any specific word, it does provide striking data about the number of examinations and re-examinations of the error words in the essay, as well as the length of time participants chose to scrutinize those errors.

A Rethinking of Global-to-Local Progression

In general, our findings lead us to question the fairly typical peer-review protocol of having students attend *first* to global issues and *then* move steadily to more specific—for example, surface-level—issues. As noted earlier, students spent a lot more time paying attention to the essay assignment prompt *during* the peer-review process than *before* it, which suggests that these students might have approached the peer-review situation from a perspective that did not foreground holistic issues. Indeed, even during the follow-up discussion with students, few participants initiated a discussion of the assignment prompt and text mismatch. As Tobin (1993) and others suggest, students might feel uncertain about their abilities to peer review successfully or appropriately.

There seemed to be genuine concern on these students' part about their ability to correctly identify assignment/text mismatches, and thus offer the kind of peer-review critique that many typical peer-review activities call for. Remember that identifying such mismatches is often one of the *first* items in a peer-review checklist (see Glenn et al., 2003). Is such concern with identifying mismatches representative of true inability or lack of confidence? It may be the case that students need to develop and adopt particular personae as readers—readers who put on a "teacherly hat" to approach a piece of student writing. Certainly this would require some explicit discussion in the classroom, not only to help students recognize the kinds of issues they are being asked to identify, but also to enable students to realize the perspective they are being asked to adopt while peer reviewing. We also believe that students should be encouraged to admit hesitancies if they are unsure of how to respond, either to content or a mechanical issue. Particularly in terms of content issues, hesitancies can mark passages in student texts that are troubling because of lack of clarity, lack of audience consideration, or lack of development. Encouraging students to be aware of when they are hesitating to offer advice and then to *voice* those hesitancies may further enrich students' experience of peer review and boost their confidence levels. If anything, students need to know that encountering and expressing their own hesitancies is *not* necessarily an indication of lack of knowledge, skill, or insight. Rather, such hesitancies are a

natural part of the reading and meaning-making process that *all* readers encounter. Voicing them may be useful for those whose work we are peer-reviewing; as such, the "teacherly hat" we may ask students to adopt should not be understood as asking students to adopt an "all-knowing" role—or to pretend to such. Further, we should keep in mind that students in a regular classroom situation might adopt such personae more readily than in the research situation in which these students participated. It is difficult to tell at this point in our research, and we suggest further inquiry into this specific aspect of the peer-review process, particularly with first-year students. At the very least, our findings suggest that students *do* indeed find an initial holistic approach difficult at best.

How then are we to understand students' much greater attention, in terms of the sheer number and duration of fixations, to surface-level errors? Such attention and multiple examinations might corroborate our sense that first-year students are not particularly expert—or do not *feel* themselves to be particularly expert—at holistic peer-review approaches; they focus instead on the kinds of errors that they can readily and easily identify. In a way, particularly for first-year writing instructors, it may be gratifying that a group of fairly typical first-year students *can* in fact note surface-level problems. However, though they comment freely in a general sense about such surface-level errors, they are not as adept at articulating what the errors are, even though analysis of their eye-movement patterns indicates that they re-examine and attend to such errors to a much greater degree than nearly anything else in the essay. But even if such students cannot actually articulate what is specifically wrong about the error, they notice that something is happening—and they notice enough that their reading is interrupted.

Again, such scrutiny of surface-level errors prompts us to question the protocol of *beginning* peer-review activities with global and holistic issues and *ending* them with editing and surface-level scrutiny. It may be more beneficial to have students articulate first their understanding of what is happening to the student text at the level of editing and then move on to more holistic issues. Doing so would accomplish a number of things. First, it would offer the students the opportunity to talk about "errors" that they are clearly able to identify—or, at least, parts of the texts under review that the eye-movement data show they are stumbling over during their initial readings. Allowing students to work first with what they are able to identify as "wrong" should help them build confidence in their ability to offer constructive and important feedback. Second, it may be vital as part of the reading process to have such errors corrected first, *before* asking students to move on to more holistic critiques. Shaughnessy (1977), in her classic study of basic writing students, argues that "Errors . . . are unintentional and unprofitable intrusions upon the consciousness of the reader" and that "even slight departures from a code cost the writer something, in whatever system he [sic] happens to be communicating, and given the hard bargain he must drive with his

reader, he usually cannot afford many of them" (pp. 12-13). Our data suggest that Shaughnessy is absolutely right; if students' reading is constantly interrupted by surface-level errors, then their ability to comprehend the text more globally and holistically may be compromised. This may be particularly true for more basic writers. In this regard, attending to such errors first may be crucial in enabling students to become adept at identifying more global issues, such as prompt/text mismatches. Our findings may corroborate Williams' (1981) assertion that addressing errors of grammar and usage entails a shift from the objective "correctness" of an item on a page to a consideration of the transaction between writer and reader.

Interestingly, the peer-review protocols that we have found to be most typically used—moving from global issues to editing tasks—seem to mimic, broadly, the "steps" in a traditionally accepted writing process, which begins first with global invention and moves steadily through revision to final editing. However, it is useful to remember that composing processes do not necessarily follow such a linear path. For instance, Smit (2004) notes the potential fallacy of adhering doggedly and without reflection to a straightforward, linear writing "process"—a process that might not meet the needs of student writers. If the composing process is potentially so circuitous, then perhaps the peer-review process should be, if not circuitous, then a little less linear. Revising the peer-review process to foreground mechanical issues might, as we have suggested, both take advantage of student strengths in offering feedback and provide them with opportunities to build confidence as peer reviewers.

We offer such advice with some hesitancy, for we believe that writing *is* a process, a complex, multifaceted and densely social act, and we do not want to value product over process. As such, we do not offer our findings as corroboration of current-traditionalist approaches to the teaching of writing. Rather, our findings suggest much more clearly and accurately exactly what first-year students are attentive to in peer-review activities and where their hesitancies and difficulties lie. Such information can be used, we believe, to help redesign peer-review protocols and activities to ensure that students are learning how to become effective peer reviewers. In other words, our data suggest that students can learn to identify global issues and holistic mismatches—but such ability must be learned and should not be assumed as part of the "toolkit" that first-year students bring to the writing class. Remember, for instance, that Carla, the student whom we used as a case study above, was very hesitant about offering holistic advice; at the same time, she looked back and forth between the essay and the prompt 40 different times during the peer-review process. We believe that such activity means she was actively and deliberately seeking out and comparing the information in the prompt with the text—attempting, perhaps, to offer holistic feedback.

Furthermore, it might be useful *not* to separate out the "stages" of writing into distinct "tasks," such as editing or focusing on organization. For instance,

students could be instructed to think about the relationship among editing, style, and rhetorical issues. Consider how several of the participants fixated the all-capitalized word LOVE multiple times, with some commenting that it is clearly an "error." Technically, such capitalization is not necessarily erroneous, but, rather, reflects a stylistic choice most likely designed for a particular rhetorical effect. Being attentive to such "errors" in the early stages of peer review need not mean that students are focusing first on simple proofreading; in this case, as an example, a useful discussion of the connection between stylistic choice and rhetorical effect can open up students' thinking to the possibilities of textual communication and the relationship between grammar and rhetoric (see Micciche, 2004).

The participants in this study scrutinized the surface-level errors in the essay to a high degree, but other first-year writers may, of course, not examine such errors to the same degree; eye-tracking research with a variety of writers needs to be undertaken so we can better understand the kinds of textual cues and reading processes that are used to navigate texts. Again, as we have suggested here, such information may be crucial in redesigning pedagogical activities and reading and writing assignments. In general, we need to be more attentive to the kinds of tasks we are asking students to perform, particularly if, as Wallace and Ewald (2000), among others, contend, we wish to engender more mutuality in the classroom so students can effectively voice their interests and build from their strengths. While composition instructors may be able to quickly and effectively read and peer review an essay, many of our students will not be as proficient at that task.

One caveat concerning the implications and suggestions that are based on this study is that they stem from, for the most part, this single study. While our research raises these issues and supports our pedagogical suggestions, we see a strong need for more research of a similar nature. The greater the variety in such research (of classroom contexts, genre responded to, peer-review purposes identified, types of essay prompts used, types of peer-review questions asked of the participants, and more), the richer our understanding of these issues will become.

In terms of other research avenues, we should be increasingly attentive to the ways in which students read *on the screen* as opposed to in print. All of the student participants in this exercise read from a computer screen. More and more instructors are putting material for students to review online or sharing such materials, including student work, electronically, and it may be useful to note how reading on screen and reading in print prompt differing reading processes. Indeed, textbook companies are increasingly putting online instruction materials accompanying print publications. For example, Alexander and Barber's (2005) textbook, *Argument Now*, has readings and discussion questions online, and students are prompted to submit answers electronically; again, noting how students read (e.g., what they look at, and pay attention to) might aid tremendously in the future design and pedagogical use of such venues. Other examples include Kemp's (see

Foreman, 2000) TOPIC at Texas Tech University, and Schunn's (Cho & Schunn, in press) SWoRD at the University of Pittsburgh. While such online systems provide innovative ways for students to submit work and receive feedback, we believe that only more specific analyses, such as those offered through methods like eye tracking, can alert us to how students are actually using such forums—and the texts they are manipulating through them.

Ultimately, we feel that research at this level—exploring specifically the reading and composing processes of our students—can be most beneficial in helping us reconsider and redesign key elements of writing instruction pedagogies. They can also attune us to what our students are actually doing with the texts that we give them and that they generate. Such attention may be particularly useful in peer-review activities and other group work, where we attempt to cultivate and nurture student voices and agency. Paying attention to students' abilities and working from them is a powerful way to honor students and their voices. In part, this means that we must continue to actively investigate their abilities with peer review (and beyond) by employing cross-disciplinary research methods and approaches—like the juxtaposition of eye tracking and peer review reported here.

Finally, honoring our students means making a commitment to furthering our understanding of such typical composition practices as peer review. Because peer review is so widely used, it is essential that we continue to consider its impact on our students and their writing development. That means reconsidering its theoretical foundations and goals, as well as its structure and organization, in practice.

AUTHORS' NOTE

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NOTES

1. The "all caps" version of "love" is technically not an error; however, so many participants labeled it as an error that we decided to include it with the other, more traditional errors in the essay.
2. A pseudonym.

REFERENCES

ALEXANDER, J., & BARBER, M. (2005). *Argument now.* New York: Longman.

BAKHTIN, M. M. (1981). The dialogic imagination. In P. Morris (Ed.), *The Bakhtin reader* (pp. 74-87). London: Edward Arnold.

BEAN, J. (1979). A method of peer-evaluation of student writing. *College Composition and Communication, 30,* 301-302.

BERKENKOTTER, C. (1983). Student writers and their audiences: Case studies of the revising

decisions of three college freshman. Paper presented at the Annual Meeting of the Canadian Council of Teachers of English, Montreal, Canada. (ERIC Document No. ED236618)

Berkenkotter, C. (1984). Student writers and their sense of authority over texts. *College Composition and Communication, 35,* 312-319.

Broman, T. (2005). The science of peer review. Retrieved September 8, 2005 from http://mendota.english.wisc.edu/~WAC/page.jsp?id=145&c_type=category&c_id=21

Brooke, R. E. (1991). *Writing and sense of self: Identity negotiation in writing workshops.* Urbana, IL: NCTE.

Carpenter, P. A., & Just, M. A. (1983). What your eyes do while your mind is reading. In K. Rayner (Ed.), *Eye movements in reading: Perceptual and language processes* (pp. 275-307). New York: Academic Press.

Chaffin, R., Morris, R. K., & Seely, R. E. (2001). Learning new word meanings from context: A study of eye movements. *Journal of Experimental Psychology: Learning, Memory, & Cognition, 27,* 225-235.

Cho, K., & Schunn, C. D. (in press). Scaffolded writing and rewriting in the discipline: A web-based reciprocal peer review system. *Computers & Education.*

Danis, F. (1982). Weaving the web of meaning: Interaction patterns in peer-response groups. San Francisco, CA: Conference on College Composition and Communication. (ERIC Document No. ED214202)

Danis, M. F. (1988).Catching the drift: Keeping peer-response groups on track. *College Composition and Communication, 39,* 356-358.

DiPardo, A., & Freedman, S. W. (1988). Peer response groups in the writing classroom: Theoretic foundations and new directions. *Review of Educational Research, 58,* 119-149.

Dodge, R. (1900). Visual perceptions during eye movement. *Psychological Review, 7,* 454-465.

Dossin, M. M. (2003). Among friends: Effective peer critiquing. *The Clearing House, 76,* 206-207.

Ehrlich, S. F., & Rayner, K. (1981). Contextual effects on word perception and eye movements during reading. *Journal of Verbal Learning & Verbal Behavior, 20,* 641-655.

Elbow, P. (1973). *Writing without teachers.* New York: Oxford University Press.

Elbow, P. (1981). *Writing with power.* New York: Oxford University Press.

Fisher, D. F., & Shebilske, W. L. (1985). There is more that meets the eye than the eye mind assumption. In R. Groner, G. W. McConkie, & C. Menz (Eds.), *Eye movements and human information processing* (pp. 149-157). Amsterdam: Elsevier.

Foreman, J. (2000). The leading edge of webcentric writing instruction. Retrieved September 8, 2005, from http://www.centerdigitaled.com/converge/?pg=magstory&id=3386

Frazier, L., & Rayner, K. (1982). Making and correcting errors during sentence comprehension: Eye movements in the analysis of structurally ambiguous sentences. *Cognitive Psychology, 14,* 178-210.

Freedman, S. W. (1992). Outside-in and inside-out: Peer response groups in two ninth-grade classes. *Research in the Teaching of English, 26,* 71-107.

George, D. (1984). Working with peer groups in the composition classroom. *College Composition and Communication, 35,* 320-326.

Gere, A. R. (1990). Talking in writing groups. In S. Hynds & D. L. Rubin (Eds.), *Perspectives on talk and learning* (pp. 115-128). Urbana, IL: NCTE.

Gere, A. R., & Stevens, R. S. (1985). The language of writing groups: How oral response shapes revision. In S. W. Freedman (Ed.), *The acquisition of written language: Response and revision* (pp. 85-105). Norwood, NJ: Ablex.

GLENN, C., GOLDTHWAITE, M. A., & CONNORS, R. (2003). *The St. Martin's guide to teaching writing.* Boston: Bedford/St. Martin's.

GOFFMAN, E. (1967). *Interaction ritual: Essays in face-to-face behavior.* Chicago: Aldine.

HARRIS, C. E. (1986). *Effective strategies in peer evaluation.* (ERIC document No. ED272897)

HEWETT, B. L. (2000). Characteristics of interactive oral and computer-mediated peer group talk and its influence on revision. *Computers and Composition, 17,* 265-288.

HOLT, M. (1992). The value of written peer criticism. *College Composition and Communication, 43,* 384-392.

HUEY, E. B. (1908/1968). *The psychology and pedagogy of reading.* Cambridge, MA: MIT Press.

JOHNSON, R. (2001). The next frontier of the student-centered classroom: Teaching students to recognize quality writing through the use of peer evaluation. (ERIC Document No. ED463813)

JUST, M. A., & CARPENTER, P. A. (1980). A theory of reading: From eye fixations to comprehension. *Psychological Review, 87,* 329-354.

JUST, M. A., & CARPENTER, P. A. (1987). *The psychology of reading and language comprehension.* Newton, MA: Allyn & Bacon.

KAREGIANES, M. L., PASCARELLA, E. T., & PFLAUM, S. W. (1980). The effects of peer editing on the writing proficiency of low-achieving tenth grade students. *Journal of Educational Research, 73,* 203-207.

KASTMAN-BREUCH, L. (2004). *Virtual peer-review: Teaching and learning about writing in online environments.* New York: SUNY Press.

MCALEXANDER, P. (2000). Developmental classroom personality and response to peer review. *Research and Teaching in Developmental Education, 17,* 4-12.

MENDONCA, C. O., & JOHNSON, K. E. (1994). Peer-review negotiations: Revision activities in ESL writing instruction. *TESOL Quarterly, 28,* 745-769.

MICCICHE, L. R. (2004). Making a case for rhetorical grammar. *College Composition and Communication, 55,* 716-737.

MORRISON, R. E. (1984). Manipulation of stimulus onset delay in reading: Evidence for parallel programming of saccades. *Journal of Experimental Psychology: Human Perception and Performance, 10,* 667-682.

MURAU, A. M. (1993). Shared writing: Students' perceptions and attitudes of peer review. *Working Papers in Educational Linguistics, 9,* 71-79.

NEUBERT, G., & MCNELIS, S. (1990). Peer response: Teaching specific revision suggestions. *The English Journal, 79*(5), 52-56.

NEWKIRK, T. (1984). Direction and misdirection in peer response. *College Composition and Communication, 35,* 301-311.

NYSTRAND, M., & BRANDT, D. (1989). Response to writing as a context for learning to write. In C. M. Anson (Ed.), *Writing and response: Theory, Practice, and Research* (pp. 209-230). Urbana, IL: NCTE.

PATON, F. (2002). Approaches to productive peer-review. In D. Roen, L. Yena, V. Pantoja, E. Waggoner, & S. K. Miller (Eds.), *Strategies for teaching first-year composition* (pp. 290-301). Urbana, IL: NCTE.

PAULSON, E. J. (2002). Are oral reading word omissions and substitutions caused by careless eye movements? *Reading Psychology, 23,* 45-66.

RAYNER, K. (1997). Understanding eye movements in reading. *Scientific Studies of Reading, 1,* 317-339.

RAYNER, K. (1998). Eye movements in reading and information processing: 20 years of research. *Psychological Bulletin, 124,* 372-422.

RAYNER, K., & POLLATSEK, A. (1989). *The psychology of reading.* Hillsdale, NJ: Erlbaum.

RUBIN, L. (2002). "I just think maybe you could . . . ": Peer critiquing through online

conversations. *Teaching English in the Two-Year College, 29,* 382-392.

Schaffer, J. (1996). Peer response that works. *Journal of Teaching Writing, 15,* 81-90.

Shaughnessy, M. P. (1977). *Errors and expectations: A guide for the teacher of basic writing.* New York: Oxford University Press.

Sherrard, W. R. (1994). An empirical study of peer bias in evaluations: Students rating students. *Journal of Education for Business, 70,* 43-47.

Sitko, B. M. (1992). Writers meet their readers in the classroom: Revising after feedback. In M. Secor & D. Charney (Eds.), *Constructing rhetorical education* (pp. 278-294). Carbondale: Southern Illinois University Press.

Sitko, B. M. (1993). Exploring feedback: Writers meet readers. In A. M. Penrose & B. M. Sitko (Eds.), *Hearing ourselves think: Cognitive research in the college writing classroom* (pp. 170-187). New York: Oxford University Press.

Smit, D. W. (2004). *The end of composition studies.* Carbondale: Southern Illinois University Press.

Spigelmire, L. (1981). A peer review process for developmental writers. *Exercise Exchange, 26,* 20-23.

Thomas, D. K. (1986). *A transition from speaking to writing: Small-group writing conferences.* (ERIC Document No. ED269761)

Tobin, L. (1993). *Writing relationships: What* really *happens in the composition class.* Portsmouth, NH: Boynton/Cook Heinemann.

Topping, K. (1998). Peer assessment between students in colleges and universities. *Review of Educational Research, 68,* 249-276.

Vatalaro, P. (1990). Putting students in charge of peer review. *Journal of Teaching Writing, 9,* 21-29.

Vygotsky, L. S. (1978). *Mind in society.* Cambridge, MA: Harvard University Press.

Wallace, D. L., & Ewald, H. R. (2000). *Mutuality in the rhetoric and composition classroom.* Carbondale: Southern Illinois University Press.

Williams, J. D. (2003). *Preparing to teach writing: Research, theory, and practice.* Mahwah, NJ: Erlbaum.

Williams, J. M. (1981). The phenomenology of error. *College Composition and Communication, 32,* 152-68.

Wixon, V., & Stone, P. (1977). *Getting it out, getting it down: Adapting Zoellner's talk-write.* Seattle, WA: NCTE. (ERIC Document No. ED140354)

Wolverton, G. S., & Zola, D. (1983). The temporal characteristics of visual information extraction during reading. In K. Rayner (Ed.), *Eye movements in reading: Perceptual and language processes* (pp. 41-51). New York: Academic Press.

Zhu, W. (1995). Interaction and feedback in mixed peer response groups. *Journal of Second Language Writing, 10,* 251-276.

Zola, D. (1984). Redundancy and word perception during reading. *Perception & Psychophysics, 36,* 277-284.

Appendix

The student essay text that student participants in our study peer reviewed follows:

> Write a narrative essay about a single experience or event that has had a significant impact on you. Be sure to focus on just one moment or occasion; don't try to recall a series of events in an essay of this length.

The Quarry

Memories of my life flood my mind, all the days my friends and I spent together growing up and learning about life. We were never apart and spent our summer days outside in nature. Mother Nature surrounded us; we could see trees and rolling farmland for miles. We grew up outside play sports, games, swimming, and just sitting outside and talking. Of all the great places we loved the one spot that stands out to me most is the Quarry, and all of my summer memories there could fill up the enormous hole. My days and nights at the Quarry are some of the best memories, and it is the place were we all watched each other grow up and this summer we watched everyone move away from the small town. At the Quarry we remembered our pasts, lived for the moment, and developed a hunger from the future.

The Quarry to some may be just an old hole in the Earth now filled with water due to the carelessness of the workers who hit a water vein and filled the hole with water. To the workers it was a big mistake but to us it was the best accident because the Quarry is a special place to my friends and I. It sits off the road surrounded by a small forest and its large rocky walls rise from the surface of the still water. An old dock and diving board are close to shore, right in front of the shabby beach house. the sand pit is close to the house and is soft beneath our feet when we play late night games of vollyball; only the moon shines down on our figures as we laught and play in the soft light. The shore is full of small pebbles and yellow sand; it is also very small and is near the only shallow water. The old basketball hoop lies just beyond the shore. The net is now gone and all the remains is the rusty poll and wooden backboard, but it is the perfect place to compete in half court games. I LOVE and miss the Quarry as I think of this wonderful place.

Selina Vásquez Mireles

Theory to Practice *Developmental Mathematics Program: A Model for Change*

The Developmental Mathematics Program (DMP) at Texas State University–San Marcos in central Texas has undergone systemic, significant changes over the past ten years. These changes primarily resulted from the alignment to the American Mathematical Association of Two-Year Colleges' (AMATYC) Crossroads in Mathematics: Standards for Introductory College Mathematics Before Calculus (Cohen, 1995) and Beyond Crossroads: Implementing Mathematics Standards in the First Two Years of College (Blair, 2006), incorporation of existing research regarding developmental education in general and developmental mathematics in particular, and infusion of best practices. This article details the impetus for change and provides a description of the current program as well as an explanation of future goals for the DMP.

AMAYTYC calls for a standards-based reform movement that parallels that of K-12 mathematics education stemming from the National Council of Teachers of Mathematics' (NCTM) *Principles and Standards for School Mathematics* (2000). *Crossroads* (1995) was the first standards document for development mathematics. It brought legitimacy and credibility to suggestions for change. For example, the use of technology in the developmental mathematics classroom was quite limited prior to *Crossroads* (1995). And, technology use in developmental mathematics classroom is recommended in

the *Crossroads* (1995) "Standard I-6: Using Technology" and "Standard P-1: Teaching with Technology." Thus, there was a need for research regarding calculator use specific to developmental mathematics students (Vásquez, 2000). This resulted in a study led by Vásquez and McCabe (2000), which found that the use of graphing calculators did not significantly impact, either positively or negatively, student academic performance. Critics of calculator use tend to claim that students will do well because they have the calculator performing the calculations. Since the results were neutral, a move to require graphing calculators for students in the program did not receive significant resistance from members of the DMP.

Research about developmental education students guided other programmatic changes for the DMP. According to Boylan (2002), the education provided to developmental students should be based on a combination of theoretical approaches drawn from cognitive and developmental psychology. Instructors should learn about these theoretical approaches and practice combining and implementing them in order to provide effective developmental education. Because they do not have such background in theory or practice, the part-time faculty and/or graduate students assigned to teach developmental mathematics students often turn to a traditional instructional method to teach basic skills. That is, teachers present fundamental skills as step-by-step procedures and reinforce by drill and practice (Krantz, 1999). Proponents of traditional instruction have purported that this approach is the most effective means of gaining fundamental skills. However, research shows that teachers with mathematics anxiety tend to favor traditional instructional techniques and that there is a high correlation between such methods and teacher ineffectiveness (Trujillo & Hadfield, 1999). Research shows a strong case for using non-traditional instructional methods based on curricular innovations such as collaborative learning, which fosters problem solving and reasoning as opposed to rote memorization (Johnson & Johnson, 1991).

Developmental mathematics students need to gain both fundamental and problem-solving skills. They need a strong mathematical foundation for obtaining their educational goals because most degree plans require at least one non-remedial mathematics course. And, in states such as Texas, students must pass state-mandated problem-solving tests in order to graduate from college. In Boylan, Bonham, and Bliss' (1994) article in *Research in Developmental Education*, "Who are the Developmental Students?", demographic data showed that a disproportionate number of minority students, namely African Americans, participated in developmental education. In an informal survey conducted by this author

of some universities in Texas, developmental mathematics students tend to outnumber developmental reading and developmental writing students. In a four-year university in Texas by the Mexican border, the ratio of developmental mathematics to developmental reading was 2:1, as was the ratio of developmental mathematics to developmental writing. In north Texas, at another four-year university, the ratio of developmental mathematics to developmental reading was 6:1, as was the ratio of developmental mathematics to developmental writing. At the institution where the DMP is housed, the ratio of developmental mathematics to developmental reading was 50:1, and the ratio of developmental mathematics to developmental writing was 26:1. Although this is not a random sample, developmental mathematics appears to be the most populated content subset of developmental education. Hence, a successful developmental mathematics program has the potential of making mathematics and, consequently, higher education more accessible for minority students.

At the Joint Meetings in Washington, DC, in January 2000, the American Mathematical Society (AMS) and the Mathematical Association of America (MAA) Committee on Teaching Assistants and Part-Time Instructors organized a special session, "Innovative Development Programs for Teaching Assistants and Part-Time Instructors." Most of the professional development available to this population was described as either informal (casual conversations amongst teaching assistants) or traditional (orientation sessions before classes start and regular meetings for a particular course). None of the twelve presentations at the conference discussed formal, concerted, programmatic efforts. Thus, there is an indication that training programs may be void of formal support (including monetary), structure (e.g., making it a requirement and committed involvement of tenured faculty), and activities (e.g., readings, structured discussions, analysis of case studies, observations and videotaping, consultations with experienced instructors, role-playing, and modeling). Moreover, the training issues discussed in this particular session were specifically for teaching assistants, not necessarily part-time faculty. Currently, there exist two programs that utilize teaching assistants and subsequently provide training related to the models, Supplemental Instruction (SI) and the Emerging Scholars Program (ESP). SI is a program developed at the University of Missouri, Kansas City, which trains supplemental instructors to foster effective study skills through content. ESP is a program based on Uri Treisman's research that shows that collaborative work on challenging problems yields increased academic performance in higher mathematics. Neither SI nor ESP specifically addresses the particular needs of part-time faculty. Hence, at

Texas State University–San Marcos, we saw a need for formal training programs for both teaching assistants and part-time faculty.

Description

The goal of the DMP at Texas State University–San Marcos is to increase developmental mathematics students' performance by improving the quality of instruction. The objectives of the program are (a) to foster fundamental and problem-solving skills in developmental mathematics students by helping them to learn when and how to create algorithms as well as when and how to use them and (b) to provide on-the-job training for all developmental mathematics instructors through an instructional framework that requires them to develop and incorporate non-traditional instructional techniques. The overall mission of the program is to provide developmental mathematics students with a positive, nurturing, learning environment, making mathematics and, thus, higher education more accessible.

The primary instructional delivery system is based upon a four-phase algorithmic instructional technique (AIT): modeling, practice, transition, and independence (Vásquez, 2003). The progression begins with teacher-directed instruction of fundamental topics and continues towards a student-directed learning environment for complex topics in a problem-solving context. The ultimate goal is to provide a student-centered learning environment where students gain an understanding of mathematical concepts by creating pertinent algorithms using problem-solving techniques that are reinforced through carefully developed problems, including those based on real-world situations. The AIT provides developmental mathematics students the nurturing environment that they need by employing non-traditional instructional techniques that yield student-authored algorithms for fundamental skills while fostering problem-solving capabilities. An example of this kind of integration is discussed in Vásquez (2003) "Utilizing an Algorithmic Instructional Technique in the Developmental Mathematics Classroom," which describes various examples including linear equations in two variables and sequences.

The program is composed of various components relevant to the developmental mathematics instructors and students. The primary instructor piece is the on-going training that each receives. Prior to each semester, the instructors participate in an intensive three-day workshop. This three-day training session includes:

1. A description of the program;
2. A review of an instructional handbook, especially an orientation to its use (the handbook is a compilation of lessons and

activities, suggesting nontraditional instructional techniques including AIT, created by the program's senior faculty and instructors, and revisions from its previous use as well as suggestions for implementation);

3. A demonstration of several activities, including at least three activities for each of the four AIT phases;
4. An opportunity to practice conducting activities that represent each of the four AIT phases;
5. A discussion on accountability and evaluation requirements such as conducting student surveys and pretests/posttests, maintaining a descriptive log of instructor developed lesson plans and activities, keeping a journal of actual classroom events and personal reflections on the day's events, and collecting samples of student work;
6. An overview, discussion, demonstration, and practice in nontraditional instructional techniques, especially collaborative learning;
7. A workshop on the use of technology in the classroom;
8. Other workshops on topics such as learning styles, professionalism, and multiculturalism that traditional training programs include; and,
9. A meeting of the advisory board charged with proposing recommendations for activity development and alignment, providing suggestions for improving the overall program and ideas for disseminating program results, and assisting other institutions with program adoption.

Other aspects of the program include a weekly seminar, mentoring, and observation/reflection opportunities. The instructors participate in a weekly seminar where they discuss day-to-day administrative issues, lessons, and pertinent literature such as AMATYC's (1995) *Crossroads*. Instructors are also each assigned a senior faculty mentor. The senior faculty mentor conducts regular observations and discusses self-reflections on videotaped classroom instruction.

The developmental mathematics students receive research-based quality instruction, academic support, and several opportunities to communicate their needs. The developmental mathematics courses are limited to approximately 25 students. Although the instructors remain the primary instructional agents, the students must also attend a one-hour lecture where a senior faculty member facilitates discussion about topics from a broad, conceptual perspective, using real-world examples and technology to tie ideas together and reinforce small-group instruction. Thus, the DMP provides students additional instructional time. Instruc-

tors must be available for appointments in addition to their required one office hour per day. Moreover, several university offices provide tutoring, including the Student Learning Assistance Center, which also offers Supplemental Instruction to students in the program. Developmental mathematics students are afforded many occasions to provide feedback about the program, including mid-semester and final course evaluations, lesson reaction polls, and results on quizzes and exams.

The most unique aspect of the program is the significance of the resources that are allocated to the DMP from the Department of Mathematics and the University. Typically, part-time/adjunct faculty teach developmental mathematics courses based on a textbook and general course outline. The DMP differs in that senior faculty members collaborate to construct an environment where instructors are carefully guided through well thought-out, research-based training that includes supporting materials and resources. This enables the part-time/adjunct faculty to become highly qualified in teaching and to address the particular needs of developmental mathematics students effectively.

The main training instrument is an instructional handbook that includes directives for teacher behavior such as what to do and how (e.g., whole-class discussion, Socratic questioning), what to stress (e.g., conceptual understanding of absolute value as it relates to the number line), and what type of activities to use (e.g., Traveling on the Number Line). Thus, it encourages inexperienced teachers to incorporate into their lessons more successful non-traditional instructional techniques. The handbook also fosters discussion among developmental mathematics instructors as they create significant contributions to the handbook based on their experiences and feedback from their coworkers. Such interchange allows experienced instructors to play out their important role in assisting with training.

The program is housed in the Department of Mathematics and is directed, coordinated, and managed by three full-time faculty members. At least 30 developmental mathematics instructors per year circulate through the system. Few, if any, of the instructors have received any teacher training. Instructors are typically full-time graduate students in mathematics, and, on average, spend at least two years as developmental mathematics instructors. Records indicate that over 80% of the instructors, after participating in the program, have received comparable positions at colleges and universities and/or are accepted to mathematics education doctoral programs with ease. In fact, the DMP contributes to the training of mathematics education doctoral students at this institution.

Consistent, on-going evaluation focusing on the students, instructors,

and the program in general occurs. The evaluation process consists of both a process and product component. The process is monitored and altered based on information from student surveys, observations by the instructor of the students, samples of student work, departmental course examinations, weekly meetings with instructors, maintenance of a descriptive log of instructor-developed lesson plans and activities, instructor participants' journals of actual classroom events, instructor participants' personal reflections on the days' events, and observations of the instructors (at times by an outside person, by a faculty mentor, or by videotape). The product is evaluated by analyzing the results on students' pretests and posttests as compared to those for a control group; their results on a state-level mathematics test, such as the Texas Higher Education Coordinating Board (THECB), as compared to their scores in previous attempts of the test; the results of their performance in their current and subsequent course, College Algebra, as compared to that for previous semesters; and the results of departmental course examinations as compared to those for a control group. Expectations for students include successful completion of the current mathematics course, passing a state-level mathematics test, and successful completion of a subsequent mathematics course. Expectations for teachers include student academic success and improved quality of teaching.

The methods of evaluation include the use of objective performance measures. The intended outcome, to increase developmental mathematics students' performance, is realized if the null hypothesis—if there is no significant difference in the adjusted means of content scores between students receiving the proposed instructional technique and students receiving the traditional instructional technique—is rejected and if there is:

1. A statistically significant increase in test scores (pretest/posttest) at the 0.05 level;
2. A significant increase (at least 10%) of students that pass developmental mathematics courses;
3. A significant increase (at least 10%) of students that pass the THEA; and,
4. A significant increase (at least 10%) of students that pass College Algebra.

Statistical analysis is conducted each semester and has consistently shown that the program is effective. As noted in Vásquez (2004), evaluation centers on general project components, instructors, and students. Insightful qualitative data reinforce these results, including anecdotal claims that the program has been successful (Vásquez, 2004).

An advisory board serves as a recommending body for activity de-

velopment and alignment. In addition to providing suggestions for improving the overall program and ideas for disseminating program results, the board also assists other institutions with program adoption. The committee members include representatives from national, state, and local organizations such as the National Center for Developmental Education (NCDE), the National Association of Developmental Education (NADE) Mathematics SPIN, the American Mathematical Society (AMS), Mathematical Association of America (MAA) Committee on Teaching Assistants and Part-Time Instructors, American Mathematical Association of Two-Year Colleges (AMATYC) Foundation/Developmental Mathematics Committee, Teachers Teaching with Technology College Short Course Program (T^3 – CSC), and the Texas Higher Education Coordinating Board (TxHECB) Center for College Readiness in the Division for Educational Partnerships.

The program includes partnerships with other colleges and universities around the nation, many of whom have sent representatives to the workshops to receive training and pilot this program at their home institutions. Furthermore, several schools contract assistance with reform efforts by revising their developmental mathematics program using the DMP as a model. Solicitations to present at conferences, assist with related projects such as the Technology in Developmental Education workshop, and host developmental education student interns are also received.

Future

Overall, the DMP maintains a productive atmosphere for all its participants. The program is continuously revised based on active, current research, successes of other programs, and revisiting of standards. For instance, a recent instructor survey indicated a strong need for efficiency in out-of-class duties such as grading. Thus, efforts are currently being made to research and, if necessary, develop new policies, procedures, and mechanisms for streamlining this process. As most publishers provide computer-based instructional products, future goals include reviewing available software packages and determining the role of a hybrid course to address the distinct needs of developmental mathematics students that need a refresher course as opposed to a remedial course (MacDonald, Vásquez, & Caverly, 2002). As recommended in *Beyond Crossroads* (2006), efforts will be made to make the developmental mathematics curriculum more career-based by including relevant, realistic applications such as those dealt with by nurses and technicians. And, efforts to align to the newly-adopted Texas College Readiness Standards are underway. In particular, both Mathematics and Cross-Discipline Stan-

dards are being addressed, and as with most standards, both process and product standards are included. In any case, the program team strives to maintain a developmental mathematics program that helps students conquer their fear of mathematics; provides teacher training; offers a framework for the development of innovative lessons including student-centered, technology-based, hands-on, real-world activities; and assists other schools, programs, and organizations with similar endeavors.

References

Blair, R. (Ed.). (2006). *Beyond crossroads: Implementing mathematics standards in the first two years of college.* Memphis, TN: American Mathematical Association of Two-Year Colleges.

Boylan, H. R. (2002). *What works: Research-based best practices in developmental education*. Boone, NC: Continuous Quality Improvement Network & National Center for Developmental Education.

Boylan, H. R., Bonham, B. S., & Bliss, L. B. (1994). "Who are the developmental students?". *Research in Developmental Education, 11*(2), 1-4.

Cohen, D. (Ed.). (1995). *Crossroads in mathematics: Standards for introductory college mathematics before calculus.* Memphis, TN: American Mathematical Association of Two-Year Colleges.

Johnson, D. W. & Johnson, R. T. (1991). *Learning mathematics and cooperative learning: Lesson plans for teachers.* Edina, MN: Interaction Book Company.

Krantz, S. G. (1999). *How to teach mathematics* (2nd ed.). Providence, RI: American Mathematical Society.

MacDonald, L., Vásquez, S., & Caverly, D. C. (2002, Winter). Techtalk: Effective technology use in the developmental mathematics classroom. *Journal of Developmental Education, 26*(2), 36-37.

National Council of Teachers of Mathematics (NCTM). (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

Trujillo, K. M., & Hadfield, O. D. (1999, June). Tracing the roots of mathematics anxiety through in-depth interviews with preservice elementary teachers. *College Student Journal, 33*(2), 219 – 233.

Vásquez, S. (2000). Calculator usage in developmental mathematics. *Research in Developmental Education, 15*(5), 1-4.

Vásquez, S. (2004, Spring). A report on the effectiveness of the developmental mathematics program M.Y. Math Project – Making your mathematics: Knowing when and how to use it. *Mathematics and Computer Education*, 38(2), 190-195.

Vásquez, S. (2003, Winter). Utilizing an algorithmic instructional technique in the developmental mathematics classroom. *Mathematics and Computer Education*, 37(1), 16-28.

Vásquez, S., & McCabe, T. W. (2002). The effect of calculator usage in the learning of basic skills. *Research and Teaching in Developmental Education*, *19*(1), 33-40.

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Effects of a Value-Reappraisal Intervention on Statistics Students' Motivation and Performance

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The authors investigated the effects of an exploratory value-reappraisal intervention on students' motivation and performance in an undergraduate introductory statistics course. They sampled 82 students from 2 instructors' sections during both the fall and spring semesters. Students were randomly assigned within each section to either the Value-Reappraisal (VR) or Control condition (C). VR presented messages about the importance of statistics and guided students in exploring potential values of learning statistics. Results showed positive effects of VR on task value, endogenous instrumentality, and a choice-behavior measure of interest. The authors found VR to affect exam performance, but only for students who had a particular instructor. This research helps broaden literature on self-regulation and expectancy-value models of motivation by focusing on the regulation of value perceptions.

Keywords: achievement, attitude, expectancy value, interest, intervention research, math and science education, motivation, self-regulation

MANY STUDENTS HAVE TROUBLE learning math and science, and they also find it difficult to understand why learning these subjects is important for them on an individual level. Furthermore, there are growing economic and social needs to increase students' achievement and continued interest in math and science education (National Science Foundation, 2006; U.S. Department of Education, 2006). Research in the areas of achievement motivation and self-regulated learning has identified important predictors of students' academic achievement and continued

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interest as well as factors that could potentially be targeted in interventions to increase these outcomes.

Expectancy-value theory posits that students' achievement and continued interest in a particular subject area can, in part, be explained by their expectations about successfully performing academic tasks and the degree to which they value those tasks (Eccles et al., 1983; Wigfield & Eccles, 2002). Students are thought to choose and be motivated toward academic tasks and courses that they expect they can successfully complete and perceive as valuable (Atkinson, 1964; Eccles & Wigfield, 2002). Although both expectation beliefs and value perceptions have been found to be positively related to motivation and achievement (e.g., Simpkins, Davis-Kean, & Eccles, 2006; Wigfield & Eccles, 1992, 2000), expectation beliefs have been found to be stronger predictors of achievement, and value perceptions have been found to be stronger predictors of continued interest in a particular subject area (e.g., enrollment in and intentions to take math courses; Meece, Wigfield, & Eccles, 1990; Wigfield & Eccles, 1992, 2000). For example, in a study of 250 seventh- through ninth-grade students, Meece et al. found that expectation beliefs directly predicted subsequent math grades and value perceptions directly predicted intentions to enroll in future math courses. Furthermore, this pattern of results held for both boys and girls. On the basis of these findings, helping students to increase their expectation beliefs might lead to stronger gains in achievement, and helping students increase their value perceptions might lead to stronger gains on measures of continued interest and, perhaps, further study in a particular content area.

Theory and research on self-regulation has suggested that students can actively modify their academic values, beliefs, and goals through the use of self-regulatory strategies (Boekaerts, Renninger, Sigel, Damon, & Lerner, 2006; Corno & Kanfer, 1993; Pintrich, 2000, 2004; Pintrich & DeGroot, 1990; Wolters, 1998, 2003; Zimmerman, 1989, 2000). Central to models of self-regulation are processes involved in setting, pursuing, and evaluating learning and achievement goals. According to Zimmerman's (2000) model, self-regulation involves three cyclical phases: forethought (setting goals and planning how to reach those goals strategically), performance/volitional control (implementing plans and metacognitively monitoring implementation efforts), and self-reflection (evaluating goal progress and reacting to and reflecting on successes and failures). A large body of research on strategic and self-regulated learning has suggested that students can increase their expectation beliefs for success and achievement through the use of self-regulatory strategies (Bandura, 1997; Bandura & Cervone, 1983; Bandura & Schunk, 1981; Cleary & Zimmerman, 2001; DeCorte, Verschaffel, & Masui, 2004; Fuchs et al., 2003; Glaser & Brunstein, 2007; Kitsantas, Reiser, & Doster, 2004; Kramarski & Gutman, 2006; Lynch, 2006; Metallidou & Vlachou, 2007; Pintrich & DeGroot; Schunk, 1996; Schunk & Ertmer, 1999, 2000; Torrance, Fidalgo, & Garcia, 2007; Zimmerman, 2000; Zimmerman, Bandura, & Martinez-Pons, 1992).

However, there is a dearth of theory and research focused on helping students to place value on and develop a continued interest in a particular subject area. Both motivation and self-regulation researchers have highlighted a need for more work in this area (Brophy, 1999; Pintrich, 2000, 2004; Wolters, 1998, 2003). For instance, Brophy (1999) argued that " . . . the value (as opposed to the expectancy) aspects of human motivation, particularly motivation to engage in domain-specific learning tasks" need to be further developed and emphasized in theoretical and empirical work (p. 75). Brophy addressed concepts and principles such as building learning communities that help students to adopt learning goals, providing students with optimally challenging tasks, and choosing tasks that have a potential to be perceived as important, given the learners' past knowledge and experiences. However, Brophy (1999) did not focus on self-regulatory processes and strategies that students could use to regulate their value perceptions and interest. In Pintrich's (2000, 2004) theoretical model of four self-regulatory phases (forethought, planning, and activation; monitoring; control; and reaction and reflection) and four areas that can be regulated during each phase (cognition, motivation/affect, behavior, and context), he emphasized that one way students can actively increase their motivation is by activating and regulating their value perceptions. Wolters's (1998) research provided support for this idea because it showed that students reported using strategies to both increase their interest in a task (e.g., by making studying into a game) and increase the relevance of a task (e.g., by thinking how learning course content could be useful in one's career). However, more theoretical, empirical, and intervention research is needed to investigate strategies that can help students to increase the value they place on their coursework and generate a continued interest in different content areas, particularly in the areas of math and science.

The purpose of this study, on the basis of an integration and organization of disparate research conducted by educational and social psychologists that is relevant to the self-regulation of students' value perceptions, was to explore the effect of an exploratory value-reappraisal intervention on motivational variables and achievement in a college statistics course.

A GENERAL FRAMEWORK FOR VALUE REAPPRAISAL

Rooted in information processing theory, models of persuasion (e.g., Chaiken, 1987; Petty & Cacioppo, 1986) and conceptual change (e.g., Dole & Sinatra, 1998) share a basic framework that is useful for understanding the modification of students' value perceptions about academic tasks and courses. This framework suggests that the processing or elaboration of a message increases the potential for attitude, or conceptual, change (Murphy, 2001; Murphy, Holleran, Long, & Zeruth, 2005; Woods & Murphy, 2001). Processing a message favorably increases the potential for attitude change in the direction advocated in the message; processing

a message unfavorably increases the potential for attitude change in the opposite direction from what was advocated in the message (Bohner & Schwarz, 2001; Greenwald, 1968; Pettty, Ostrom, & Brock, 1981). The effect of a persuasive message on a students' attitude is, therefore, believed to be mediated by the students' cognitive responses to the message. This indicates that presenting students with messages about why a task may be valuable and then guiding them in processing these messages favorably could help them to positively reappraise the value of the task. However, very few studies have been conducted on strategies to help guide students in processing persuasive messages. Research on persuasion and conceptual change has primarily focused on the persuasive aspects of the message (e.g., credibility of the author, strength of arguments, ease of understanding text, balanced arguments, emotion provoking, interesting text) and personal characteristics of the participants (e.g., preexisting beliefs and values, level of prior knowledge about the message topic, and motivation to process the message) and how these variables interact to predict students' cognitive responses to a message and hence their change in attitudes or beliefs (Bohner & Schwarz, 2001; Murphy, 2001).

Persuasion and conceptual change researchers also acknowledge that there are two routes that students can use to process a message (Woods & Murphy, 2001). The central route refers to "... effortful scrutiny of message arguments and other relevant information" (Bohner & Schwarz, 2001, p. 419) and involves linking "... any incoming arguments to issue-relevant information previously encoded within a recipients' memory" (Woods & Murphy, 2001, p. 644). Conversely, the peripheral route refers to less effortful and more superficial processing of a message, such as by using heuristic rules (e.g., "experts make valid arguments," "longer arguments are more persuasive than shorter arguments") to decide on the persuasiveness of a message (Bohner & Schwarz, 2001; Wood & Murphy, 2001). Whereas the peripheral route has been found to promote temporary attitude change, the central route has been associated with lasting attitude change (Stiff, 1994).

The extent to which students elaborate on a message through the central route has been found to depend on their motivation and ability to process the message (Petty & Cacioppo, 1986). Low levels of student motivation and ability to process a message can thus pose a problem when researchers and/or educators wish for students to actively process messages. One possible solution to this problem is for students to complete activities that guide them in actively processing the messages. However, there is a lack of research focused on interventions that both present students with messages and guide them in using strategies to explore issues related to those messages.

Persuasive Messages

Providing students with messages about the different reasons that an academic task might be valuable has been suggested as one approach that could help

students to positively reappraise the value of a task (Brophy, 1999; Hofer, 2002). For example, Dholakia and Bagozzi (2003) found that students had stronger commitments and were more likely to access extra not-for-credit reading assignments when they received a message about the importance of the reading compared with those students who received no such message. Similarly, providing a rationale when assigning a task has been found to lead to relatively higher motivation and performance in work/occupational settings (Latham, Erez, & Locke, 1988). However, what content should the message convey to students to convince them that an academic task is important? Current conceptualizations of task value put forth by Eccles and Wigfield (see Eccles et al., 1983; Eccles & Wigfield, 2002) postulated that students might value a task for different reasons, and this framework could be used to help explain to students the potential value of a task. For example, students may value a task because it is generally important to them and in line with their self-concept (attainment value), useful for achieving their future goals (utility value), or enjoyable in and of itself (intrinsic value; Eccles, 2005; Eccles et al., 1983; Wigfield & Eccles, 1992, 2000). In addition, the cost of task engagement (e.g., time, effort, negative emotions) is another type of value perception that could be addressed (Eccles et al., 1983). Although providing students with messages about why a task may be important could be instrumental in helping students positively reappraise the value of a task, reappraising a task's value may also involve the active use of strategies, and interventions could guide students in using such strategies.

Value-Reappraisal Strategies

Wolters (1998) found that students reported using strategies to enhance their valuation for academic tasks in order to increase their motivation, especially in situations in which they initially appraised the material as irrelevant. Students reported strategies such as trying to make the task personally relevant, finding ways that the task could be useful in future situations, and trying to make the task more enjoyable. Helping students actively brainstorm different reasons and generate rationales for course engagement might help students to modify their course-related value perceptions and continued interest in a subject area.

Using imagination and mental simulation (Markus & Nurius, 1986; Pham & Taylor, 1999; Singer, 1975) to explore the value of learning (e.g., imagining experiencing positive incentives associated with task success) might also be an important strategy involved in generating value perceptions. Singer showed that most humans daydream and use imaginative processes to elaborate thoughts and ideas and that these processes are instrumental in linking cognition, emotion, and motivation. Furthermore, Markus and Nurius suggested that imaginative processes are involved in the elaboration of future possible selves, which are schemata that serve to motivate people toward the futures that they envision for themselves.

In addition, contrasting future benefits of learning with costs of task engagement (Oettingen, Pak, & Schnetter, 2001) has been found to help students increase their commitments to learning course material. Oettingen et al. conducted a series of studies across various domains (e.g., academic, interpersonal) and found that contrasting future benefits with realistic costs of a task resulted in higher task commitment and performance compared with when they were asked to imagine only future benefits or only realistic costs. On the basis of disparate theory and research, value-reappraisal strategies might include brainstorming, generating rationales, imagining, and contrasting pros and cons about the importance of academic tasks, courses, and subject areas. Such strategies could potentially be used by students to self-regulate their value perceptions.

METHOD

Overview of the Study

The major purpose of this study was to design a value-reappraisal intervention and investigate its effects on self-report measures of task value (perceived value of course tasks), endogenous instrumentality (perceived usefulness of developing knowledge and skills related to a course for the attainment of future goals), and self-efficacy (confidence in one's capabilities to succeed at the work in a course); a choice-behavior measure of interest in statistics (whether students accessed extra not-for-credit Web sites related to statistics); and postintervention exam performance.

The VR intervention was designed to help students positively reappraise the value they placed on developing statistical knowledge and skills. Students were presented with messages about the importance of becoming an intelligent consumer of statistics in everyday life (attainment value), academic and professional uses of statistics (utility value), and the intrinsic enjoyment of learning statistics (intrinsic value). Students were also guided in actively processing the content of these messages through the central route by brainstorming, generating rationales, imagining, and contrasting pros and cons related to the importance of learning statistics. A no-treatment control condition (C) was also included and students were randomly assigned to either VR or C.

Since VR was focused on increasing students' value perceptions, it was hypothesized that students in the VR group would evidence stronger gains on measures of task value and endogenous instrumentality over time (pretest, immediate posttest, 2-week delayed posttest) compared to students in the control group. Furthermore, it was hypothesized that the VR group would be more likely to access extra not-for-credit statistics websites (the choice-behavior measure of interest) than the control group. Because VR was focused on modifying students' value perceptions, not

their expectation beliefs; and, because research on expectancy-value theory has suggested that value perceptions are stronger predictors of continued interest and expectation beliefs are stronger predictors of achievement (Meece et al., 1990; Wigfield & Eccles, 1992, 2000), it was questionable whether VR would affect students' ratings of self-efficacy and their postintervention exam performance. Therefore, we made no specific hypotheses about these two outcome variables.

The domain of statistics was chosen for these studies because students often express negative attitudes and beliefs toward statistics (Fullerton & Umphrey, 2001; Gal & Ginsburg, 1994; Gal, Ginsburgh, & Schau, 1997; Garfield, Hogg, Schau, & Whittinghill, 2002; Mills, 2004), and given the common usage of statistics in the media and across various occupations, there might be valid reasons for students to increase the value they place on learning statistics. In addition, the introductory statistics course in which this research was conducted included a research participation requirement. This made it convenient to recruit participants and conduct experimental intervention research.

Participants

A total of 82 college students from an introduction to statistics course offered through the educational psychology department of a large public university in the South Central United States were recruited through the department's human subject pool. Students received research participation credit for completing this study. Students were sampled from four sections of the course over two consecutive semesters: Fall Section 1 ($n = 21$) and Section 2 ($n = 19$); Spring Section 3 ($n = 23$) and Section 4 ($n = 19$). There were two instructors: Instructor A taught Sections 1 and 3, and Instructor B taught Sections 2 and 4. There were 68 women and 14 men, which is representative of those who enroll in introductory statistics courses through this department but not of the university at large, which enrolls 51% female students. The ethnic composition of the sample was as follows: African American ($n = 2$), Asian ($n = 16$), Caucasian ($n = 49$), Hispanic ($n = 12$) and 3 did not specify an ethnicity. Students tended to be in upper division: first year students ($n = 1$), sophomores ($n = 15$), juniors ($n = 33$), seniors ($n = 27$), and graduate students ($n = 6$). Students were enrolled in various colleges and programs across campus and intended to seek degrees in the following areas: advertising ($n = 9$), anthropology ($n = 1$), applied learning and development ($n = 1$), athletic training ($n = 1$), biology ($n = 2$), chemistry ($n = 1$), communication sciences and disorders ($n = 8$), communications ($n = 1$), educational psychology ($n = 1$), exercise physiology ($n = 2$), human development and family sciences ($n = 14$), human ecology ($n = 1$), kinesiology ($n = 7$), music ($n = 2$), nursing ($n = 16$), nutrition ($n = 6$), pharmacy ($n = 2$), physical therapy ($n = 2$), public relations ($n = 1$), textiles and apparel ($n = 3$), and urban studies ($n = 1$). Furthermore, most students had already declared a

major ($n = 78$). For many students, completing the introductory statistics course fulfilled a degree requirement even though taking this particular course may not have been required. The average age was 21.43 years ($SD = 3.21$).

Design

Potentially confounding variables were partially controlled for within the experimental design by using stratified random assignment. Students were stratified on instructor, gender, and year in school and then randomly assigned to one of two groups: VR group ($n = 41$) or the control group ($n = 41$). The repeated measures design used in this study included a pretest (immediately before the intervention), an immediate posttest (immediately after the intervention), and a 2-week delayed posttest.

Procedures

Table 1 provides an overview of the study procedures. Students in this study came to two sessions. Session 1 (approximately 100 min) was held in a computer lab with enough computers for 20 people. Sessions were held on weekdays, typically between 5:00 p.m. to 7:30 p.m., for approximately 3 weeks. On average, 10 students came to each session. Students were greeted and asked to sit at one of the computer stations. After signing the consent form, students completed the pretest measures (task value, endogenous instrumentality, and self-efficacy). Then,

TABLE 1
Overview of Study Procedures

Stage of Project	*Timing*	*Activity*
Preintervention Course Exam	Approximately 3 weeks into the semester	• Students took preintervention course exam
Session 1	Approximately 6 weeks into the semester	• Students took pretest measures • Students completed intervention/control condition • Students took immediate posttest measures
Session 2	Approximately 8 weeks into the semester	• Students took 2-week delayed posttest measures • Students took demographic survey
Choice-Behavior Measure	Approximately 10 weeks into the semester	• Statistics websites were posted for students to access
Postintervention Course Exam	Approximately 12 weeks into the semester	• Students took postintervention course exam

students were told how to sign on to the computers and download the relevant intervention (randomly assigned). The researcher was available to students to help with logistical questions. After the students completed the intervention, they took the immediate posttest measures (same as the pretest measures), signed up for Session 2, and left.

Session 2 (approximately 30 min) took place approximately 2 weeks after the students' first session in a classroom large enough to seat 50 people. On average, 20 students came to any one session (held weekdays at 4:00 p.m. or 5:00 p.m.). Students completed the 2-week delayed posttest measures (same as the pretest measures), and completed the demographic survey. Last, students were thanked and debriefed via e-mail once the study was completed. Students completed the pretest, immediate posttest, 2-week delayed posttest, and demographic measures by reading the items in a questionnaire booklet and bubbling in their responses on a Scantron sheet. The intervention and control conditions were delivered in the form of Microsoft Word 2000 files, and students typed their responses to the activities directly into these files.

Dependent Variables

Self-report measures of task value, endogenous instrumentality, and self-efficacy were administered at all three time points. All self-report measures used a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), and referenced students' statistics course.

Task value. We used the Task Value Scale from the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 1991) to measure task value generally (overall importance a student places on course-related tasks). The Task Value Scale has two items for attainment (e.g., "It is important for me to learn the course material in this course"), utility (e.g., "I think I will be able to use what I learn in this course in other courses"), and intrinsic value (e.g., "I am very interested in the content area of this course") resulting in a total of six items. The items are averaged together to compute an overall task value score. This scale has been used in numerous studies and strong reliability evidence has been established ($\alpha = .9$; Duncan & McKeachie, 2005). We included this measure because it has been successfully used as a general measure of task value with college populations.

Endogenous instrumentality. We used three items to measure endogenous instrumentality (the perceived usefulness of developing knowledge and skills related to a task for the attainment of future goals; e.g., "What I learn in this course will be useful for my future occupation"). Items were taken from an unpublished

revision of Husman, Derryberry, Crowson, and Lomax's (2004) four-item measure of endogenous instrumentality (J. Husman, personal communication, July 17, 2005). Endogenous instrumentality differs from task value because the Task Value Scale is a general measure that includes items related to attainment, utility, and intrinsic value. At a conceptual level, endogenous instrumentality is similar to utility value; however, one difference is that endogenous instrumentality is specifically focused on the utility of learning course material, as opposed to, for example, the usefulness of passing a class. Another difference is that each item from the endogenous instrumentality scale makes an explicit reference to the future, whereas, the items from the Task Value Scale do not reference the future explicitly. We included endogenous instrumentality as an outcome in this study because a major focus of the VR intervention was to help students discover the relevance of developing knowledge and skills in statistics. Empirical evidence suggested that the original 4-item measure of endogenous instrumentality had good reliability ($\alpha =$ .86; Husman et al.). In addition, on the basis of results from structural equation modeling, Husman et al. found that their endogenous instrumentality measure, the MSLQ Task Value Scale (two of the six items were removed because of poor reliability), and the MSLQ measure of intrinsic motivation, were measuring unique constructs. Also, endogenous instrumentality and task value were found to be positively related, but the relation reported was fairly weak.

Self-efficacy. The Perceived Academic Competence Scale was developed by Kaplan and Midgley (1997) by selecting seven items from the Academic Self-Beliefs Scale of Midgley, Maehr, and Urdan's (1993) Patterns of Adaptive Learning Survey. This scale was used to measure self-efficacy for completing course-related tasks (e.g., "I can do almost all the work in this course if I don't give up"). Items loaded as expected in a factor analysis that also included learning and performance goal orientation items and allowed factors to correlate (Kaplan & Midgley). In addition, good reliability data ($\alpha = .83$ to .85) were reported (Kaplan & Midgley). For the purposes of the present study, the items were adapted to refer to students' statistics course instead of English or math classes.

Preintervention exam performance. We used the first course exam, which was given approximately 3 weeks before the administration of the intervention, as a baseline measure of students' course achievement and treated it as a covariate in analyses examining intervention effects on postintervention exam performance. Because instructors did not use the same exam, we standardized the preintervention exam scores within each section by dividing the standardized residual by an estimate of its standard deviation, which yielded a mean of 0 and a standard deviation of 1 for each section. Instructor A's exam covered the following topics: introduction to statistics, frequency distributions, central tendency, variability, z

scores, and probability. Instructor B's exam covered the same topics as Instructor A's exam but also covered introduction to hypothesis testing and introduction to the *t* statistics.

Postintervention exam performance. The third course exam, which was given approximately 1 month after the administration of the intervention, was used as a dependent variable. We also standardized postintervention exam scores using the same procedures as described in the previous paragraph. Instructor A's exam covered the following topics: related samples *t* test, independent samples *t* test, correlation, simple linear regression, and chi-square test of association. Instructor B's exam covered the same topics as did Instructor A's exam, with one exception: Instructor B's exam covered statistical techniques for ordinal data, whereas Instructor A's exam covered *t* tests.

Choice-behavior measure of interest in statistics. Approximately 3 weeks after the intervention, two Web sites (one that was related to statistics concepts and procedures and the other that was related to how statistics is used in different careers) were posted on the course Web site. Then, an e-mail was sent out to students by their instructor with the following message:

> Hi, Class,
> A graduate student of mine found two really good Internet sites related to statistics. One site has definitions and explanations for statistical terminology and the other has information about why statistics is important and how people use statistics in various occupations. If you have some free time, please check them out. They are interesting.

Students could then go to the course Web site and access either or both of the statistics Web sites that were posted. Accessing the Web sites was not a requirement, and students could not earn points by accessing them. When an assignment is not required and points cannot be earned, accessing it could potentially be used as an indicator of interest in that subject area. A feature on the course Web site was enabled that tracked which students clicked on the statistics Web sites. Unfortunately, the statistical tracking mechanism was not available for us to use during the fall semester, so this measure was only included during the spring semester of the study ($n = 42$). A dichotomous variable indicating whether students accessed the Web site was of interest, as opposed to the frequency of times a student accessed the Web site. This was because once a student accessed one of the statistics Web sites, he or she could then save that Web site to his or her own computer and access it later, barring our statistical tracking mechanism from tracking that student's access to that Web site.

Description of the Value-Reappraisal Intervention and Control Conditions

We administered the experimental conditions using computers in a campus computer lab. The materials were in the form of Microsoft Word 2000 files downloaded from a designated Web site. For each condition, students read a series of reading passages and completed associated activities. Students typed their responses to the activities directly into the file. The number of passages, activities, and approximate time it took to complete each condition are as follows: control (four passages, four activities, 75 min) and value reappraisal (six passages, eight activities, 75 min).

Value-Reappraisal Intervention (VR). VR was designed to help students reappraise their values related to their introductory statistics course. Students were presented with messages and strategies to explore the value of learning statistics. Particular emphasis was given to helping students consider the importance of developing statistical knowledge and skills.

Passage 1 (639 words) explained what attitudes are and why it is important for students to construct a positive attitude toward their coursework. Activity 1 asked students to describe one positive and one negative attitude students generally might have toward college courses.

Passage 2 (453 words) explained that one possible route to developing a more positive attitude toward a course is to understand why learning the content and mastering the skills related to that course may be personally important. Activity 2 asked students to create a list of knowledge and skills that could be developed from learning the content presented in their statistics course. In addition, students were asked to first create a list of incentives for developing that knowledge and skill; and second, to generate mental simulations of them realizing these incentives in the future. We used Oettingen et al.'s (2001, p. 740) instructions for generating mental simulations.

Passage 3 (482 words) discussed how developing statistical knowledge and skill could help students become more intelligent consumers of statistical information. Activity 3 asked students to describe past and future situations in which they used or would use statistically based information. They were also asked to generate a rationale for why learning the material in their statistics course could help them become more intelligent consumers of statistical information.

Passage 4 (70 words) briefly discussed how developing statistical knowledge and skills could help students become better prepared for future courses. Activity 4 asked students to brainstorm a list of upcoming courses in which having statistical knowledge and skills might be useful and to generate a rational for why learning the material in their statistics course could help them in a future course.

Passage 5 (136 words) briefly discussed how developing statistical knowledge and skills could be instrumental in becoming better prepared in a future career

and provided examples of how statistics are used in various careers. In Activity 5, students were asked to create a list of potential careers for them and then to chose one and describe the ways in which they saw statistical knowledge and skills being used in that career. They were also asked to generate a rationale for why learning statistics could help prepare them for that career.

Passage 6 (244 words) briefly discussed how statistics could be challenging, interesting, and enjoyable. It also discussed how negative thoughts related to learning statistics can make it less enjoyable. Activity 6 asked students to identify two negative thoughts that they had related to their introductory statistics course and to replace each thought with a positive thought. We adapted this particular activity from Weinstein, Woodruff, and Awalt's (2002) "Becoming a Strategic Learner: Attitude Module."

The last part of VR was designed to help students examine the costs and benefits related to learning statistics. This part did not have any reading passages, only activities. Activity 7 asked students to generate an argument supporting why statistics was important for them and an argument supporting why statistics was not important for them. Then, students were asked to choose which argument was truer for them. Activity 8 asked students to contrast positive incentives for learning statistics with obstacles standing in their way. This activity was taken from Oettingen et al. (2001) and adapted to focus on students' statistics course.

Control condition. Students read four passages on multicultural education: Passage 1 (2,192 words), Passage 2 (1,116 words), Passage 3 (2,155 words), and Passage 4 (1,043 words). Multicultural education was chosen as the topic of the control condition because learning about it was not expected to affect the variables of interest but could potentially be beneficial to students in other ways. After students read each passage, we asked them (a) to explain what they liked most about the reading and why; (b) what they liked least about the reading and why; and (c) to summarize some of the main points from the reading.

RESULTS

Reliability analyses of the pretest self-report measures yielded strong Cronbach's alpha coefficients: task value (.90), endogenous instrumentality (.88), and self-efficacy (.90). Pearson product-moment correlation coefficients suggested that the three self-report measures were intercorrelated. Self-efficacy was positively correlated with task value ($r = .38$, $p < .01$) and endogenous instrumentality ($r = .26$, $p < .05$), and task value was positively correlated with endogenous instrumentality ($r = .75$, $p < .01$). The high correlation between task value and endogenous instrumentality raised concerns about the redundancy of conducting analyses on

TABLE 2
Descriptive Statistics for Self-Report Measures by Intervention Group

	Pretest		*Immediate Posttest*		*2-Week Delayed Posttest*	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Task Value						
Control	3.81	1.33	3.60	1.33	3.66	1.32
Value Reappraisal	3.51	1.39	4.26	1.37	4.00	1.35
Endogenous Instrumentality						
Control	3.85	1.69	3.91	1.65	3.93	1.65
Value Reappraisal	3.71	1.67	5.02	1.44	4.52	1.55
Self-efficacy						
Control	5.15	1.32	5.18	1.29	5.03	1.36
Value Reappraisal	5.22	1.13	5.36	1.03	5.19	1.01

Note. Control ($n = 41$) and VR ($n = 41$). A 7-point scale was used for each self-report measure.

both variables. However, because task value and endogenous instrumentality were found to be both empirically unique and theoretically distinct in previous work with much larger sample sizes, and because researchers whose work pertains to task value and endogenous instrumentality might prefer to see the results presented separately for each measure, both measures were retained and analyzed separately.

Table 2 presents the pretest, immediate posttest, and 2-week delayed posttest means and standard deviations for the Control and VR groups on all self-report measures. To check whether group differences existed at pretest, we conducted 2 (VR: present or absent) × 2 (instructor: A or B) × 2 (semester: fall or spring) analyses of variance (ANOVAs) for task value, endogenous instrumentality, and self-efficacy. No statistically significant intervention group, instructor, or semester main effects or interactions were detected on any of the pretest self-report variables. There were too few men in this study to examine the effect of gender in any of the analyses. In addition, the number of graduate students in this study was too small to examine differences with undergraduates. Because students' gender and year in school could potentially affect results, we used stratified random assignment to control for these variables.

A major purpose for this study was to examine the effect of VR on self-report measures of task value, endogenous instrumentality, and self-efficacy over time. Even though students were randomly assigned to either the Control or VR group within each section, it was possible that the VR intervention could have differentially affected students' ratings on the self-report measures on the basis of which instructor they had or which semester they were enrolled in the course. To investigate this, we ran a 2 (VR — present or absent) × 2 (instructor: A or B) × 2 (semester: fall or spring) × 3 (time: pretest, immediate posttest, 2-week

delayed posttest) repeated measures ANOVA for each self-report variable. We conducted a power analysis using G*Power 3.0.10, and it suggested that there was sufficient power (.95) to detect between-within interaction effects with a modest effect size ($\eta_p^2 = .03$), given the following inputs: $\alpha = .05$; $N = 82$; groups = 8; repeated measures = 3; correlation among repeated measures = .75; and nonsphericity correction $\varepsilon = .94$. No main effects or interactions involving instructor or semester were detected nor where there any effect sizes larger than $\eta_p^2 = .03$, so we dropped these two variables in further analyses to increase power.

We analyzed the data subsequently reported for measures of task value, endogenous instrumentality, and self-efficacy using 2 (VR − present or absent) × 3 (time: pretest, immediate posttest, 2-week delayed posttest) repeated measures ANOVAs. We used *F* tests using the Greenhouse-Geisser degrees of freedom adjustment for violations of the sphericity assumption (no violations of sphericity were observed, but this test was used because it is more conservative) to test the significance of the main and interaction effects of VR and time. In addition, we used Bonferroni adjustments for post hoc pairwise comparisons to control for increases in Type I error as a result of multiple comparisons.

Task Value

Repeated measures ANOVA results for task value showed a strong VR × Time interaction, $F(1.98, 158.48) = 16.99$, $p < .01$, $\eta_p^2 = .18$ (see Figure 1). Post hoc

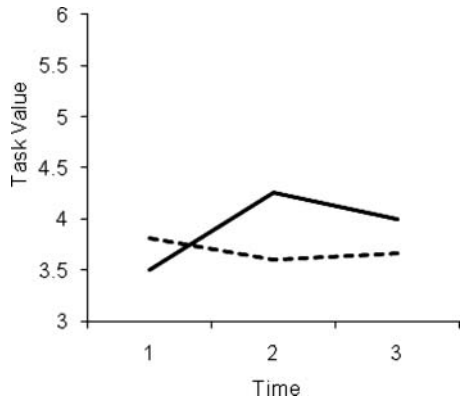

FIGURE 1 A statistically significant value-reappraisal x time interaction effect on task value is shown. Change over time is not statistically significant for the control group. The VR group increased significantly from Time 1 to 2 and Time 1 to 3, but change from Time 2 to 3 was not statistically significant. Time 1 = pretest. Time 2 = immediate posttest. Time 3 = two-week delayed posttest. Straight Line = VR group, Dotted Line = control group. Control ($n = 41$) and VR ($n = 41$).

tests using Bonferroni adjustments suggested that the control group did not make statistically significant gains or losses on task value over time. Conversely, the VR group made gains on task value from pretest to immediate posttest (difference in $M = 0.74$, $SE = 0.12$, CI = .44 to 1.04, $p < .01$, $d = .54$). These intervention effects were not found to attenuate significantly from immediate posttest to 2-week delayed posttest. Also, at the 2-week delayed posttest, students in the VR group still showed statistically significant gains on task value compared with their scores at pretest (difference in $M = 0.49$, $SE = 0.12$, CI = .20 to .78, $p < .01$, $d = .36$).

Endogenous Instrumentality

A similar pattern of results emerged for endogenous instrumentality as it did for task value. A strong VR was detected Time interaction ×, $F(1.98, 158.52) = 16.36$, $p < .01$, $\eta_p^2 = .17$ (see Figure 2). Post hoc tests using Bonferroni adjustments suggested that the control group did not make gains or losses on endogenous instrumentality over time. However, the value-reappraisal group made statistically significant gains on endogenous instrumentality from pretest to immediate posttest (difference in $M = 1.32$, $SE = 0.15$, CI = .94 to 1.70, $p < .01$, $d = .84$). These intervention effects were found to partially attenuate from immediate posttest to 2-week delayed posttest (difference in $M = –0.50$, $SE = 0.15$, CI = –.87 to –.14,

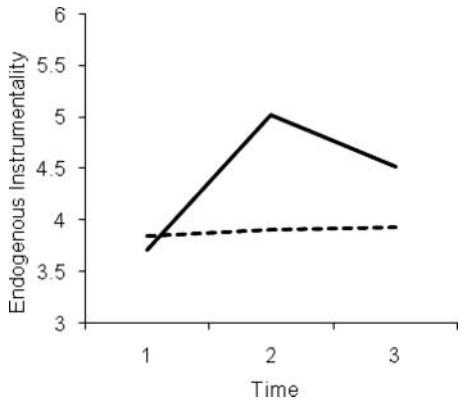

FIGURE 2 A statistically significant value-reappraisal x time interaction effect on endogenous instrumentality is shown. Change over time is not statistically significant for the control group. The VR group increased significantly from Time 1 to 2 and Time 1 to 3, and decreased significantly from Time 2 to 3. Time 1 = pretest. Time 2 = immediate posttest. Time 3 = two-week delayed posttest. Straight Line = VR group, Dotted Line = control group. Control ($n = 41$) and VR ($n = 41$).

$p < .01$, $d = -.33$). Despite this attenuation, the VR group made statistically significant gains on endogenous instrumentality from pretest to 2-week delayed posttest (difference in $M = 0.81$, $SE = 0.16$, CI = .42 to 1.21, $p < .01$, $d = .50$).

Self-Efficacy

Repeated measures ANOVA results revealed no statistically significant intervention effects on self-efficacy.

Choice-Behavioral Measure of Continued Interest

Whether or not students accessed two statistics Web sites that were posted on their course's Web site was tracked and used as a choice-behavior measure of interest in statistics. This measure was only administered to students in the Spring Semester and was thus limited to a total of 40 students (21 in the control group and 19 in the VR group). The data showed that all students who accessed one Web site also accessed the other website. Therefore, only one dichotomous outcome variable indicating whether or not students accessed both statistics Web sites was used. Of the 40 students, seven accessed both statistics Web sites that were posted (1 was in the control group and 6 were in the VR group; see Table 3). We used logistic regression to investigate intervention effects on this measure. First, we entered main and interactive effects of intervention group and instructor as predictors of choice behaviors. Because instructor and the interaction of instructor and intervention group were not statistically significant, they were removed from the model. The final model included intervention group as a predictor variable of the choice-behavior measure of interest in statistics, $\chi^2(1, N = 40) = 5.36$, $p < .05$, and explained approximately 13% of the variation in students' choice behaviors. As expected, a statistically significant VR main effect was detected (B = 2.22, SE = 1.14, p < .05, Odds Ratio = 9.23) (see Figure 1). This suggested

TABLE 3
Choice-BehaviorMeasure of Interest in Statistics by Group

	Accessed Websites		*Did Not Access Websites*	
	n	%	n	%
Control	1	4.8	20	95.2
Value Reappraisal	6	31.6	13	68.4

Note. Data on students' choice-behaviors were collected approximately 4 weeks after the administration of the VR intervention and control condition.

TABLE 4
Postintervention Standardized Exam Scores by Intervention Group and Instructor

	Instructor A			*Instructor B*		
	N	*Mean**	*SE*	*N*	*Mean**	*SE*
Control	22	.16	.2	19	$-.31_a$	.21
Value Reappraisal	22	−.22	.2	19	$.32_a$	.21

Note. Means sharing the same subscript are significantly different at $p < .05$.
*Means were adjusted for standardized pre-intervention exam scores.

that, on average, students in the VR group were 9.23 times more likely to access the statistics Web sites compared with students in the control group.

Postintervention Exam Performance

Another major purpose for this study was to investigate the effects of the VR intervention on students' postintervention exam performance. Furthermore, the possibility that the VR intervention differentially affected students' exam performance on the basis of which instructor they had or which semester they enrolled in the course needed to be examined. First, to check whether group differences existed on students' preintervention standardized exam scores, we conducted a 2 (VR − present or absent) × 2 (instructor: A or B) × 2 (semester: fall or spring) ANOVA. We detected no statistically significant group, instructor, or semester main effects or interactions on preintervention exam performance. Next, we analyzed students' postintervention standardized exam scores using a 2 (VR − present or absent) × 2 (instructor: A or B) × 2 (semester: fall or spring) analysis of covariance (ANCOVA), controlling for preintervention standardized exam scores. ANCOVA results suggested a statistically significant VR × Instructor interaction effect, $F(1, 73) = 5.93$, $p < .05$, $\eta_p^2 = .08$. Table 4 presents the adjusted means and standard errors for standardized postintervention exam scores by intervention group and instructor. For Instructor A's students, there was not a statistically significant effect of the VR intervention. However, for Instructor B's students, the VR group had significantly higher standardized postintervention exam scores compared with those of students in the control group (adjusted difference in $M = 0.62$, $SE = 0.30$, CI = .02 to 1.23, $p < .05$).

DISCUSSION

The hypotheses for task value and endogenous instrumentality were supported by the data. The VR group was found to make statistically significant gains on both

task value and endogenous instrumentality from pretest to immediate posttest and from pretest to 2-week delayed posttest. The control group, on the other hand, remained stable on these measures over time. Furthermore, measures of effect size suggested that the gains observed for the VR group were substantial, particularly on endogenous instrumentality. These findings suggest that the VR intervention was effective at helping students to place greater importance on the tasks in their statistics course and to increase how useful they think developing statistical knowledge and skills is for the attainment of their future goals.

The hypothesis for the choice-behavior measure of interest in statistics was also supported by the data. Results showed that students in the VR group were significantly more likely to access the statistics Web sites than were the students in the control group; despite that, overall, a small number of students accessed the Web sites. These findings imply that the VR Intervention may have helped some students generate an interest in learning about statistics, particularly because accessing the statistics Web sites was not a course requirement. Furthermore, these results show that the VR intervention was powerful enough to influence students' choices 4 weeks after receiving the intervention.

These findings add causal support to theory and research suggesting that value perceptions and choice behaviors can be modified through self-regulation interventions (Pintrich, 2000, 2004; Wolters, 1998, 2003). These results are promising because they suggest that students' preexisting value perceptions about learning statistics can be improved by presenting them with messages and guiding them in using self-regulatory strategies to explore the value of learning statistics.

Previous theory and research has suggested that providing students with purposes and reasons for engaging in academic tasks can help them to place more value on those tasks (Brophy, 1999; Hofer, 2002; Latham et al., 1988). Eccles et al. (1983) outlined four components of the value construct (attainment, utility, intrinsic, and cost), and this framework was used to help structure the arguments presented in the VR intervention. Using Eccles et al. framework may have contributed to the success of the intervention and could be important to consider when crafting an argument about the importance of academic tasks.

This study also helps to provide support for theory and research that has suggested that students can actively use strategies to increase the value they place on academic tasks (Pintrich, 2000, 2004; Wolters, 1998, 2003). Wolters's (1998) work in this area showed that students report using strategies to increase the value they place on their academic tasks. The current study adds to this line of research by showing that an intervention focused on guiding students in using value-reappraisal strategies (brainstorming, generating rationales, imagining, and contrasting pros and cons) can lead to increases in students' value-perceptions and influence students' choice behaviors. Accordingly, using value-reappraisal strategies may be important for self-regulating one's motivation.

Models of persuasion and conceptual change have tended to focus on the persuasive aspects of messages and personal characteristics of the participants (Bohner & Schwarz, 2001; Murphy, 2001) but have given relatively little attention to strategies that could be used to guide participants in actively processing messages through the central route. This study was unique because students were both presented with persuasive messages and guided in using value-reappraisal strategies to actively process those messages. Even though we did not examine the unique effect of value-reappraisal strategies on the study outcome variables, researchers interested in modifying attitudes may want to consider using value-reappraisal strategies to facilitate central-route processing of messages.

Although the VR intervention was successful at influencing students' value perceptions and choice behaviors, we did not find it to affect students' self-efficacy beliefs for successfully completing course tasks. This finding provides interesting data related to a causal relation between expectancies and values by suggesting that increasing value perceptions might not lead to short-term increases in self-efficacy. Bandura's (1997) theory and research suggested that self-efficacy beliefs are directly influenced by students' past successes and failures, vicarious experiences, verbal persuasion, and physiological arousal. If increasing students' value perceptions could lead students to have a greater number of successes in the course, then changes in self-efficacy beliefs could potentially be observed sometime after those successes were made. However, in this study, we measured students' self-efficacy beliefs only up to 2 weeks after students completed the VR intervention.

An effect of the VR intervention on students' exam performance was only observed for students who had Instructor B. For students who had Instructor A, the difference between the VR group and control group was not statistically significant. It is difficult to pinpoint why this effect was only observed for Instructor B. Although the exams had different items, the topics covered on each exam were similar for each instructor, and all students took the exam approximately 1 month after the intervention. This finding suggests that the VR intervention has the potential to positively affect students' learning and achievement in a course but that the benefit of the intervention might depend on and interact with other instructor and course factors. For instance, intervention effects on exam performance may be more pronounced in academic contexts in which there is little support offered to help prepare students for exams (e.g., review sessions, exam objectives, study tips). Also, students whose instructors effectively motivate them may benefit less from a motivational intervention.

Limitations

One limitation of this study was that students were nested within four sections of the course. Although stratified random assignment to interventions within each section allowed for meaningful comparisons between intervention groups, a study

with a more sufficient number of sections (at least 10) would allow for between class variance to be modeled hierarchically with participants at a lower level. Future studies could measure characteristics of the instructor and the course and examine them in interaction with the VR intervention. Another limitation of this study was that the sample was primarily women. It is, therefore, questionable whether these findings would generalize to male participants. Research on gender differences in math and science typically suggest that women have lower confidence and less interest in those subjects compared with men (see Wigfield & Eccles, 2002). Women may, therefore, be more likely to benefit from an intervention focused on increasing their value perceptions compared with men.

Future Research

While VR had positive impacts on students' values and choice behaviors, it is unclear what specific mechanisms within the intervention contributed to student gains. Students were asked to use a variety of value-reappraisal strategies (e.g., brainstorming attainment, utility, and intrinsic reasons for learning course content, generating rationales, imagining experiencing benefits resulting from learning course content, and contrasting benefits with costs of task engagement) and these strategies could have differentially affected students' values. A systematic investigation into the effects of different value-reappraisal strategies on students' values, choice behaviors, motivation, and achievement is an important area for future work. Furthermore, the messages students received about the reasons learning statistics might be important for them could have contributed to changes in students' values. The main and interactive effects of persuasive messages and value reappraisal strategies also need to be examined in future studies. In addition, it is important that future research examine the VR intervention over longer periods of time (e.g., months and years) and on other outcome measures (e.g., students' intentions to continue learning statistics and students' course enrollment decisions). It is also important to investigate whether students can be taught to successfully use value-reappraisal strategies on their own and without continual guidance from an intervention.

The high correlation between task value and endogenous instrumentality found in this study differed from previous research that found a fairly weak correlation between these measures (see Husman et al., 2004). However, the items used for each measure were not identical in both studies. In our research, we used a revised version of the endogenous instrumentality measure, and Husman et al. removed two items from the Task Value Scale because of poor reliability. More studies need to be conducted to further examine the uniqueness of these constructs. In future research on the VR intervention, we could try including either one general measure of task value or measuring specific components of the value construct.

Conclusion

Results from this study suggested that the VR intervention helped students to both increase the value they placed on learning statistics and develop a stronger understanding about how learning statistics could help them reach their future goals. The VR intervention was also found to positively affect students' choices to engage in learning activities related to statistics that were not required as part of the course. In addition, some tentative evidence was found that the VR intervention could increase students' performance on course exams but these benefits seemed to depend on unknown instructor and course factors which need to be further investigated in future research.

This research helps to address the growing economic and social needs to develop and test theory-based interventions aimed at increasing students' continued interest in math and science (National Science Foundation, 2006; U.S. Department of Education, 2006). The VR intervention could potentially be used in introductory statistics courses to help students increase the value they place on learning statistics. Because many undergraduate programs within the United States require successful completion of an introductory statistics course for graduation or entry into an upper division major, and because the number of students taking introductory undergraduate statistics courses has been reported to be increasing (Loftsgaarden & Watkins, 1998), this intervention may be relevant to a great deal of students. The VR intervention could also serve as a model for instructing students about the importance of learning course material in other math and science courses.

Theoretically, this research is important because it helps to expand and integrate research on self-regulation and motivation by examining an approach to modifying students' value perceptions that involves both presenting them with persuasive messages and guiding them in using value-reappraisal strategies. The framework used in this study could help guide other researchers interested in investigating the effects of persuasive messages and value-reappraisal strategies on students' value perceptions, continued interest, self-efficacy, and achievement in math, science, and statistics courses.

AUTHOR NOTES

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REFERENCES

Atkinson, J. W. (1964). *An introduction to motivation*. Princeton, NJ: Van Nostrand.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.

Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology, 45*, 1017–1028.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, *41*, 586–598.

Boekaerts, M., Renninger, K. A., Sigel, I. E., Damon, W., & Lerner, R. M. (2006). *Self-regulation and effort investment*. Hoboken, NJ: Wiley & Sons.

Bohner, G., & Schwarz, N. (2001). Attitudes, persuasion, and behavior. In A. Tesser & N. Schwarz (Eds.), *Blackwell handbook of social psychology: Intraindividual processes* (pp. 413–435). Malden, MA: Blackwell.

Brophy, J. (1999). Toward a model of the value aspects of motivation in education: Developing appreciation for particular learning domains and activities. *Educational Psychologist*, *34*(2), 75–85.

Chaiken, S. (1987). The heuristic model of persuasion. In M. P. Zanna, J. M. Olson, & C. P. Herman (Eds.), *Social influence: The Ontario Symposium* (Vol. 5, pp. 3–39). Hillsdale, NJ: Erlbaum.

Cleary, T., & Zimmerman, B. J. (2001). Self-regulation differences during athletic practice by experts, no-experts, and novices. *Journal of Applied Sport Psychology*, *13*, 61–82.

Corno, L., & Kanfer, R. (1993). The role of volition in learning and performance. *Review of Research in Education*, *19*, 301–341.

DeCorte, E., Verschaffel, L., & Masui, C. (2004). The CLIA-model: A framework for designing powerful learning environments for thinking and problem solving. *European Journal of Psychology of Education*, *19*, 365–384.

Dholakia, U. M., & Bagozzi, R. P. (2003). As time goes by: How goal and implementation intentions influence enactment of short-fuse behaviors. *Journal of Applied Social Psychology*, *33*, 889–922.

Dole, J. A., & Sinatra, G. M. (1998). Reconceptualizing change in the cognitive construction of knowledge. *Educational Psychologist*, *33*(2/3), 109–128.

Duncan, T. G., & McKeachie, W. J. (2005). The making of the motivated strategies for learning questionnaire. *Educational Psychologist*, *40*(2), 117–128.

Eccles, J. S. (2005). Studying gender and ethnic differences in participation in math, physical science, and information technology. *New Directions for Child & Adolescent Development*, *110*, 7–14.

Eccles, J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., et al. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motivation* (pp. 75–146). San Francisco: W. H. Freeman.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values and goals. *Annual Review of Psychology*, *53*, 109–132.

Fuchs, L. S., Fuchs, D., Prentice, K., Burch, M., Hamlett, C. L., Owen, R., et al. (2003). Enhancing third-grade students' mathematical problem solving with self-regulated learning strategies. *Journal of Educational Psychology*, *95*, 306–315.

Fullerton, J. A., & Umphrey, D. (2001, August). *An analysis of attitudes toward statistics: Gender differences among advertising majors*. Paper presented at the 84th Annual Meeting of the Association for Education in Journalism and Mass Communication, Washington, DC.

Gal, I., & Ginsburg, L. (1994). The role of beliefs and attitudes in learning statistics: Towards an assessment framework. *Journal of Statistics Education*, *2*(2). Retrieved April 28, 2007, from http://www.amstat.org/publications/jse/v2n2/gal.html

Gal, I., Ginsburg, L., & Schau, C. (1997). Monitoring attitudes and beliefs in statistics education. In I. Gal & J. B. Garfield (Eds.), *The assessment challenge in statistics education* (pp. 37–51). Amsterdam, The Netherlands: IOS Press.

Garfield, J., Hogg, B., Schau, C., & Whittinghill, D. (2002). First courses in statistical science: The status of educational reform efforts. *Journal of Statistics Education*, *10*(2). Retrieved April 28, 2007, from http://www.amstat.org/publications/jse/v10n2/garfield.html

Glaser, C., & Brunstein, J. C. (2007). Improving fourth-grade students' composition skills: Effects of strategy instruction and self-regulation procedures. *Journal of Educational Psychology*, *99*, 297–310.

Greenwald, A. G. (1968). Cognitive learning, cognitive response to persuasion, and attitude change. In A. Greenwald, T. Brock, & T. Ostrom (Eds.), *Psychological foundations of attitudes* (pp. 148–170). New York: Academic Press.

Hofer, B. (2002). Motivation in the college classroom. In W. J. McKeachie (Ed.), *McKeachie's teaching tips: Strategies, research and theory for college and university teachers* (11th ed.) (pp. 118–127). Boston, MA: Houghton Mifflin Co.

Husman, J., Derryberry, P. W., Crowson, M. H., & Lomax, R. (2004). Instrumentality, task value, and intrinsic motivation: Making sense of their independent interdependence. *Contemporary Educational Psychology, 29*, 63–76.

Kaplan, A., & Midgley, C. (1997). The effect of achievement goals: Does level of perceived academic-competence make a difference? *Contemporary Educational Psychology*, *22*, 415–435.

Kitsantas, A., Reiser, R. A., & Doster, J. (2004). Developing self-regulated learners: Goal-setting, self-evaluation, and organizational signals during acquisition of procedural skills. *The Journal of Experimental Education*, *72*, 269–287.

Kramarski, B., & Gutman, M. (2006). How can self-regulated learning be supported in mathematical e-learning environments? *Journal of Computer Assisted Learning*, *22*(1), 24–33.

Latham, G. P., Erez, M., & Locke, E. (1988). Resolving scientific disputes by the joint design of crucial experiments by the antagonists: Application to the Erez–Latham dispute regarding participation in goal setting. *Journal of Applied Psychology*, *73*, 753–772.

Loftsgaarden, D. O., & Watkins, A. E. (1998). Statistics teaching in colleges and universities: Courses, instructors, and degrees in fall 1995. *American Statistician*, *52*, 308–314.

Lynch, D. J. (2006). Motivational factors, learning strategies, and resource management as predictors of course grades. *College Student Journal*, *40*, 423–428.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, *41*, 954–969.

Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. *Journal of Educational Psychology*, *82*(1), 60–70.

Metallidou, P., & Vlachou, A. (2007). Motivational beliefs, cognitive engagement, and achievement in language and mathematics in elementary school children. *International Journal of Psychology*, *42*(1), 2–15.

Midgley, C., Maehr, M. L., & Urdan, T. (1993). *Manual for the Patterns of Adaptive Learning Survey (PALS)*. Ann Arbor: University of Michigan.

Mills, J. D. (2004). Students' attitudes toward statistics: Implications for the future. *College Student Journal*, *38*, 349–361.

Murphy, P. K. (2001). What makes a text persuasive? Comparing students' and experts' conceptions of persuasiveness. *International Journal of Educational Research*, *35*, 675–698.

Murphy, P. K., Holleran, T. A., Long, J. F., Zeruth, J. A. (2005). Examining the complex roles of motivation and text medium in the persuasion process. *Contemporary Educational Psychology*, *30*, 418–438.

National Science Foundation. (2006). *Investing in America's future: Strategic plan FY 2006–2011*. Retrieved June 16, 2008, from http://www.nsf.gov/pubs/2006/nsf0648/NSF-06-48.pdf

Oettingen, G., Pak, H., & Schnetter, K. (2001). Self-regulation of goal setting: Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology*, *80*, 736–753.

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 123–205). New York: Academic Press.

Petty, R. E., Ostrom, T. M., & Brock, T. C. (Eds.). (1981). *Cognitive responses in persuasion*. Hillsdale, NJ: Erlbaum.

Pham, L. B., & Taylor, S. E. (1999). From thought to action: Effects of process- vs. outcome- based mental simulations on performance. *Personality and Social Psychology Bulletin*, *25*, 250–260.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 452–502). San Diego, CA: Academic Press.

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, *16*, 385–407.

Pintrich, P. R., & DeGroot, E. V. (1990). Motivation and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*, 32–40.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A Manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)* (Technical Report No. 91-B-004). Ann Arbor, MI: National Center for Research to Improve Postsecondary Teaching and Learning.

Schunk, D. H. (1996). Goal and self-evaluative influences during children's cognitive skill learning. *American Educational Research Journal*, *33*, 359–382.

Schunk, D. H., & Ertmer, P. A. (1999). Self-regulatory processes during computer skill acquisition: Goal and self-evaluative influences. *Journal of Educational Psychology*, *91*, 251–260.

Schunk, D. H., & Ertmer, P. A. (2000). Self-regulation and academic learning: Self-efficacy enhancing interventions. In M. Boekaerts, P. R. Pintrich, and M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 631–649). San Diego, CA: Academic Press.

Simpkins, S. D., Davis-Kean, P. E., & Eccles, J. S. (2006). Math and science motivation: A longitudinal examination of the links between choices and beliefs. *Developmental Psychology*, *42*(1), 70–83.

Singer, J. L. (1975). Navigating the stream of consciousness: Research in daydreaming and related inner experience. *American Psychologist*, *30*, 727–738.

Stiff, J. B. (1994). *Persuasive communication*. New York: Guilford Press.

Torrance, M., Fidalgo, R., & Garcia, J. (2007). The teachability and effectiveness of cognitive self-regulation in sixth-grade writers. *Learning and Instruction*, *17*, 265–285.

U.S. Department of Education. (2006). *Answering the challenge of a changing world: Strengthening education for the 21st century*. Retrieved June 19, 2008, from http://www.ed.gov/about/inits/ed/competitiveness/strengthening/strengthening.pdf

Weinstein, C. E., Woodruff, T., & Awalt, C. (2002). *Becoming a strategic learner: LASSI instructional modules*. Clearwater, FL: H&H Publishing.

Wigfield, A., & Eccles, J. S. (1992). The development of achievement task values: A theoretical analysis. *Developmental Review*, *12*, 265–310.

Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology*, *25*(1), 68–81.

Wigfield, A., & Eccles, J. S. (2002). *Development of achievement motivation*. New York: Academic Press.

Wolters, C. A. (1998). Self-regulated learning and college students' regulation of motivation. *Journal of Educational Psychology*, *90*, 224–235.

Wolters, C. A. (2003). Regulation of motivation: Evaluating an underemphasized aspect of self-regulated learning. *Educational Psychologist*, *38*, 189–205.

Woods, B. S., & Murphy, P. K. (2001). Separated at birth: The shared lineage of research on conceptual change and persuasion. *International Journal of Educational Research*, *35*, 633–649.

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology*, *81*, 329–339.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). San Diego, CA: Academic Press.

Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal*, *29*, 663–667.

Writing Sample of Emily Miller Payne

Payne, E.M. (under review). Tutor and mentor training program evaluation. In K.S. Agee, & R.B. Hodges (Eds.), *CRLA handbook for training peer tutors and mentors.* (pp. TBA). College Reading and Learning Association: TBA.

Tutor and Mentor Training Program Evaluation

Emily Miller Payne
Texas State University-San Marcos

Postsecondary programs that deliver tutoring and mentoring services increasingly require more sophisticated and data-driven evaluation plans to meet the demands of institutional and funding accountability requirements. Those demands exert pressure on program planners to engage in targeted needs assessment, to attend to data that represent the program delivery process, to assess the impact of the program overall, and to report results to stakeholders at various levels. Outcome evaluations play a prominent role in education, especially when funding for education programs is scarce (Chen, 1996; Fitzpatrick, Sanders, & Worthen, 2004; Rossi, Lipsey, & Freeman, 2004; Scriven, 1996) because they monitor whether programs are achieving their goals sufficiently to continue to be funded.

The program outcome evaluation strategies that will be discussed here will help programs measure the effect that effective tutor and mentor training has on tutor and mentor performance and ultimately on their students' academic performance, study behaviors, and academic success (Kirkpatrick, 1994). The intent of this article is to help program managers plan and implement an effective program internal evaluation strategy for a tutor and mentor training program.

Needs Assessment

The first step in conducting an outcome evaluation of this nature is for the evaluation team, typically made up of stakeholders who are familiar with the program, to review the needs assessment that program planners conducted initially to guide the development of the tutor and mentor training program (Sonnichsen, 2000). Needs assessment data help the evaluation team learn about the history and origins of the program: What was the initial problem the program was developed to address, how has implementation of the program reduced the problem, and how do the goals and objectives of the program link to the results of the needs assessment?

Because a needs assessment represents the current need for the training program, the evaluators should use the data that established the need for the program in developing the evaluation plan (Gupta, 1999). However, if the needs assessment is outdated or if the program has shifted its focus or the personnel it trains, it may be necessary to conduct a new needs assessment prior to developing the evaluation plan. In order to determine the viability of the most recent needs assessment, the evaluators should talk with the staff who conducted the assessment and, if possible, with any stakeholders who participated. In a tutor and mentor training program, stakeholders can be students who receive tutoring and mentoring, faculty who teach the students who partake of the services, and others in the institution with knowledge of the training program. Once the evaluators have established the extent of the current need for the program, the next step is to plan the evaluation guided by the needs assessment data.

Program Evaluation Plan

The second step in the process is developing the comprehensive program evaluation plan. The evaluation team should develop a concise description of the nature of the program to be evaluated. How do program staff and stakeholders describe the training program? The evaluators should determine what elements or components from the program will be covered in the evaluation. If the evaluation covers tutor and mentor training for staff in a comprehensive learning center, the components could be extensive (e.g., how well tutors and mentors were trained to conduct outreach to students, to work with students in the intended settings, to conduct outreach to faculty), but if the evaluation covers one component or service (e.g., tutor training in a specific content area) the focus of the evaluation may be narrower and the evaluation plan less elaborate.

As the evaluation team develops the plan, it will be important to determine what existing data are available. Using for an example the tutor and mentor training for a learning center, the program probably already collects student satisfaction survey data and may collect feedback data from faculty who refer students to the center. If that is the case, the evaluators should plan to use as much existing data as possible in the evaluation plan. Many tutoring

programs use online or one-question exit surveys to gather student feedback; if this survey strategy works, it will be easier and more cost effective for the evaluators to incorporate the existing collection and analysis method into the plan. Most postsecondary programs have access to online services or survey software that makes data collection and analysis relatively seamless.

Next the evaluators should determine what new data can be collected relatively easily. Tutor and mentor training programs can ultimately touch many people, beyond the students with whom tutors and mentors work and the faculty who teach those students; therefore, the evaluator should think broadly when considering what data to collect and from whom. The intent of this article is to inform practitioners about outcome evaluations, but evaluators may also want to think about setting up a plan for an impact evaluation by which the latent effects of good tutor and mentor training might ultimately be measured.

A major task in developing evaluation instruments is determining the key questions to ask for both the formative (process) and summative (product) evaluation. Logically, the program evaluation questions should reflect the needs assessment questions if the needs assessment was done thoroughly and if the questions are current and relevant (Holden, 2008). If the program depends on external funding from a grant or other external source to support the tutor and mentor training, the funding source may require that the evaluation address specific questions related to the effectiveness of operations; if that is the case, the evaluators should address the funder's questions as part of the plan. If the evaluation involves getting feedback from multiple stakeholder groups, it may make sense to develop more than one instrument in order to keep the instrument length manageable and to focus specific questions to the stakeholders who can offer the most relevant input.

A second consideration in developing the questions for assessment instruments is the institutional reporting line of the tutor and mentor training program. Whether the program reports to multiple divisions (e.g., academic affairs and student affairs) or to just one division, the evaluators should inquire about specific information administrators up the reporting line will require in an evaluation of the program.

Once the evaluation team has developed and piloted questions to ask of stakeholders, it is time to consolidate them into one or more instruments. If the evaluation will solicit input from stakeholders with very different connections to the program, such as students and faculty, multiple instruments targeting the specific populations' interests would be in order. The reporting authority may call for answers that are quantitative (such as Likert scale responses) or qualitative (such as open-ended responses) or a combination of the two. Generally speaking, a combination of quantitative and qualitative questions will offer a more comprehensive picture of the training program, but evaluators should consult with program staff about the specific needs of the funding source and reporting lines.

Data Collection and Analysis

Data for a program evaluation can be gathered through various means, and typically the least complicated strategies are the best. If the tutor and mentor training program currently gathers data using an electronic instrument in an online medium like Blackboard™ or other commercially available survey systems such as Survey Monkey™ or MR Interview™, and if that system works well, the evaluators should consider staying with what works and is familiar to the stakeholders. If the current data collection system depends on collecting and analyzing hand-written data, staying with the current system is an option to consider; however, the evaluators and the training program manager may want to explore more efficient and less expensive means of collecting ongoing data.

Evaluation of large amounts of quantitative data, if the data collection is well planned, can be as simple as downloading from Survey Monkey™ or MR Interview™ into an SPSS program. Data sets that are less complicated or less robust may be a good match for a well-designed spreadsheet available in most comprehensive software programs. Large quantities of qualitative data collected via open-ended questions in an online survey can be analyzed by using a commercially packaged qualitative data management and analysis software package such as HyperRESEARCH™. If the qualitative data are limited to only a few questions with no more than 50 or so respondents, analysis by hand may be more efficient. Many good sources can guide the evaluation team through that sort of analysis (Lichtman, 2010; Punch, 2009). Typically, program evaluation benefits from qualitative data gathered by the evaluator or his or her surrogate in the form of interviews or observations. Interview and observation data tend to be qualitative and robust and will, therefore, require more time and experience in the analysis phase (Punch, 2009).

Evaluation Reports

Once the data are collected and analyzed, the evaluation team must determine who is to be the intended audience or audiences to whom the report will be directed. In preparing the evaluation report for a tutor or mentor training program, it may be appropriate to plan, at a minimum, reports with two or three levels of detail: A comprehensive report for the program staff, an overview report for primary stakeholders such as administrators immediately above program staff, and an executive summary of the results for upper administration, students served by the tutoring and mentoring services, and other interested parties (Sonnichsen, 2000). Programs often report the results of a good evaluation via the campus newspaper or the institution's public affairs office, and for those purposes the executive summary is typically sufficient. Program staff should determine in advance how they intend to use the results of the evaluation in order to gain maximum advantage from the reports.

The second factor to consider is whether the funder or institution requires that the evaluation team reports the results on a specific form or in a particular format. If the report is part of a training program's accountability plan with the institution or funder, a prescribed form or format are probably specified. If no form or format is specified, the program staff and the evaluators should discuss what format will showcase the results best.

Evaluation should be a natural part of program planning and administration; this is especially true of training programs that must continually reevaluate effectiveness to remain viable. Ultimately, the completed evaluation will allow all stakeholders in the tutor or mentor training program to understand which processes are working and which require revision. The process and the resulting report can be invaluable as a planning tool for the future of the training program.

References

Chen, H. (1996). A comprehensive typology for program evaluation. *Evaluation Practice, 17*, 121-130.

Fitzpatrick, J. L., Sanders, J. R., & Worthen, B. R. (2004). *Program evaluation: Alternative approaches and practical guidelines* (3rd ed.). Boston, MA: Pearson Education.

Gupta, K. (1999). *A practical guide to needs assessment.* San Francisco, CA: Jossey-Bass.

Holden, D. J. (2008). *A practical guide to program evaluation planning: Theory and case examples*. Thousand Oaks, CA: Sage.

Kirkpatrick, D. L. (1994). *Evaluating training programs: The four levels*. San Francisco, CA: Berrett-Koehler.

Lichtman, M. (2010). *Understanding and evaluating qualitative educational research.* Thousand Oaks, CA: Sage.

Punch, K. (2009). *Introduction to research methods in education*. Thousand Oaks, CA: Sage.

Rossi, P. H., Lipsey, M. W., & Freeman, H. E. (2004). *Evaluation: A systematic approach* (7th ed.). Thousand Oaks, CA: Sage.

Scriven, M. (1996). Types of evaluation and types of evaluator. *Evaluation Practice, 17,* 151-161.

Sonnichsen, R. C. (2000). *High impact internal evaluation: A practitioner's guide to evaluating and consulting inside organizations*. Thousand Oaks, CA: Sage.

Attachment D: Evaluation Budget

I. RFP Budget Line Item	II. Item Description	III. Purpose and Explanation	IV. Percent of Time on Project	V. Amount (July 1, 2011 through August 31, 2011)	VI. Amount (September 1, 2011 through August 31, 2012)	VII. Amount (September 1, 2012 through October 31, 2012)	VIII. Total Amount
10.7.1	**Principal Investigator and Co-investigator(s)**			**$ -**	**$ 32,042.98**	**$ -**	**$ 32,042.98**
		Dr. Eric Paulson, PI	25%	$ -	$ 11,845.03	$ -	$ 11,845.03
		Dr. Taylor Acee, Co-PI	25%	$ -	$ 12,445.79	$ -	$ 12,445.79
		Dr. Selina V. Mireles, Co-PI	25%		$ 7,752.16	$ -	$ 7,752.16
10.7.2	**Other Professional Staff**			**$ 1,115.84**	**$ 9,045.17**	**$ 1,487.78**	**$ 11,648.79**
		Dr. Emily Miller Payne		$ -	$ 1,000.00	$ -	$ 1,000.00
		TBN (1), Doctoral Research Assistant	25%	$ 1,115.84	$ 8,045.17	$ 1,487.78	$ 10,648.79
10.7.3	**Support Staff**			**$ 1,350.00**	**$ 5,400.00**	**$ 1,100.00**	**$ 7,850.00**
		Program Coordinator	5%	$ 375.00	$ 1,500.00	$ 250.00	$ 2,125.00
		Logistics Coordinator	5%	$ 375.00	$ 1,500.00	$ 250.00	$ 2,125.00
		Technology Support	20%	$ 600.00	$ 2,400.00	$ 600.00	$ 3,600.00
10.7.4	**Fringe Benefits**			**$ 410.49**	**$ 11,502.91**	**$ 403.72**	**$ 12,317.13**
10.7.5	**Travel**			**$ -**	**$ 5,036.50**	**$ -**	**$ 5,036.50**
		Site visits (18)		$ -	$ 4,005.00	$ -	$ 4,005.00
		Round-trip to Austin		$ -	$ 31.50	$ -	$ 31.50
		Planning Committee Meetings (2)			$ 1,000.00	$ -	$ 1,000.00
10.7.6	**Professional or Other Fees**			$ -	$ -	$ -	$ -
10.7.7	**Student Incentives (if applicable)**			**$ -**	**$ -**	**$ -**	**$ -**
10.7.8	**Other Direct Costs**			**$ 5,250.00**	**$ 22,750.00**	**$ 3,000.00**	**$ 31,000.00**
		Resource Materials		$ 1,750.00	$ 3,750.00	$ 1,250.00	$ 6,750.00
		Resource Materials for EABEs		$ -	$ 9,000.00	$ -	$ 9,000.00
		Program Supplies and Materials		$ 1,000.00	$ 3,000.00	$ 500.00	$ 4,500.00
		M&O		$ 1,000.00	$ 3,000.00	$ 500.00	$ 4,500.00
		Technology Support		$ 1,500.00	$ 4,000.00	$ 750.00	$ 6,250.00
		Total ALL Program Costs					$ 99,895.39
	Cost Sharing from Applicant			$ 4,000.00	$ 4,000.00		$ 8,000.00
		College of Science - Student Worker		$ 2,000.00	$ 2,000.00		$ 4,000.00
		Department of Curriculum and Instruction - Student Worker		$ 2,000.00	$ 2,000.00		$ 4,000.00
		Proposal Amount (Equals ALL Program Costs LESS Cost Sharing)		$ -	$ -		$ 99,895.39

Attachment E: Letters of Support

Attachment E-1: Letter of Support from the Chair of the Department of Curriculum & Instruction

Attachment E-2: Letter of Support from the Chair of the Department of Mathematics

Attachment E-3: Letter of Support from the Dean of the College of Education

Attachment E-4: Letter of Support from the Dean of the College of Science

TEXAS STATE UNIVERSITY
SAN MARCOS
The rising STAR *of Texas*

June 6, 2011

To Whom It May Concern:

In my position as Chair of the Department of Curriculum & Instruction at Texas State University– San Marcos, I want to offer my enthusiastic support of the goals and objectives of the Evaluation of the Adult Basic Education Innovation Grant Program proposed by Curriculum & Instruction faculty Dr. Eric Paulson and Dr. Taylor Acee, and Department of Mathematics faculty Dr. Selina Mireles.

The goal of the proposed project is to conduct external evaluations of Adult Basic Education Innovation Grant project sites throughout the state of Texas. I support this goal, and am willing to commit department resources, if necessary, to help insure the success of this project. For example, to begin the project, the Department of Curriculum & Instruction is willing to commit $8hr x 10 hrs/wk x 25 weeks = $2,000.00 per year to hire a graduate student to assist with the program.

Please let me know if I can offer any additional information to this letter of support.

Sincerely,

Patrice Werner

Patrice Werner, Ph.D.
Chair, Department of Curriculum & Instruction

CURRICULUM & INSTRUCTION DEPARTMENT
601 UNIVERSITY DRIVE | SAN MARCOS, TEXAS 78666-4616 | *phone* 512.245.2157 | *fax* 512.245.7911 | WWW.TXSTATE.EDU

TEXAS STATE UNIVERSITY
SAN MARCOS
The rising STAR *of Texas*

June 6, 2011

To Whom It May Concern:

As Dean of the College of Education at Texas State University - San Marcos, I am pleased to offer my enthusiastic support of the goals and objectives of the Evaluation of the Adult Basic Education Innovation Grant Program proposed by Curriculum & Instruction faculty members Dr. Eric Paulson and Dr. Taylor Acee, and Department of Mathematics faculty member Dr. Selina Mireles.

The goal of the proposed project is to conduct external evaluations of Adult Basic Education Innovation Grant project sites throughout the state of Texas. Their evaluation design focuses on process data, efficacy of ongoing implementation of project initiatives, and potential for scalability, with the potential to lead to a community of practice that will continue to explore, identify, and evaluate effective ways to improve these initiatives.

I am pleased to support this project. Please let me know if I can offer any additional information to this letter of support.

Sincerely,

Stan Carpenter

Stan Carpenter, Dean
College of Education

COLLEGE OF EDUCATION
601 UNIVERSITY DRIVE | SAN MARCOS, TEXAS 78666-4616 | *phone* 512.245.2150 | *fax* 512.245.3158 | WWW.TXSTATE.EDU

TEXAS STATE UNIVERSITY
SAN MARCOS
The rising STAR *of Texas*

June 7, 2011

To Whom It May Concern:

As Chair of the Department of Mathematics at Texas State University – San Marcos, I enthusiastically support the goals and objectives of the Evaluation of the Adult Based Education Innovation Grant Program proposed by Dr. Selina Mireles of the Department of Mathematics and Drs. Eric Paulson and Taylor Acee of the Department of Curriculum & Instruction. I have worked closely with Dr. Mireles on other projects and have found her to be very competent in her field and very knowledgeable of current education trends. She is aware of the national need in developmental mathematics education and has been deeply involved over the years in studying the educational issues and problems and in contributing to their solutions. The currently proposed project's goal is to conduct an external evaluation of the Adult Basic Education Innovation Grant Programs throughout the state of Texas. I support this goal, and am willing to further commit department resources, if necessary, to help insure the success of this project. Already, we have allotted space to serve the needs of the Mathematics Readiness Clinic. I believe the department's Mathematics Education Ph.D. program will also complement the project.

Best regards,

S Wayment by HJ

Stanley G. Wayment, Chair
Department of Mathematics

DEPARTMENT OF MATHEMATICS
601 University Drive | San Marcos, Texas 78666-4616 | *phone:* 512.245.2551 | *fax:* 512.245.3425 | WWW.TXSTATE.EDU/MATH

TEXAS STATE UNIVERSITY
SAN MARCOS
The rising STAR *of Texas*

June 7, 2011

To whom it may concern,

I am happy to support the Evaluation of the Adult Basic Education Innovation Grant Programs project as proposed by Dr. Selina Vásquez Mireles and her colleagues. The proposed effort will greatly strengthen the effect of the Adult Basic Education Innovation Grant Programs that have begun in Texas. Dr. Mireles has a strong research record in developmental education, and she is an ideal person to conduct the proposed research.

To begin the project, the College of Science is willing to commit $8hr x 10 hrs/wk x 25 weeks = $2,000.00 per year to hire an undergraduate student to assist with the program.

Sincerely,

Dr. Stephen B. Seidman
Dean, College of Science

COLLEGE OF SCIENCE
601 UNIVERSITY DRIVE | SAN MARCOS, TEXAS 78666-4616 | *phone* 512.245.2119 | *fax* 512.245.8095 | WWW.TXSTATE.EDU

Attachment F: Sample Instruments

Attachment F-1: Site visit protocol

Attachment F-2: Theoretical Framework of Rubric

Attachment F-3: THECB Suggested Evaluation Report Template

Attachment F-4: Sample Institutional Review Board Application

Attachment F-1: Site visit protocol

Site Visit Protocol

1. Negotiate contact dates (pre-site visit (virtual), site visit, post-site visit (virtual)).
2. Establish logistics.
3. Host pre-site visit (virtual).
    a. Use rubric to identify project components.
    b. Establish intervention effectiveness evaluation including tutorials on building self-evaluation tools especially methodology and understanding quantitative and qualitative data collection and analysis.
    c. Communicate site visit expectations and agenda.
    d. Provide technical assistance.
4. Conduct site visit.
    a. Host institution presents program description.
    b. ABE-IG evaluation team observes interventions at work.
    c. ABE-IG evaluation team meets with program faculty, staff, and students.
    d. ABE-IG evaluation team works collaboratively with ABE-IG site to complete intervention identification rubric.
    e. ABE-IG evaluation team provides technical assistance.
5. Host post-site visit (virtual).
    a. Provide feedback and recommendations.
    b. Provide suggestions for practice.
    c. Provide technical assistance.

Attachment F-2: Theoretical Framework of Program Component Identification Rubric

ABE-IG Program Components: Postsecondary and Workforce Training Models (10.1)					
Program Component	**Essential Element**	**Existing**	**Developing**	**Expanding**	**Examples**
One-to-One or Small-group Advising (10.1.2)					
Notes					
Workforce Training Models (10.1.3) (I-BEST, Concurrent Enrollment, Alternative Models)					
Notes					
Alternative standardized English language assessments (10.2.1)					
Notes					

ABE-IG Program Components: Partnerships (11.1.1) Two partnerships are required.					
Program Component	**Essential Element**	**Existing**	**Developing**	**Expanding**	**Examples**
Partnerships with local adult education or social service provider					
Notes					
Partnerships with local LWDB					
Notes					

ABE-IG Program Components:
Student Support Services (11.1.2)

Must create and/or expand the availability and quality of academic advising, counseling, and retention services for ABE students.

Program Component	Essential Element	Existing	Developing	Expanding	Examples
provide counseling and support services, and perhaps child-care, during times appropriate for prospective working adult students (i.e. evening and weekend access times).					
Notes					
Types of support services may include: academic advising, counseling services, financial advising, career counseling, retention counseling, and other wrap-around services that will increase the likelihood of student success and persistence.					
Notes					

ABE-IG Program Components:
Faculty Development Access and Participation (11.1.3)

Must include a plan to increase the availability of faculty development opportunities related to ABE transition to postsecondary, workforce readiness, team teaching, curriculum development and alignment

Program Component	Essential Element	Existing	Developing	Expanding	Examples
Notes					
Training content must use the most recent evidence-based instructional strategies.					
Notes					
Projects should include an opportunity for follow up activities and technical assistance where applicable.					
Notes					
Activities should focus on expanding the knowledge-base of faculty that is demonstrated through improved student outcomes					
Notes					

ABE-IG Program Components:
Augmented Academic Support (11.1.5)

Must include academic support activities as integral components of the program.

Program Component	Essential Element	Existing	Developing	Expanding	Examples
Academic support may include tutoring, purposeful orchestration of academic and social integration, or integrated academic advising based on developmental growth theories.					
Notes					

ABE-IG Program Components:
Monitoring, Mentoring, Counseling and Case-Management (11.1.6)

provision for a key person(s) who monitors student success throughout their enrollment in the ABE to career pathway program

Program Component	Essential Element	Existing	Developing	Expanding	Examples
The ABE/ESL instructor and technical instructor should meet at least once a week to discuss individual student progress and coordinate instructional and support efforts to assist students facing challenges. At least twice a month the instructional team should meet with key support staff to identify problems and solutions to facilitate student progress. Student support and follow-up should continue for at least one year after completion of job training.					
Notes					

ABE-IG Program Components:
Data Collection (11.1.7)

Objective	Data Type	Plan to Collect	Data Collection Tool	Timeline to Collect Data	Outcome
Notes					
Notes					
Objective	**Data Type**	**Plan to Collect**	**Data Collection Tool**	**Timeline to Collect Data**	**Outcome**
Notes					
Notes					
Objective	**Data Type**	**Plan to Collect**	**Data Collection Tool**	**Timeline to Collect Data**	**Outcome**
Notes					
Notes					

ABE-IG Optional Program Components (11.2)

Program Component	Essential Element	Existing	Developing	Expanding	Examples
Incentives to Students					
Notes					
Peer Academic Support Groups					
Notes					
Long-term Student Support					
Notes					
(Other Promising Components)					
Notes					

ABE-IG Integration of Texas College and Career Readiness Standards (CCRS) (11.1.4)

Content Area and/or Certification Program	*Existing* CCRS Performance Expectations	*Absent* CCRS Performance Expectations	*Potential* CCRS Performance Expectations	Plan for Implementing CCRS Performance Expectations
Notes				
Notes				
Notes				
Notes				
Notes				
Notes				

Attachment F-3: THECB Suggested Evaluation Report Template

APPENDIX C - THECB SUGGESTED EVALUATION REPORT TEMPLATE[1]

I. Executive Summary (1 page maximum)
   a. Brief program description
   b. Key highlights findings (bulleted)
   c. Key Recommendations (bulleted)

   (Section I should be able to stand alone if pulled out from the full document. Use bullets where appropriate. Keep all text short and clean and to the point)

II. Introduction
   a. Brief history of the program (where applicable)
   b. Theoretical background of the program such as relevant literature, statute, policies, if applicable

III. Brief Description of Key Program Components
   a. Goals (long and short term)
   b. Inputs (resources, people)
   c. Outputs (people served by the program by relevant categories and characteristics)

IV. Evaluation Methods
   a. Research questions
   b. Briefly describe participants (samples/subsets/groups in analyses); procedures; measures/indicators; and data collection instruments/tools.
   c. Explain how all items above will document the goals, inputs, outputs, and outcomes.

V. Results/Outcomes
   a. Organize by research questions (not by data source) (use graphs and charts as appropriate)
   b.

VI. Summary/Conclusion
   a. General summary
   b. Strengths and limitations of the study
   c. Next steps
   d. Recommndations (as appropriate and in consulation with THECB research and evaluation staff).

VII. References (where applicable)

Appendix A: Separate reports on individual program sites (where applicable)

Appendix B-ZZ: Copies of instruments used (where applicable)

[1] All reports to the THECB should comply with the THECB Style manual. Awarded Applicant will be provided with a copy of the style manual.

Attachment F-4: Sample Institutional Review Board Application
Application for IRB Exemption Data Sheet

IRB Exemption Application Number: EXP2010C5141
Section I

1. This project is: Funded Research

2. If you are a student, please provide your supervising faculty member's full name:

Section II

1. If this is an academic or classroom project, does the scope extend beyond Texas State University?

No

2. Would you describe this project as "a systematic investigation, designed to develop or contribute to generalizable knowledge?

Yes

3. Will the results of your project be put on the internet, shared at a conference, published, or otherwise disseminated?

Yes

4. Will identifiable private information from individuals be collected from contact with research participants ?

No

5. Will identifiable private information from individuals be collected from other sources (e.g. medical records)?

No

6. Does the project involve fetuses, pregnant women or human in vitro fertilization?

No

7. Does the project involve prisoners?

No

8. Does the project involve any persons who are mentally impaired or homeless or who have limited autonomy?

No

9. Does the project involve the review of medical records if the information is recorded in such a way that subjects can be identified, directly or through identifiers linked to the subjects?

No

10. Does the project involve survey or interview techniques which include minors as subjects in which the researcher(s) participate in the activities being observed?

No

11. Will a drug, biological product, medical device, or other product regulated by the FDA be used in this project?

No

12. Will the participants be asked to ingest substances of any kind?

No

13. Will the participants be asked to perform any physical tasks?

No

14. Does the research attempt to influence or change participants' behavior, perception, or cognition?

Yes

15. Does the project involve questions or discussions of sensitive or deeply personal aspects of the subject's behavior, life experiences or attitudes? Examples include substance abuse, sexual activity, sexual orientation, sexual abuse, criminal behavior, sensitive demographic data, detailed health history, etc.

No

16. Does the project involve techniques which expose the subject to discomfort, harassment, embarrassment, stigma, alarm or fear beyond levels encountered in the daily life of a healthy individual?

No

17. Does the project involve the deception of subjects?

No

18. Does the project involve videotaping or audiotaping of subjects?

No

Section III

1. If you are choosing one of the six federal categories of exemption, which **one** are you choosing?
**If your project falls under more than one exemption, choose the one that is most applicable. You may cite the others in #3 below.

Category 1 (ii)

Please note for questions 1, 3, and 4 :
The text areas are limited to 2000 characters/approximately 300 words. Even though you are allowed to type more than the specified limit, those additional words/characters will be cropped/cut off when you move to the next question.

2. What is the purpose of the project? (300 words or less)

The purpose of the project is to develop, demonstrate, and evaluate (1) innovative course options for mathematics, reading, and learning support; (2) on-line, non-course based thematic mathematics and learning support modules; (3) a systemic, unified curricular component based on the Texas College & Career Readiness Standards Cross Disciplinary Standards to be incorporated into each developmental education course; and, (4) institutional frameworks that systemically afford equity and access to

underprepared learners.

3. Explain how this exemption category pertains to your project: (300 words or less)

Category 1 (ii) pertains to this project in that the effectiveness of curricular innovative options will be evaluated. Furthermore, research-based instructional techniques already proven to be effective with developmental education students will be utilized.

4. If you believe your project poses no risk to human participants or should be exempt from IRB review for other reasons, please explain: (300 words or less)

This project poses no risk to human participants and should be exempt from IRB review.

Exempt Categories of Research listed at 45 CFR, Part 46, Sec. 101(b)
(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as
(i) research on regular and special education instructional strategies, or
(ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and
(ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.
(Note: Surveys on sensitive or personal topics which may cause stress to study participants may not be exempt from review.)
(Note: The section of this category pertaining to standardized educational tests may be applied to research involving children. This category may also apply to research with children when the investigator observes public behavior but does NOT participate in that behavior or activity. However this section is NOT applicable to survey or interview research involving children.)
(3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (2) of this section, if:
(i) the human subjects are elected or appointed public officials or candidates for public office; or
(ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.
(Example: existing data, records review, pathological specimens)
(Note: This data must be in existence before the project begins)
(5) Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine:
(i) public benefit or service programs;
(ii) procedures for obtaining benefits or services under those programs;
(iii) possible changes in or alternatives to those programs or procedures; or
(iv) possible changes in methods or levels of payment for benefits or services under those programs.
(Note: Exemption category refers to federal government research)
(6) Taste and food quality evaluation and consumer acceptance studies,
(i) if wholesome foods without additives are consumed or
(ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food & Drug Administration or approved by the Environmental Protection Agency or the Food Safety & Inspection Service of the U.S. Dept of Agriculture

Attachment H: References

Acee, T.W., & Weinstein, C.E., (2010). Effects of a value reappraisal intervention on statistics students' motivation and performance. *Journal of Experimental Education, 78,* 487-512. doi:10.1080/00220970903352753

Acee**,** T.W., et al. (2010). Academic boredom in under- and over-challenging situations. *Contemporary Educational Psychology, 35,* 17-27. doi:10.1016/j.cedpsych.2009.08.002

Cohen, A. M. & Brawer, F. B. (2008). *The American Community College* (5th Ed.). San Francisco, CA: Jossey-Bass.

Comings, J. P., Beder, H., Bingman, B., Reder, S., & Smith, C. (2003). Establishing an evidence-based adult education system. *NCSALL Occasional Paper,* National Center for the Study of Adult Learning and Literacy, Harvard Graduate School of Education.

Cousins, J. B., Donohue, J. J., & Bloom, G. A. (1996). Collaborative evaluation in North America: Evaluators' self-reported opinions, practices, and consequences. *Evaluation Practice, 17* 207-226.

Jenkins, D., Zeidenberg, M., & Kienzl, G. (2009). Educational outcomes of I-BEST Washington State Community and Technical College System's Integrated Basic Education and Skills Training Program: Findings from a Multivariate Analysis. *CCRC Working Paper No. 16,* Community College Research Center, Teachers College, Columbia University.

Joint Committee on Standards for Educational Evaluation (JCSEE). (2011). *The program evaluation standards: Summary Form.* http://www.eval.org/evaluationdocuments/progeval.html

McDougall, G.J., Becker, H., Pituch, K., Acee, T.W., Vaughan, P., & Delville, C. (2010). The SeniorWISE study: Improving everyday memory in older adults. *Archives of Psychiatric Nursing*, *24*(5), 291-306. doi:10.1016/j.apnu.2009.11.001

Mireles, S. V. (2010, Spring). Developmental mathematics program: A model for change. *Journal of College Reading and Learning*, *40*(2), 81-90.

Paulson, E. J., Alexander, J., & Armstrong, S. (2007). Peer review re-viewed: Investigating the juxtaposition of composition students' eye movements and peer-review processes. *Research in the Teaching of English*, *41*(3), 304-335.

Stevens, D. D. & Levi, A. (2005). *Introduction to rubrics: An assessment tool to save grading time, convey effective feedback, and promote student learning*. Sterling, VA: Stylus.

Taggart, G. L. (Ed.). (1998). *Rubrics: A handbook for construction and use*. Lancaster, PA: Technomic.

Texas Center for the Advancement of Literacy and Learning. (2008). *Texas Adult Education Standards and Benchmarks for ABE ASE and ESL Learners.*

Texas Higher Education Coordinating Board (THECB). (2008). *Texas College and Career Readiness Standards (TX CCRS).*

Vásquez, S. (2004, Spring). A report on the effectiveness of the developmental mathematics program M.Y. Math Project – Making Your Mathematics: Knowing when and how to use it. *Mathematics and Computer Education, 38*(2), 190-195.

Weinstein, C.E., Acee, T.W., & Jung, J. (2010). Learning strategies. In B. McGaw, P.L. Peterson, & E. Baker (Eds.) *International Encyclopedia of Education* (3rd ed., pp. 323-329). New York, NY: Elsevier.

Yarbrough, D. B., Shulha, L. M., Hopson, R. K., and Caruthers, F. A. (2011). *The program evaluation standards: A guide for evaluators and evaluation users* (3rd ed.). Thousand Oaks, CA: Sage

George, D., & Mallery, P. (2010). *SPSS for Windows step by step: A simple guide and reference 18.0 update (11th ed.).* Prentice Hall.

THECB Contract Number: **BMS 7154**

STATE OF TEXAS §
COUNTY OF TRAVIS §

INTERAGENCY CONTRACT

This Contract is entered into by and between the Texas State Agencies shown below as Contracting Parties, pursuant to the authority granted and in compliance with the provisions of the Interagency Cooperation Act, Texas Government Code, Chapter 771.

Section 1.0 CONTRACTING PARTIES:

Receiving Agency: Texas Higher Education Coordinating Board
1200 East Anderson Lane
Austin, Texas 78752

Performing Agency: Texas State University – San Marcos
601 University Drive
San Marcos, Texas
78666

Performing Contractor's Remittance Address
(if different from Permanent Mailing Address listed above):

Same as above

Section 2.0 PURPOSE:

Conduct program evaluation of the Texas Higher Education Coordinating Board (THECB) Adult Basic Education Innovation Grant (ABE-IG)

Section 3.0 STATEMENT OF SERVICES TO BE PERFORMED:

A. **SERVICES:** During the Contract Term, the Performing Agency shall provide the following services ("Services"):

The Services anticipated are discussed in further detail in the Request for Applications from which this Contract resulted and in Performing Agency's Application (and any addenda thereto). Both the RFA and the Performing Agency's Application (and any addenda thereto) are fully incorporated into this Contract. As a summary, the evaluation must include:

- Within the first month after the contract is signed, submit a revised, detailed evaluation plan, time line and budget, with critical dates for deliverables for the review and approval of THECB staff, allowing for the increased budget of up to $299,895 with up to eight (8) additional sites and extending the end date to August 31, 2013.
- Assisting all ABE-IG project sites in the design and implementation of a rigorous evaluation (randomized controlled trial or quasi-experimental), in consultation with designated THECB staff, of either the (a) integrated academic advising, or (b) integrated vocational English as a second language (VESL)/ABE (or basic skills) and technical certificate program.

- Developing standard survey instruments, focus group and observational protocols for a cross-site process evaluation of both the (a) integrated academic advising, and (b) integrated vocational ESL/ABE (or basic skills) and technical certificate program, in consultation with THECB staff.
- Assisting all ABE-IG project sites in implementing the use of survey instruments, focus groups and observational protocols to collect process data for their sites.
- Conducting a minimum of two, two-day site visits per project site between September 1, 2011, and August 1, 2013. The purpose of the site visits is to conduct targeted observations, interviews, and focus groups of students, faculty, and counseling and administrative staff.
- Preparing interim evaluation reports due December 16, 2011, August 1, 2012, and one final report due August 1, 2013, using the final report template and process prescribed by the THECB research and evaluation staff. Reports should include recommendations, based on research, for the scalability of existing programs and the dissemination of effective practices to other sites.
- Assisting higher education institution sites in acquiring institutional review board (IRB) or other appropriate approval for all aspects of the program evaluation, including long-term tracking of student success by the THECB.
- Providing technical assistance in data collection, analysis, and reporting to the project sites. Ensure that high quality, standardized procedures are used to measure the success of targeted program components. (Project sites are encouraged to target their own evaluation efforts on a limited and reasonable number of specific interventions.)

B. CHANGE ORDERS OR AMENDMENTS: Performing Agency shall maintain an ongoing relationship with THECB during the Contract Term and will collaborate with the THECB on any modifications that may be necessary to the Services to meet the objectives of this Contract. A change may not be made to the Services except by a written request for change signed by the THECB and Performing Agency (a "Change Order" or "Amendment"). Each Change Order shall be sequentially numbered and deemed to automatically incorporate the terms of this Contract. Any alterations, additions, or deletions to the terms of this Contract shall be by an Amendment or Change Order in writing and executed by both Parties to this Contract. All amendments shall be approved by THECB's Program Manager prior to THECB's execution. No contract amendment shall occur without the issuance of a written contract amendment by THECB's Contract Management Services office. Costs not included and pre-approved by THECB shall not be eligible for reimbursement.

To the extent applicable laws, regulations, court orders, or official interpretations require either Party to include additional language in its contracts, each agrees to amend this Contract and to cooperate in the execution of any amendment to this Contract necessary to effectuate such laws, regulations, court order, or official interpretations unless the effect of such laws, regulations, orders or interpretation is to render performance hereunder impossible or in violation of law.

C. INVOICES: Performing Agency shall, in a good and satisfactory manner carry out the Services as called for in this Contract. Performing Agency shall submit invoices to THECB for payment of performed Services in accordance with the schedule in Section 4B2.

Section 4.0 CONTRACT AMOUNT AND PAYMENT FOR SERVICES:

A. CONTRACT AMOUNT: The total costs to be reimbursed by THECB to the Performing Agency during the term of this Contract shall not exceed **$299,895.00, Two hundred ninety-nine thousand, eight hundred ninety-five dollars and no cents** ("Contract Amount").

B. PAYMENT FOR SERVICES:

1. The basis for computing reimbursable costs shall be as follows:

   X Services of employees
   ☐ Service of materials

☐ Services of equipment
☐ Subcontracting costs or purchases of equipment
X Other: ___ Travel expenses, supplies and materials, and incentives approved in writing by the THECB primary contact as stated in the application budget dated June 9, 2011 and any amendments to that budget approved by the THECB primary contact pursuant to this contract.

Costs not listed above must receive prior written approval from THECB.

2. Subject to funding availability and to THECB's receipt of detailed invoices from Performing Agency, THECB shall reimburse Performing Agency in the following manner:

Subject to funding availability and to THECB's receipt of detailed invoices from Performing Agency, THECB shall reimburse Performing Agency in the following manner:

Six equal payments: First payment in the amount of $49,982.50 payable upon signing of the contract and receipt of an invoice on or about the 20th day of the month of August 2011, with subsequent payments to be payable upon receipt and acceptance of deliverables and invoiced on the first of the months of October, 2011, March 2012, August 2012, March 2013 in the amount of $49,982.50 each, with a final payment of $49,982.50 invoiced on or about August 1, 2013.

To the extent there is any advancement of funds by THECB to Performing Agency, this is necessary to enable Performing Agency to fully perform the Services described in this Contract

3. Payment by THECB shall be issued in accordance with Texas Government Code, Chapter 771 (the Interagency Cooperation Act).

Section 5.0 TERM OF CONTRACT:

The term of this Contract shall begin **August 10, 2011,** and shall expire **October 31, 2013,** ("Contract Term"), unless terminated earlier pursuant to the terms of this Contract or extended or renewed by mutual agreement of the Parties in writing (including by a Change Order as discussed in Section III).

Section 6.0 TERMS AND CONDITIONS:

A. **ASSIGNMENT OR SUBCONTRACTING**: No contractual rights, interest, or obligation shall be assigned, delegated, or subcontracted by the Performing Agency without prior written permission of THECB's Program Manager. Any attempted assignment, delegation, or subcontract by the Performing Agency shall be wholly void and ineffective for all purposes unless made in conformity with this section. No assignment, delegation, or subcontract shall relieve the Performing Agency of any obligation or responsibility under this Contract.

B. **DISPUTE RESOLUTION**: The dispute resolution process provided for in Texas Government Code, Chapter 771 (the Interagency Cooperation Act) shall be used by THECB and the Performing Agency to attempt to resolve any claim for breach of contract.

C. **TERMINATION**: THECB may terminate this Contract in accordance with the following:

1. Convenience – THECB may terminate this Contract for convenience upon thirty (30) days written notice to the Performing Agency.

2. Cause – THECB may terminate the Contract immediately, either in whole or in part, upon notice to Performing Agency, or at such later date as THECB may establish in such notice, upon the occurrence of any material breach, including failure to perform any or all of the Services under this Contract within the time specified, or, if applicable, any extension thereof. THECB will provide Performing Agency with an opportunity for consultation with THECB prior to termination.

3. Interpretation – Either party may terminate this Contract immediately upon notice to the other party in the event federal or state law is amended or judicially interpreted so as to render continued fulfillment of the Contract, on the part of either party, commercially unreasonable or impossible.

4. Non-Appropriation – This Contract may be terminated if funds allocated to THECB should become reduced, depleted, or otherwise unavailable during the Contract term and to the extent that THECB is unable to obtain additional funds for such purposes. Upon receipt of THECB's written termination notice, the Performing Agency shall not incur new obligations after the effective date of termination and shall cancel as many outstanding obligations as reasonably practicable.

5. Upon termination for any reason, the Performing Agency shall deliver to THECB all work products produced hereunder as well as a comprehensive program evaluation. Performing Agency shall, unless otherwise mutually agreed upon in writing, cease all Services immediately upon the effective date of termination. THECB shall be liable to Performing Agency for that portion of Services authorized by THECB and which have been completed prior to the effective date of termination

D. **APPLICABLE LAW AND VENUE**: The exclusive venue of any suit brought concerning this Contract or its incorporated documents is fixed in any state or federal court of competent jurisdiction in Travis County, Texas. This Contract shall be construed by and governed in accordance with the laws of the State of Texas. Each Party shall comply with all applicable federal and state statutes, rules, and regulations. Performing Agency shall comply with all orders and decrees of any court or administrative bodies or tribunals in any matter affecting Performing Agency's performance, including if applicable, workers' compensation laws, minimum and maximum salary and wage statutes and regulations, and licensing laws and regulations. For the entire duration of the Contract, Performing Party shall maintain all required licenses, certifications, permits, and any other documentation necessary to perform this Contract. When required or requested by the Agency, Performing Party shall furnish THECB with satisfactory proof of its compliance with this provision.

E. **AUDIT AND ACCESS TO RECORDS:** Performing Agency understands that acceptance of funds under this Contract, or indirectly through a subcontract under this Contract, acts as acceptance of the authority of the State Auditor's office, THECB or any successor agency, as well as any external auditors selected by THECB or any auditors selected by the United States (collectively referred to as "Audit Entities"), to conduct an audit or investigation in connection with those funds. Performing Agency further agrees to cooperate fully with Audit Entities in the conduct of the audit or investigation, including providing all records requested. The Performing Agency shall ensure that this clause concerning the authority to audit funds received indirectly by subcontractors through the Performing Agency and the requirement to cooperate is included in any subcontract the Performing Agency awards.

1. Maintenance of Records – The Performing Agency shall establish, maintain, and utilize internal program procedures sufficient to provide for the appropriate and effective management of all activities relevant to this Contract. Records and accounts shall be maintained in a manner that assures a full accounting for all funds received and expended by the Performing Agency in connection with this Contract. The Performing Agency shall make available for review, inspection, and/or audit all books, records, documents, and other evidence reasonably pertinent to performance on all work under this Contract, including any amendments hereto, in accordance with accepted

professional practices for a minimum of three (3) years after completion or termination of this Contract.

2. Reimbursement - In those cases where THECB advanced funds to Performing Agency, Performing Agency shall submit a final financial report to THECB within sixty (60) days following the expiration or termination of this Contract, setting forth the actual costs incurred. The report shall be accompanied by a payment in the amount of any excess funds, if any, advanced by THECB over costs actually incurred. . Likewise, THECB reserves the right to require the reimbursement of any over-payments determined as a result of any audit or inspection of records on work performed under this Contract. Performing Agency shall reimburse THECB within 30 calendar days of receipt of notice from THECB of overpayment. Performing Agency's failure to comply with this provision shall constitute a breach of Contract. This provision survives the termination of this Contract.

F. OWNERSHIP OF WORK; LICENSE:

1. Ownership of Work – All work product generated as a result of this Contract Project, including but not limited to all information, materials, products, research, reports, studies, statistical analyses, work papers, approaches, designs, deliverables, systems, documentation, methodologies, concepts, research materials, data, photos, software, intellectual property or other property produced or generated in connection with this Contract, either completed or partially completed, shall be the sole property of THECB and all rights, title, and interest in and to the work product shall vest in THECB upon payment for the Services. All such work product shall be delivered to THECB by Performing Agency upon completion, termination, or cancellation of this Contract. All property rights, including publication rights, hereunder shall be retained by THECB, and Performing Agency shall assert no right in law or equity to such work product. THECB shall have the right to obtain and to hold in its own name any and all patents, copyrights, marks, or such other protection as may be appropriate to the subject matter, and any extensions and renewals thereof. Performing Agency shall ensure that this provision, "Ownership," is contained in any subcontract Performing Agency is authorized by THECB to award. Performing Agency may, at its own expense, keep copies of all its writing for its personal files. Performing Agency shall not use, willingly allow, or cause to have such work product used for any purpose other than the performance of Performing Agency's obligations under this Contract without the prior written consent of THECB; provided, however, that Performing Agency shall be allowed to use non-confidential materials for writing samples in pursuit of work.

2. License – In addition, and as a limited exception to Section F. 1., THECB hereby grants a non-exclusive, non-transferable, non-assignable license to Performing Agency and its faculty associated with the Work Product to use the Work Product under this Contract for educational purposes consistent with Performing Agency's educational mission, including publication of scholarly works. This license is revocable by THECB at any time and for any reason or no reason at all. The license rights do not excuse Performing Agency from compliance with applicable requirement of any federal or state laws, rules, or regulations that apply to this license for this purpose from THECB. Each research product produced pursuant to this license through use of the Work Product under this Contract shall contain a disclaimer that clearly states that the conclusions of the researcher or other producer are not necessarily those of the THECB or the State of Texas. The parties may jointly waive this requirement in writing for any individual project.

G. INDEPENDENT CONTRACTORS: For purposes of this Contract and all services to be provided hereunder, the parties shall be, and shall be deemed to be, independent contractors and not agents or employees of the other party. Neither party shall have the authority to make any statements, representations, nor commitments of any kind, nor to take any action that shall be binding on the other Party, except as may be expressly provided for herein.

H. **PROVISION OF WORK PRODUCT**: Upon any request by THECB for the remittance of any work product, the Performing Agency shall immediately remit such work product. Any failure to immediately remit such work product shall be considered a breach of Contract.

I. **PUBLIC DISCLOSURE:** The Performing Agency understands and agrees that no public disclosures or news releases pertaining to this Contract, including any results, findings or reports conducted to fulfill requirements of this Contract shall be made without prior written approval of THECB.

J. **IRB APPROVAL**: Pursuant to federal regulations found at 45 CFR 46, any research conducted by the Performing Agency involving human subjects must receive approval from the Performing Agency's Institutional Review Board (IRB).

K. **STRICT PERFORMANCE/WAIVER:** Failure by THECB at any time to require strict performance of any contractual provision or obligation contained herein shall not constitute a waiver or diminish THECB's rights thereafter to demand strict compliance.

L. **FERPA**: In compliance with the Family Educational Rights and Privacy Act (FERPA), the Performing Agency agrees (1) to protect any confidential student information it receives or accesses that could make a student's identity traceable, and (2) any data analysis or report shall not be disclosed to any third party without THECB's prior written consent.

M. **CONTACTS**: Primary contacts for routine communications related to the performance of work under this Contract are as follows:

THECB Staff	Performing Agency Staff
Program Manager: Robin Zuniga	Professor Eric Paulson, Ph.D:

N. **NOTICE:** Notices occur when there are substantial changes that effect the Contract terms and conditions in the form of an amendment or termination of the Contract. All notices required to be given hereunder shall be in writing and shall be given by delivery thereof or by overnight courier or certified or registered mail, postage prepaid, to the office shown below. Notices may be sent by facsimile during normal business hours; however, they shall be followed up with a hardcopy original document via one of the above delivery methods. Any notice served shall be deemed given on the date of hardcopy original document delivery.

THECB Notice Address	Performing Agency Notice Address
Texas Higher Education Coordinating Board Office of Contract Management Services P.O. Box 12788 Austin, Texas 78711-2788 Fax: (512) 427-6472	Texas State University – San Marcos Grants Department 601 University Drive San Marcos, Texas 78666

O. **FEDERAL LAWS:** If federal monies are funding this Contract, Performing Agency must comply with all federal laws, rules, and regulations pertaining to this Contract, including but not limited to those referenced in any attachments regarding Debarment, Lobbying (required if utilizing federal funds & over $100,000), and Applicable Federal Laws.

P. **ENTIRE AGREEMENT AND ORDER OF PRECEDENCE**: This Contract consists solely of the following documents, and, in the event of conflicts or inconsistencies between this Contract and its exhibit or attachments, such conflicts or inconsistencies shall be resolved by reference to the documents in the following order of precedence: (1) the Contract (including its Exhibits, if any), (2) THECB's Request for Proposals, if any (and its addenda, if any), and (3) Performing Agent's

Proposal, if any (and its addenda, if any). This Contract (including its Exhibits, if any) contains the final, complete and exclusive understanding of the Parties, and supersedes all prior contemporaneous, oral or written understandings, representations, and negotiations between Parties relating to the subject matter of this Contract. The Parties further agree that this Contract may not in any way be explained or supplemented by a prior or existing course of dealings between the Parties, by usage of trade or custom, or by any prior performance between the Parties pursuant to this Contract or otherwise.

Section 7.0 **SIGNATURES:**

By signature hereon, the individuals below represent and warrant they are duly authorized representatives of their respective agencies and have the authority to bind their respective agencies in a contractual agreement.

William C Nance

Mr. William Nance,
Vice President, Finance & Support Services

8/22/11

Date

This section reserved for Agency use:
I, an authorized official of Agency, hereby certify that this contract is in compliance with applicable statutes and regulations and authorize the services to be performed as written above.

AGREED and accepted on behalf of Agency this _____ day of _____ (month/year).

Dr. Arturo Alonzo
Deputy Assistant Commissioner
Business and Finance
Texas Higher Education Coordinating Board