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Printed by the Association for Career and Technical Education

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Career and Technical Education Research (CTER) is published three times a year and is an official publication of the Association for Career and Technical Education Research (ACTER). ACTER was organized in 1966 and strives to: (a) stimulate research and development activities related to career and technical education, (b) stimulate the development of training programs designed to prepare persons for responsibilities in career and technical education research, (c) foster a cooperative effort in research, (d) foster a cooperative effort in research and development activities with the total program of career and technical education and other disciplines, and (e) facilitate the dissemination of research findings and diffusion of knowledge.

Editor's Note

James P. Greenan
Purdue University

Volume 32, Issue 3 encompasses three major research problems that are significant for future policy and practice in the field of Career and Technical Education (CTE). The research problems focus on the relationship between CTE research and methodologies and the contemporary scientifically-based research (SBR) paradigm; CTE teachers' attitudes about and use of reading within their instruction; and the efficacy of worked-based learning (WBL), social support, and occupational engagement orientations in students' career development.

Sinan Gemici and Jay Rojewski analyze the fundamental principles of SBR, the favored research paradigm and methodologies of several federal governmental agencies. They examine the different positions in the discourse regarding SBR. Additionally, they provide a concise overview of the major initiatives and agencies that have been created to guide federal policy with respect to educational research. Gemici and Rojewski reflect on the existing and potential long-term effects that SBR could have on the status of CTE scholars and research. They reviewed research articles in CTE that were published during a five-year period to contrast CTE research and methodologies with SBR requirements and expectations. Sinan and Rojewski found a significant discrepancy between the focuses of CTE published research and the emphasis of SBR standards for government-funded research. Further, they discuss the role that SBR should play relative to the quality of CTE research. Gemici and Rojewski suggest that the field of CTE should critically examine its paradigm of disciplined inquiry. They claim that CTE researchers and consumers have had a "limited" reaction to SBR. Perhaps, the CTE research community will become more "proactive" as a consequence of reading this article,

Travis Park and Ed Osborne explore the relationships among attitudes and practices associated with reading in the context of agricultural science instruction. The theoretical framework is predicated on the teacher practicing in a sociocultural context that consists of three elements including the reader, text, and activity (or purpose for reading). Accordingly, they posited two major research questions: (a) What are the factors associated with teachers' attitudes toward reading in general and for applications in agricultural science? and (b) What factors are associated with their knowledge of content area reading strategies and frequencies of text and strategy use in agricultural science education? The findings of the study answer some important questions and contribute to both theory and practice in CTE. However, Park and Osborne note that the findings also elicit several new questions, a pathway for future research.

Jeffrey Bennett examines the efficacy of work-based learning and social support with respect to enhancing positive occupational engagement orientations for high school seniors. The theoretical framework of the study is based on an interaction between student demographic characteristics, district internship program requirements, social support, and feedback. The research questions that emerged from the theory included: (a) How much do student demographic characteristics account for high school seniors' orientations toward occupational engagement? (b) To what extent does completion of work-based learning internships influence high school seniors' occupational engagement orientations? and (c) How influential is social support in enhancing high school seniors' occupational engagement orientations over and above the influence that work-based learning internships provide? The results contribute to theory and practice in work-based learning, a relatively new but rapidly expanding programmatic emphasis in the schools across the nation. Bennett offers several recommendations that can improve policy, practice, and the career development experiences of seniors in their transition from high school to the world of work, higher education, and life.

Finally, I would like to extend my thanks and appreciation to all of the Editorial Board members and reviewers for their time and excellent work in the editorial review process of Volume 32. Their dedication, expertise, and excellent reviews are very much appreciated. I look forward to working with many of you in the creation of Volume 33.

JPG

Evaluating Research in Career and Technical Education Using Scientifically-Based Research Standards

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Abstract

*The recent emphasis on scientifically-based research (SBR) as the government's favored research paradigm has direct implications for career and technical education (CTE). From a practical standpoint, federal funds will now be appropriated exclusively on scholars' readiness and ability to engage the "right" research questions. While the government can determine the agenda for federally-funded research, the narrow definition reflected by SBR guidelines does not, and should not, define CTE research. Even so, the CTE community's overall reaction to SBR has been limited rather than proactive, suggesting that a full examination of SBR's far-reaching implications for CTE research has yet to occur. This article examines the main tenets of SBR and outlines the major positions in the debate about SBR in educational research. This debate is applied to CTE research by examining published articles in recent issues of *Career and Technical Education Research* (CTER; 2001-2005). An overwhelming majority of the published articles examined were either descriptive or qualitative in nature. Only 6% employed quasi-experimental designs. No articles using true experimental designs were published during this period. The findings were further examined from political, conceptual, and practical positions. While the emphasis of most CTER research differs from the SBR focus mandated for government-funded research, this discrepancy does not necessarily indicate a lack of quality in CTE research. It does, however, suggest that internal dialogue and investigation are needed regarding the role of SBR in CTE research. This article may be one avenue for promoting such a dialogue.*

Introduction

Since the adoption of the [No Child Left Behind \(NCLB\) Act](#) in 2001, the notion of scientifically-based research (SBR) has had a substantial impact on the design, process, and evaluation of educational research. Six years after NCLB's inception, many scholars continue to grapple with SBR's fundamental propositions. Discourse regarding what constitutes the epitome of scientific inquiry in education remains highly controversial. The marginalization of so-called non-scientific endeavors in favor of empirical evidence and objective assessment has been criticized by a variety of researchers ([Berliner, 2002](#); [Erickson & Gutierrez, 2002](#); [Pellegrino & Goldman, 2002](#); [St. Pierre, 2002, 2006](#)). These scholars have pointed to

several concerns inherent in the federal government's approach towards educational research, such as (a) confusing scientific methods with the process of science, (b) the adoption of an evidence-based social engineering approach to educational program effectiveness, (c) the disregard for the complexity of issues concerning the scientific method and research quality, and (d) the utter rejection of postmodern theories.

Notwithstanding calls for a more inclusive attitude towards educational scholarship, many practitioners and agency officials have defined the usefulness of research solely in terms of objective achievement metrics (Kaestle, 1993). Increasing pressure towards program accountability has encouraged policymakers to impose a medical model of true experimentation to guide both federal funding allocations and administrative decisions on educational research. While federal guidelines defining the nature of acceptable research standards carefully avoid any formal deprecation of qualitative inquiry, the overwhelming majority of federally funded studies have posed research questions that require the exclusive application of true or quasi-experimental methods.

The preponderance of SBR as the government's exclusive research paradigm has direct implications for career and technical education (CTE). From a practical standpoint, appropriation of federal funds will largely depend on the field's readiness and ability to engage in the "right" research questions and employ the "right" research designs and methods. However, the CTE community's overall reaction has been limited rather than proactive. The fact that the literature features few detailed considerations about how CTE scholars have responded to the more stringent research standards corroborates the notion that a true examination of SBR's far-reaching implications has yet to occur.

As stewards of federal policy, the Department of Education is exerting considerable pressure on all sectors of education, including CTE, to propose research designs that follow the provisions of SBR. A primary driver for the federal position is based on a perceived need to answer questions related to student achievement and program improvement to raise the efficacy of current and future interventions. Tying the credibility of research results to specific questions and methods has allowed policymakers to establish rigorous quantitative designs as the *gold standard* for worthwhile academic inquiry. Against this background, the initial intent was to review and determine the extent to which publications in a major CTE journal, *Career and Technical Education Research (CTER)*, adhered to SBR guidelines since the adoption of NCLB in 2001 and the Education Sciences Reform Act (ESRA) in 2002. More specifically, it was sought to overlay the ESRA's scientifically-based research standards on journal articles that were published in *CTER* between 2001 and 2005. The ESRA was chosen as the primary frame of reference for this examination because its scientific research definition has been adopted as the standard in the most recent reauthorization of the Carl D. Perkins Career and Technical Education Improvement Act (2006).

Preliminary analysis for this study produced sobering results insofar as all articles in the sample failed to reference, let alone follow, SBR principles. Moreover, there seemed to be a significant gap between the rather broad questions addressed by the field and the government's strongly evaluation-driven research agenda. Given SBR's increasing importance as a *sine qua non* for securing federal program and research funding, this disregard of more rigorous research standards may eventually be harmful to CTE. Given an initial assessment of research in CTE relevant to SBR principles and the primary institutional definitions of SBR, the major themes and research questions that have emanated from recent research in CTE were reviewed. Ultimately, this article may enhance the level of engaged discourse regarding the current status and future direction of CTE research.

Scientifically-Based Research (SBR) Defined

Scientifically-based research is first and foremost a definition of parameters that identifies educational interventions or research endeavors worthy of federal funding. The term is a de facto procedural mandate that, arguably, will result in good academic research. However, what exactly constitutes good academic research in education? How is good academic research defined through SBR principles? A plethora of interpretations has emanated from within the scientific community that extends on a continuum from strictly conservative to more liberal definitions. Of these constructs, four primary mandates capture the essence of SBR as it is currently envisioned by federal and state agencies. In this section, the four definitions put forth by the [National Research Council \(2002\)](#), the [No Child Left Behind Act \(2001\)](#), the [Education Sciences Reform Act \(2002\)](#), and the [What Works Clearinghouse \(2006\)](#) are summarized and contrasted.

National Research Council (NRC). As the primary operating agency of both the National Academy of Sciences and the National Academy of Engineering, the NRC is a private, nonprofit organization that is instrumental in advising the federal government in the areas of science, technology, and health policy. Due to its strategic position at the crossroads between legislators, administrators, and the scientific community, the NRC is the key influencing body in the formulation of federal research policy. Acting upon the advice of NRC, Congress established the National Educational Research Policy and Priorities Board (NERPPB) under the Improving America's Schools Act of 1994 to facilitate the creation of a long term agenda for educational research, development, and dissemination ([United States Department of Education, 1999](#)). According to [Eisenhart and Towne \(2003\)](#), the NERPPB charged the NRC with an investigation of core elements that would constitute a sound approach to SBR in the eyes of education researchers. The objective was to construct a general definition of scientific research principles in education, not to assemble a checklist of acceptable methodologies and statistical procedures. Consequently, the NRC's work resulted in the formulation of components deemed necessary to engage in what it refers to as a successful program of research ([NRC, 2002](#)). All pieces of a

given research project considered jointly are, therefore, required to (a) pose significant questions that can be investigated empirically, (b) link research to relevant theory, (c) use methods that permit a direct investigation of the question, (d) provide a coherent and explicit chain of reasoning, (e) replicate and generalize across studies, and (f) disclose research data and methods to encourage professional scrutiny and critique.

The NRC's elements of a successful program of research represent a set of research principles that endorse both quantitative and qualitative research designs, including experimental research, case studies, grounded theory, and surveys. This broad, inclusive approach stands in stark opposition to the restrictive definition set forth in NCLB which was passed only months after the initial release of the NRC standards.

No Child Left Behind Act (NCLB). The goals of the NRC in defining SBR were inherently different from those of federal lawmakers involved in [NCLB \(2001\)](#). Whereas the NRC set out to infuse a scholarly perspective of sound research principles into education policy, NCLB mandated specific research criteria as a prerequisite for the distribution of federal program resources. The ensuing definition is one that embodies an essentially prescriptive approach to SBR that is highly exclusionary in its unequivocal championing of experimental and some quasi-experimental methods. According to NCLB, SBR is research that (a) applies rigorous, systematic, and objective procedures to obtain valid knowledge relevant to educational interventions, (b) employs systematic, empirical methods that draw on observation or experiment, (c) involves rigorous data analyses that are adequate to test the stated hypotheses and justify the general conclusions drawn, (d) relies on measurements or observational methods that provide valid data across evaluators and observers and across multiple measurements and observations, and (e) has been accepted by a peer-reviewed journal or approved by a panel of independent experts through a comparably rigorous, objective, and scientific review.

The NCLB criteria offer a singular focus on hypothesis testing and statistical measures of significance. This government-endorsed gold standard has far-reaching implications for education service providers; it clearly marks the sole path to securing federal program funds. It should be emphasized; however, that NCLB's narrow definition of SBR is mainly targeted at program administrators for the justification of program expenditures and intervention costs, not at scholars who require funding for forthcoming research projects.

Education Sciences Reform Act (ES RA). In 2002, the ESRA led to the replacement of a long-standing federal agency, the Office of Educational Research and Improvement (OERI), with the Institute of Education Sciences ([IES, 2006](#)). The objective of the IES is to "provide rigorous evidence on which to ground education practice and policy" ([United States Department of Education, 2006, ¶ 1](#)). In order to achieve this goal, the ESRA introduced a set of scientifically-based research standards to which any IES-funded research would have to adhere. According to the

ESRA (2002), scientifically-based research standards mandate that research studies (a) apply rigorous, systematic, and objective methodology to obtain reliable and valid knowledge relevant to education activities and programs; (b) present findings and make claims that are appropriate to and supported by the methods that have been used; (c) employ systematic, empirical methods that draw on observation or experiment; (d) involve data analyses that are adequate to support the general findings; (e) make claims of causal relationships only in random assignment experiments or other designs (to the extent such designs substantially eliminate plausible competing explanations for the obtained results); (f) ensure that studies and methods are presented in sufficient detail and clarity to allow for replication or, at a minimum, to offer the opportunity to build systematically on the findings of the research; (g) obtain acceptance by a peer-reviewed journal or approval by a panel of independent experts through a comparably rigorous, objective, and scientific review; and (h) use research designs and methods appropriate to the research question posed.

The ESRA refrains from demanding that fundable projects be grounded exclusively in randomized control group designs. Instead, the ESRA standards allow for the research question to drive the method and, therefore, condone the use of exploratory, descriptive, or hypothesis-generating studies. Unlike NCLB, the ESRA targets education researchers and provides a framework for scientific inquiry. As such, the ESRA imparts upon the academic community a working definition of what it considers to be good academic research.

What Works Clearinghouse (WWC). Following the passage of the ESRA (2002), the IES established the WWC as a direct means to “provide educators, policymakers, researchers, and the public with a central and trusted source of scientific evidence of what works in education” (What Works Clearinghouse, 2006, ¶ 1). The WWC’s objective is to ensure sound methodology and validity of education research and, to this end, provide standards to help identify studies that provide the strongest evidence of statistically significant effects. The WWC applies the following classification scheme:

1. Meets evidence standards:
 - a. Randomized controlled trials that do not have problems with randomization, attrition, or disruption
 - b. Regression discontinuity designs that do not have problems with attrition or disruption
2. Meets evidence standards with reservations:
 - a. Strong quasi-experimental studies that have comparison groups and meet other WWC evidence standards
 - b. Randomized trials with randomization, attrition, or disruption problems
 - c. Regression discontinuity designs with attrition or disruption problems

3. Does not meet evidence screens:
 - a. Studies that provide insufficient evidence of causal validity or are not relevant to the topic being reviewed

The WWC applies these rigorous standards to assess the effectiveness of education interventions with regard to quantity, quality, and relevance of evidence. Its focus is purely quantitative, with both a strong consideration of effect size and a heavy emphasis on random assignment. No qualitative study would meet WWC's evidence screens. Yet, this unidirectional focus represents an especially questionable antagonism insofar as the WWC emerged out of the ESRA, which purportedly supports quantitative and qualitative methods alike.

Purpose

The précis of SBR definitions casts a controversial light on the current state of affairs. While many practitioners and agency officials pay lip service to academe's demands for methodological diversity, the realities of federal funding guidelines strike a much less tolerant note. The inconsistencies between the de jure directives and the de facto consideration of what is good academic research are particularly striking in the case of the ESRA and the WWC. The ESRA offers generously composed *Scientifically-Based Research Standards*, while the WWC demands an exclusive focus on statistical chasteness. This dichotomy has direct implications for research in CTE. The reauthorized [Carl D. Perkins Career and Technical Education Improvement Act of 2006](#) stipulates that funding for the National Research Center for Career and Technical Education is to “carry out scientifically-based research and evaluation for the purpose of developing, improving, and identifying the most successful methods for addressing the education, employment, and training needs [...] in career and technical education programs” (p. 23). Perkins' explicit adoption of the ESRA definition of SBR provides a clear directive for CTE researchers. Yet, to what extent does research published in one of the field's leading scholarly journals conform to the ESRA's scientifically-based research standards? To date, no comprehensive cross-validation of the literature base has been conducted in which the methods applied in contemporary CTE research have been juxtaposed with federally mandated SBR guidelines.

Methodology and Findings

The examination of SBR's impact on research endeavors in CTE was based on a research synthesis strategy (Cooper & Hedges, 1994). This approach allowed for the review, extraction, and classification of the major research themes in the sample. The sample consisted of five recent complete volumes of the *CTER* journal, Vols. 26-30. The *CTER* journal was chosen for analysis because it is recognized as one of the field's premier refereed scholarly publications and provides a broad,

comprehensive consideration of important issues in CTE. The original research, literature reviews, and conceptual or opinion-based expository pieces published in *CTER* are, to some degree, reflective of the most current trends in the field. The time frame for the investigation, 2001 through 2005, was based on the adoption of NCLB in 2001. The NCLB provided the first federally-sanctioned definition of desirable and acceptable research standards and, therefore, confronted the academic community with a drastic change in the approach towards scholarly practices. The sample included 15 issues consisting of 64 articles that represented unsolicited research and was conducted by individual scholars who worked independently of a broader, coordinated research agenda (see Appendix).

In the investigation, the articles were classified into three different categories. Quantitative studies accounted for slightly over one-half of all published articles. Approximately 20% of the articles were qualitative in nature, with the remainder consisting of expository pieces including literature reviews and Association of Career and Technical Education Research (ACTER) Presidential Addresses. In total, 25% of all articles in the sample represented non-original research (see Table 1).

Table 1
Research by Type, Published in Career and Technical Education Research, 2001-2005

Type of research	2001		2002		2003		2004		2005		Total	
	<i>n</i>	%										
Expository ^a	3	21	7	44	2	15	2	17	2	22	16	25
Original research												
Qualitative	4	29	2	12	6	46	—	—	2	22	14	22
Quantitative ^b	7	50	7	44	5	39	10	83	5	56	34	53

Note. ^a Includes conceptual articles, opinion articles, literature reviews, and ACTER Presidential Addresses. ^b Includes Delphi studies.

Of the 48 articles identified as original research, 14 employed qualitative research designs; whereas, 9 used a causal-comparative approach. A majority of publications in the sample was descriptive or correlational in nature. This is in opposition to the number of experimental ($n = 0$) and quasi-experimental studies ($n = 3$) which constituted a mere 6% of the sample. The scarcity of experimental research studies is of particular interest given SBR's unequivocal preference for such designs. Table 2 provides a detailed account of the different research designs employed in the sample.

Table 2
Research Designs Employed for Studies Published in Career and Technical Education Research, 2001-2005

Design	2001		2002		2003		2004		2005		Totals	
	<i>n</i>	%										
Qualitative	4	36	2	22	6	55	—	—	2	29	14	29
Descriptive/ Correlational	2	18	5	56	3	27	8	80	4	57	22	46
Causal-comparative	5	46	2	22	1	9	—	—	1	14	9	19
Quasi-experimental	—	—	—	—	1	9	2	20	—	—	3	6
Experimental	—	—	—	—	—	—	—	—	—	—	—	—

In order to classify articles by their respective focus of investigation and target audience, four distinct categories consisting of secondary CTE students, postsecondary CTE students, CTE teachers, as well as CTE professionals including policymakers, administrators, and researchers were identified. During the sorting process, a miscellaneous category was added to account for articles that fell outside of the four principal classification categories. Approximately 40% of the articles in the sample focused on issues related to secondary and postsecondary CTE students. A majority of these studies was directed at student achievement and persistence, as well as aspects of curriculum design. While most research explored characteristics of domestic students, several studies offered an international perspective, involving participants from Canada, Germany, Taiwan, and Thailand. Research involving or directed at CTE teachers represented approximately one-fourth of all sample articles and included a variety of topics such as technical teacher preparation, performance, attrition, motivation, and stress. Publications directed at CTE professionals revolved around issues of policy, CTE research frameworks, school-to-work transitions, statistical methods in CTE research, and future directions of the field in general. The remainder of the studies was classified as miscellaneous and featured a broad spectrum of topics from women entrepreneurs in Zimbabwe to the environmental sustainability of school-based enterprises. Table 3 provides an overview of the sample in terms of research focus. Table 4 illustrates the distribution of research topics.

The statistical methods employed for data analysis in the sample's quantitative research articles were mostly inferential in nature (80%) and relied on descriptive statistics. A total of 5% of the quantitative studies in the sample consisted of Delphi studies. Although several studies employed rather sophisticated inferential methods, many authors limited their analysis to procedures such as ANOVA, *t*-tests, and multiple regression or correlation. The relative frequency of simple statistical inference procedures was partially indicative of the level of inquiry of many studies.

In other words, simple inferential methods were employed to answer simple research questions.

Table 3
Research Focus for Studies Published in Career and Technical Education Research, 2001-2005

Research focus	<i>n</i>	%
Secondary CTE students	14	29
Postsecondary CTE students	6	13
CTE teachers ^a	11	23
CTE professionals ^b	9	19
Miscellaneous	8	17

Note. Totals reflect an unduplicated count of primary or exclusive focus of research article.

^aIncludes both secondary ($n = 9$) and postsecondary ($n = 2$) educators.

^bIncludes both CTE teacher educators ($n = 7$) and other CTE professionals ($n = 2$).

Table 4
Research Topics for Studies Published in Career and Technical Education Research, 2001-2005

Research topics	<i>n</i>	%
Conceptual frameworks, research, and trends in CTE	8	13
Student/teacher retention	4	6
Student interests	8	13
Curriculum development, integration, or assessment	16	25
Student/teacher performance	7	11
Teacher certification/preparation	10	16
Distance learning	4	6
Miscellaneous	7	11

Discussion

A majority of published articles in the sample was either descriptive or qualitative in nature; whereas, only 6% employed quasi-experimental designs. Clearly, the emphasis of most CTE research differs from the SBR focus mandated for government-funded research. However, this discrepancy does not necessarily indicate a lack of quality in CTE research. First of all, the mission of any scholarly journal, including *CTER*, is broader than the exclusive focus on disseminating quantitative research reports. The *CTER* journal also values and disseminates the results of qualitative, historical, and philosophical research; reviews of literature;

book reviews; and rejoinders to published work. In addition, there are numerous peer-reviewed publication outlets for CTE research. So, while the sample of published articles is delimited by these factors, it does provide a glimpse of what is important to CTE researchers.

It is important to also place the SBR mandate into perspective. As a funding agent, the federal government has the prerogative of establishing the expected outcomes for its funded programs and the types of research studies it deems important. As noted by the proponents of SBR, clearly, there is an important role of intervention studies in educational research. Given the historic pressures for demonstrating the effectiveness of CTE in public education, a greater appreciation and more widespread application of the SBR paradigm would address this concern. An increased focus on SBR standards with CTE research may enhance the credibility of CTE research in the eyes of policymakers and scholars from related educational disciplines. More importantly than reacting to external stimuli, however, an internal dialogue about the role of SBR in CTE research may provoke an internal assessment and, if necessary, a stronger push towards the enhancement of research standards from within the field.

Time and resource constraints may be two of the principal factors for the relatively marginal position of experimental studies in CTE research. The nature of universities' tenure track requirements obliges new faculty members to produce a proven track record of scholarly publications. Given the substantial pressure to publish, aspiring scholars may prefer descriptive and qualitative pieces that can frequently be completed in a more timely fashion with fewer logistical obstacles. In contrast, the time-intensive nature of experimental studies may be perceived as counterproductive to satisfying tenure track objectives. Furthermore, novice scholars frequently operate under resource constraints that are not conducive to the successful implementation of large-scale experimental designs. Overall, the current pattern for conducting CTE research is highly problematic because it fosters the creation of an academic mantra that gives preference to quantity versus quality. If CTE researchers decide to more actively promote SBR-compliant studies, attempts should be made to level the playing field for scholars interested in conducting experimental research in CTE.

Despite calls for a better balance between descriptive and experimental studies in CTE, SBR should not be considered as the ultimate cure for the perceived ills of educational research. A singular focus on issues of student performance or intervention efficacy would lead to the exclusion of extensive segments of the educational spectrum. For example, SBR purists might consider the descriptive approach of this very article to be rather trivial in advancing the understanding of CTE interventions. However, the purpose of the examination was to reflect upon the effects of SBR on the current status of CTE research. It is the authors' credo that essential questions and issues do exist beyond an exclusive focus on student performance, achievement, or retention. Clearly, then, the objective is not one of

promoting the SBR mandate as the predominant direction for future research efforts. Rather, CTE should take an informed approach and engage in a less polarized and ideology-laden debate. Many of the prior discussions of SBR in education have focused on either commending or rebuking federal research guidelines based on divergent philosophical positions. A more moderate debate might help the field determine the appropriate role SBR should play in order to ameliorate the overall quality of CTE research. This, however, requires thoughtful, ongoing discourse from CTE professionals. Such discourse could be facilitated through research symposia and special issues on SBR in major CTE research journals. Most importantly, individual researchers bear the primary responsibility to clearly identify the contributions their research will make to the field.

In reviewing the principal propositions of the SBR mandate, the study sought to gauge the current status of CTE research regarding the use of experimental designs that are congruent with the government's preferred research methods. The fact that state and federal funding is increasingly tied to the fulfillment of SBR criteria should prompt the field to grapple more seriously with these guidelines and propositions. There is no need to sacrifice diversity in CTE research on the altar of SBR standards or to place exclusive focus on the government's singular quantitative paradigm. However, CTE needs to be sensitive to accountability demands placed on it from outside actors. In the absence of discourse, the field faces the loss of credibility and may miss the opportunity to evolve for the benefit of CTE students. Ultimately, the question is whether CTE should promote a structured research agenda that focuses more attention on intervention efficacy. The authors look forward to ensuing dialogue and reactions to this important issue.

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Appendix. Coding Decisions Made for All Articles Published in *CTER*, 2001 – 2005 to Support Data Analysis and Conclusions

Year	Volume (Issue)	Author(s)	Title	Type ^{a,b}	Design ^c	Focus [Participants] ^d	Topic ^e
2001	26(1)	Camp, W.	Formulating and evaluating theoretical frameworks for career and technical education research	Expository	—	—	CTE conceptual frameworks, research, and trends
		Chen, S., & Thomas, H.	Constructing vocational and technical college student persistence models	Quantitative	Causal-comparative	Postsecondary CTE students	Student / teacher retention
		Ruhlman, S.	Factors that influence the turnover and retention of Minnesota's technical college teachers	Quantitative	Causal-comparative	CTE professionals [Postsecondary technical educators]	Student / teacher retention
		Athanasou, J., & Cooksey, R.	Judgment of factors influencing interest: An Australian study	Quantitative	Descriptive / Correlational	Postsecondary CTE students	Student interests
2002	26(2)	Hutchinson, N., Munby, H., & Chin, P.	The intended curriculum in co-operative education in Ontario secondary schools: An analysis of school district documents	Qualitative	Qualitative [Doc analysis]	Miscellaneous	Curriculum development, integration, or assessment
		Ruhlman, S., & Brewer, J.	Implementing an assessment plan to document student learning in a two-year technical college	Qualitative	Qualitative [Doc analysis]	Miscellaneous	Curriculum development, integration, or assessment
		Jacobs, J.	What is the future for post-secondary occupational education?	Expository	—	—	CTE conceptual frameworks, research, and trends.
		Conroy, C., & Sipple, J.	A case study in reform: Integration of teacher education in agriculture with teacher education in mathematics and science	Qualitative	Qualitative [Case study]	CTE professionals [Teacher educators]	Teacher preparation / development or certification [Curriculum]
		Gordon, H.	American Vocational Education Research Association members' perceptions of statistical significance tests and other statistical controversies	Quantitative	Descriptive / Correlational	CTE professionals [Teacher educators]	Miscellaneous
2003	26(3)	Plank, S.	A question of balance: CTE, academic courses, high school persistence, and student achievement	Quantitative	Causal-comparative	Secondary CTE students	Student / teacher retention
		Griffith, J., & Wade, J.	The relation of high school career and work-oriented education to postsecondary employment and college performance: A six-year longitudinal study of public high school graduates	Quantitative	Causal-comparative	Secondary CTE students	Student / teacher performance [Outcomes]
		Warren, J., LePore, P., & Mare, R.	Employment during high school: Consequences for students' grades in academic courses	Quantitative	Causal-comparative	Secondary CTE students	Student / teacher performance
		MacIver, M., & Legters, N.	Partnerships for career-centered high school reform in an urban school system	Qualitative	Qualitative [Case study]	Miscellaneous	Curriculum development, integration, or assessment
		Shumer, R.	A new, old vision of learning, working, and living: Vocational education in the 21st century	Expository	—	—	CTE conceptual frameworks, research, and trends

(table continues)

Appendix. Coding Decisions Made for All Articles Published in *CTER*, 2001 – 2005 to Support Data Analysis and Conclusions (continued)

Year	Volume (Issue)	Author(s)	Title	Type ^{a,b}	Design ^c	Focus [Participants] ^d	Topic ^e
2002	27(1)	Rojewski, J.	Preparing the workforce of tomorrow: A conceptual framework for career and technical education	Expository	—	—	CTE conceptual frameworks, research, and trends
		Harkins, A.	The futures of career and technical education in a continuous innovation society	Expository	—	—	CTE conceptual frameworks, research, and trends
		McCaslin, N., & Parks, D.	Teacher education in career and technical education: Background and policy implications for the new millennium	Expository	—	—	Teacher preparation / development or certification [Secondary]
		Bartlett, J.	Preparing, licensing, and certifying postsecondary career and technical educators	Expository	—	—	Teacher preparation / development or certification [Postsecondary]
		Walzer, R., & Gray, K.	Teacher preparation licensure in career and technical education	Expository	—	—	Teacher preparation / development or certification [Secondary]
		Twomey, S.	The virtual teacher training center: A one-year program to transform subject-matter experts into licensed career and technical education teachers	Expository	—	—	Teacher preparation / development or certification [Distance Learning]
		Kuchinke, K.	Strengthening ties between career-technical education and human resource development	Expository	—	—	CTE conceptual frameworks, research, and trends
		Adams, J.	Going to work: An examination of the meaning of work in welfare-to-work	Qualitative [Case study]	Qualitative	Postsecondary CTE students	Student interests
		Zohngen, S.	The role of key qualifications in the transition from vocational education to work	Quantitative [Delphi]	Descriptive / Correlational	CTE professionals	Student / teacher performance [Outcomes]
		Harrison, J.	Perceived knowledge level, utilization, and implementation of school-to-work by pre-service teacher educators in Ohio	Quantitative	Descriptive / Correlational	CTE professionals [Teacher educators]	Curriculum development, integration, or assessment
2003	27(3)	Kim, H., & Rojewski, J.	Using structural equation modeling to improve research in career and technical education	Quantitative	Causal-comparative	Secondary CTE students	Student interests
		Resch, T., & Hall, H.	Attrition, completion, and graduation rates in Georgia technical colleges before and after the initiation of the HOPE grant	Quantitative	Causal-comparative	Postsecondary CTE students	Student / teacher retention
		Clark, P.	The curriculum internationalization process in banking and finance school-to-work programs: A cross case study	Qualitative	Qualitative [Case study]	Secondary CTE students	Curriculum development, integration, or assessment
		Kerlin, T.	A comparison of role/task/environment stress experienced by beginning academic and career-technical teachers in southwestern Ohio career technical schools	Quantitative	Descriptive / Correlational	CTE professionals [Secondary teachers]	Miscellaneous
		Knobloch, N., & Whittington, M.	Novice teachers' perceptions of support, teacher preparation quality, and student teaching experience related to teacher efficacy	Quantitative	Descriptive / Correlational	CTE professionals [Teacher educators]	Teacher preparation / development or certification

(table continues)

Appendix. Coding Decisions Made for All Articles Published in *CTER*, 2001 – 2005 to Support Data Analysis and Conclusions (continued)

Volume Year (Issue)	Author(s)	Title	Type ^b	Design ^c	Focus [Participants] ^d	Topic ^e
2003 28(1)	Rojewski, J.W.	Globalization and the internationalization of research on career and technical education	Expository	—	—	CTE conceptual frameworks, research, and trends
	Field, D.	Applied technology proficiency of high school students in applied and traditional courses	Quantitative	Quasi-experimental	Secondary CTE students	Student / teacher performance
	Ruhlman, S.	Evaluating tech prep education programs: Implications for reporting program and student outcomes	Qualitative	Qualitative	Secondary CTE students	Curriculum development, integration, or assessment
	Neumark, D., & Allen, A.	What do we know about the effects of school-to-work? A case study of Michigan	Qualitative	Qualitative	Secondary CTE students	Curriculum development, integration, or assessment
	Eisenman, L., Hill, D., & Bailey, R.	The beauty of teacher collaboration to integrate curricula: Professional development and student learning opportunities	Qualitative	Qualitative	CTE professionals [Secondary teachers]	Teacher preparation / development or certification
	Arenas, A.	School-based enterprises and environmental sustainability	Qualitative	Qualitative [Case study]	Miscellaneous	Curriculum development, integration, or assessment
	Brewer, E., & McMahon, J.	Job stress and burnout among industrial and technical teacher educators	Quantitative	Descriptive / Correlational	CTE professionals [Teacher educators]	Miscellaneous
	Farrell, B., & Kotriak, J.	Design and evaluation of a tool to assess strategic information processing styles	Quantitative	Descriptive / Correlational	Postsecondary CTE students	Student interests
	Zinke, C.	Distance education and career and technical education: A review of the research literature	Expository	—	—	Distance education
	28(3)	Shafiqul Azam, M., & Branchie, P. E.	A study of supervisor and employee perceptions of work attitudes in information age manufacturing industries	Quantitative	Causal comparative	Miscellaneous
Ncube, L., & Greenan, J.		Entrepreneurial careers of women in Zimbabwe	Qualitative	Qualitative [Phenomenology]	Miscellaneous	Miscellaneous
Hernandez, V. M., & Brendefur, J.		Developing authentic, integrated, standards-based mathematics curriculum: [More than just] an interdisciplinary collaborative approach	Qualitative	Qualitative [Case study]	CTE professionals [Secondary teachers]	Curriculum development, integration, or assessment
Ruhlman, S. K., & Brenner, C.		Perceptions of traditionally and alternatively certified career and technical education teachers	Quantitative	Descriptive / Correlational	CTE professionals [Secondary teachers]	Teacher preparation / development and certification
Redmann, D., & Kotriak, J.		Analysis of technology integration in the teaching-learning process in selected career and technical education programs	Quantitative	Descriptive / Correlational	CTE professionals [Secondary teachers]	Miscellaneous
Birkholz, A.		An investigation of student, faculty, and administration perceptions of the application of accelerated learning strategies in the Wisconsin technical college system	Quantitative	Descriptive / Correlational	Secondary CTE students (also CTE teachers)	Curriculum development, integration, or assessment

(table continues)

Appendix. Coding Decisions Made for All Articles Published in *CTER*, 2001 – 2005 to Support Data Analysis and Conclusions (continued)

Year	Volume (Issue)	Author(s)	Title	Type ^a	Design ^c	Focus [Participants] ^d	Topic ^e
		Stewart, R., Moore, G., & Flowers, J.	Emerging educational and agricultural trends and their impact on the secondary agricultural education program	Quantitative [Delphi]	Descriptive / Correlational	CTE professionals	CTE conceptual frameworks, research, and trends
		Linneman, F.	The relation of source credibility and message frequency to program evaluation and self-confidence of students in a job shadowing program	Quantitative	Quasi-experimental	Secondary CTE students	Student interests
29(2)		Zinser, R., & Lawrence, F.	New roles to meet industry needs: A look at the advanced technological education program	Quantitative	Descriptive / Correlational	CTE professionals [Secondary teachers]	Curriculum development, integration, or assessment
		Johnson, S., Benson, A., & Duncan, J.	Internet-based learning in postsecondary career and technical education	Quantitative	Descriptive / Correlational	CTE professionals [Postsecondary teachers]	Distance learning
		Branchle, P., & Azam, M.	Factorial invariance of the occupational work-ethic inventory	Quantitative	Descriptive / Correlational	Miscellaneous	Student interests
		Becker, K., & Maunsaityat, S.	A comparison of students' achievement and attitudes between constructivist and traditional classroom environments in Thailand vocational electronics programs	Quantitative	Quasi-experimental	Secondary CTE students	Student / teacher performance
29(3)		Zirkle, C.	Distance education programming barriers in career and technical teacher education in Ohio	Quantitative	Descriptive / Correlational	CTE professionals [Teacher educators]	Distance learning
		Keiser, J., Lawrence, F., & Appleton, J.	Technical education curriculum assessment	Expository	—	—	Curriculum development, integration, or assessment
		Stone, J., Kowalski, B., & Alfeld, C.	Career and technical education in the late 1990s: A descriptive study	Quantitative	Descriptive / Correlational	Miscellaneous	Curriculum development, integration, or assessment
		Edwards, M.	Cognitive learning, student achievement, and instructional approach in secondary agricultural education: A review of literature with implications for future research	Expository	—	—	Student / teacher performance
2005	30(1)	Barabasz, A., & Lakes, R.	School-to-work transition in East Germany: Challenges of a market society	Expository	—	—	Miscellaneous
		Cladd, J., & Anderson, M.	Illinois work-based learning programs: Work-site mentor knowledge and training	Quantitative	Descriptive / Correlational	CTE professionals [Secondary teachers]	Student / teacher performance
		Geunry, M., Rizza, M., Peters, S., & Hu, S.	Professionalism, sense of community and reason to learn: Lessons from an exemplary career and technical education center	Qualitative [Case study]	Qualitative	Secondary CTE students	Student / teacher performance
30(2)		Whittington, S.	Using standards to reform teacher preparation in Career and Technical Education: A successful reform	Expository	—	—	Teacher preparation / development and certification
		Hanus, B., & Knobloch, N.	Preservice teachers' motivation and leadership behaviors related to career choice	Quantitative	Descriptive / Correlational	CTE professionals [Preservice teachers]	Teacher preparation / development and certification

(table continues)

Appendix. Coding Decisions Made for All Articles Published in *CTER*, 2001 – 2005 to Support Data Analysis and Conclusions (continued)

Year	Volume (Issue)	Author(s)	Title	Type ^{a,b}	Design ^c	Focus [Participants] ^d	Topic ^e
		Stone, J.R., & Aliaga, O.	Career and technical education and school-to-work at the end of the 20th century: Participation and outcomes	Quantitative	Descriptive / Correlational	Secondary CTE students	Curriculum development, integration, or assessment
30(3)		Günun, P., Workman, J., & Anderson, M.	Influences of training and strategic information processing style on spatial performance in apparel design	Quantitative	Causal comparative	Postsecondary CTE students	Student interests
		Hammish, D., & Lynch, R.	Secondary to postsecondary technical education transitions: An exploratory study of dual enrollment in Georgia	Qualitative	Qualitative [Case study]	Secondary CTE students	Curriculum development, integration, or assessment
		Smith, B., & Katz, S.	Employability standards: Teachers' perceptions of inclusion in family and consumer sciences secondary curriculum	Quantitative	Descriptive / Correlational	CTE professionals [Secondary teachers]	Curriculum development, integration, or assessment

^aExpository includes conceptual articles, opinion articles, literature reviews, and ACTER Presidential Addresses. ^bQuantitative designation includes Delphi studies, Editor's Notes not included. ^cResearch designs were categorized as qualitative, descriptive/correlational, causal-comparative, quasi-experimental, or experimental. ^dFocus [Participants] included secondary CTE students, postsecondary CTE students, CTE teachers, CTE professionals, and miscellaneous. ^eEight research topics were used, including CTE conceptual frameworks, research, and trends; student/teacher retention; student interests/self-efficacy; curriculum development, integration, or assessment; student/teacher performance; teacher preparation/development and certification; distance learning; and miscellaneous. Volume 27(1) was a special issue of scholarly papers presented at the 2002 National Career and Technical Education Institute. These articles may slightly bias our results because of the expository nature of all 6 papers.

Agricultural Science Teachers' Attitudes About and Use of Reading in Secondary Agricultural Science Instruction

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Abstract

A national survey of 216 agriscience teachers investigated the attitudes and practices related to reading. Knowledge of strategies, total time of text use, confidence in strategy use, and the general approach to reading explained 67% of the variance in frequency of content area reading strategy use. Teachers held positive attitudes about reading from personal and instructional standpoints. However, they lacked knowledge and confidence in content area reading strategies, which translated into low frequency of strategy use. Teachers appeared to use reading and text with justifiable frequency in their agricultural science courses. Because knowledge of reading strategies explained such a large amount of variance (nearly 64%) in frequency of reading strategy use, career and technical education program administrators and teacher educators should encourage professional development about reading strategies.

Introduction

Because today's students will read and write more than any other previous generations of students, they must learn the requisite skills necessary to create meaning from the surfeit and diversity of texts available (Moore, Bean, Birdyshaw, & Rycik, 1999; Vacca, 2002). Yet, students continue to perform poorly on literacy assessments (Snow, 2002). The American educational system has made little to no progress with respect to improving students' reading and comprehension over the past twenty years; more than 25% of high school students graduate without the ability to read at the basic level (National Center for Educational Statistics [NCES], 2001).

Learning to create meaning from texts begins in the classrooms, especially early in a student's formal education. It does not cease with advancing grades. Rather, with the increasingly rigorous texts that students encounter, instruction in reading, comprehension, and literacy also should increase throughout high school. This instruction must occur in all courses with responsibility falling upon all

teachers, including career and technical education teachers (Readence, Bean, & Baldwin, 1998; Vacca, 2002).

Increasingly, content area teachers, including agricultural science teachers, are being called upon to enhance student achievement in math, science, and reading (Belcher, McCaslin, & Headley, 1996; Conroy & Walker, 2000). One method of enhancing achievement in reading could be the implementation of content area reading strategies. Content area reading strategies are operationally defined as those text-based strategies that enable students to acquire new content in a given discipline (McKenna & Robinson, 1990). However, few content area teachers employ content area reading strategies (Barry, 2002; Durkin, 1978), for a variety of reasons, including a perceived lack of confidence in their use and an aversion to reading themselves (Park & Osborne, 2006). What are the factors associated with teachers' attitudes toward reading in general and for applications in agricultural science? What factors are associated with their knowledge of content area reading strategies and frequencies of text and strategy use in agricultural science education?

Theoretical and Conceptual Framework

The RAND Reading Study Group ([RRSG]; Snow, 2002) developed a research agenda for research on comprehension that provided the theoretical framework for this study. The RRSg defined reading comprehension as “the process of simultaneously extracting and constructing meaning through interaction and involvement with written language” (p. xiii), which is comprised of three elements: reader, text, and activity or purpose for reading, all occurring in a larger sociocultural context, including the teacher (see Figure 1).

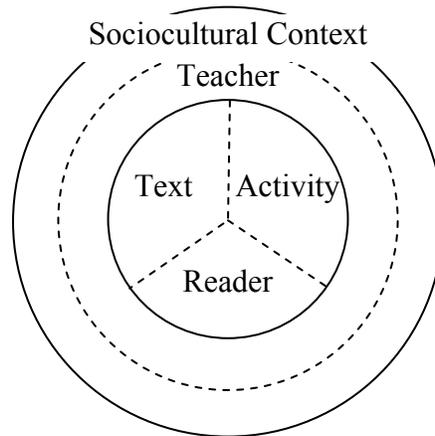


Figure 1. A heuristic for thinking about reading comprehension (Snow, 2002).

The reader brings his or her cognitive capabilities, motivation, knowledge, and experiences to the reading processes (Snow, 2002). These characteristics vary from reader to reader and significantly impact the understanding of written material. Within career and technical education (CTE), students entering these courses possess a wide range of cognitive capabilities, ranging from the most capable students to those who need extra assistance in order to learn from texts. Career and technical education students also enter specific courses with varying levels of motivation, background knowledge, and experiences.

The text includes the representation of information, including the surface code, text base, and mental models. Each different text varies in readability, vocabulary, structure, and content, thereby, impacting comprehension. Texts in CTE areas, such as agricultural science education, can include textbooks, online information, technical manuals, chemical labels, United States Department of Agriculture Extension publications, trade magazines, and trade books. Each of these provides different information in different formats. For students who struggle with reading, the variety of texts in CTE courses may challenge their abilities to learn unless appropriate strategies are employed.

The activity for reading involves the purposes, operations of reading, and outcomes of the reading comprehension processes. Outcomes can consist of solving problems, increasing knowledge, or engaging the reader. In agricultural science education, teachers may challenge students to solve plant growth problems in a greenhouse, to develop solutions for improving the nutrition of livestock, or to create a design for a school landscaping project. Each of these outcomes may involve the use of texts as sources of ideas and information. What teachers expect of the outcomes of reading influences how students read and employ strategies to accomplish those ends.

The context of reading comprehension is comprised of the larger sociocultural environment in which the student encounters and navigates reading (Snow, 2002). This sociocultural context includes the teacher, but also extends beyond the classroom to encompass the community and world of the student. It involves the social aspects of constructing meaning and the development of power within society. When students work collaboratively in the CTE classroom, they are engaging with texts within the sociocultural aspects of their classroom and societal environment. For example, in agricultural science education, students reading a trade magazine may encounter specific biases toward or against agricultural practices. Learning to identify these sociocultural influences is critical to comprehending texts in CTE.

Instruction with Content Area Reading Strategies

Conceptually and practically, comprehension strategies are “procedures that guide students as they attempt to read and write” (National Reading Panel [NRP], 2000, pp. 4-40). CTE teachers employ reading strategies to help students learn when they use texts to gather and complete information to solve problems. These strategies

are “procedural, purposeful, effortful, willful, essential, and facilitative in nature” (Jetton & Alexander, 2001, ¶ 17). Highlighting a set of instructional strategies called *Reading Apprentice*, Schoenbach, Braunger, Greenleaf, and Litman (2003) suggested that effective strategies focus on “*how we read and why we read in the ways we do*” (p. 134). In CTE, this translates into reading different genre of texts using different strategies and helping students understand the purposes for reading in a specific way.

Students who are not explicitly taught reading strategies are unlikely to learn, develop, and employ strategies spontaneously (NRP, 2000). Reading strategy instruction requires a shift from didactic instruction to one that is more student-centered (Sinatra, 2000). The explicitness of strategy instruction has a positive effect on student comprehension, especially for low-achieving students (Snow, 2002). “Explicit instruction provides a clear explanation of the criterion task, encourages students to pay attention, activates prior knowledge, breaks the task into small steps, provides sufficient practice at every step, and incorporates teacher feedback” (p. 33).

In a meta-analysis of reading comprehension strategies, the NRP (2000) found eight strategies to be research-based. These comprehension strategies improve student recall, question answering and generation, and summarization of texts. When these general strategies are used by students, they show general gains on standardized comprehension tests. The eight strategies include:

1. *Comprehension monitoring* in which the reader learns how to be aware or conscious of his or her understanding during reading and learns procedures to deal with problems in understanding as they arise
 2. *Cooperative learning* in which readers work together to learn strategies within context
 3. *Graphic and semantic organizers* that allow the reader to represent graphically (write or draw) the meanings and relationships of the ideas that underlie the words in the text
 4. *Story structure* from which the reader learns to ask and answer who, what, where, when, and why questions about the plot and, in some cases, maps out the timeline, characters, and events in stories
 5. *Question answering* in which the reader answers questions posed by the teacher and is given feedback on the correctness
 6. *Question generation* in which the readers ask what, when, where, why, what will happen, how, and who questions
 7. *Summarization* in which the reader attempts to identify and write the main or most important ideas that integrate or unite the other ideas or meanings of the text into a coherent whole
 8. *Multiple-strategy teaching* in which the reader uses several of the procedures in interaction with the teacher over the text
- Multiple-strategy teaching is effective when the procedures are used flexibly and appropriately by the reader or the teacher in naturalistic contexts (pp. 4-6).

While not all of these strategies are applicable to CTE, such as the story structure strategies about plot, many are applicable to learning from texts in CTE. Further, these strategies have been effective for improving student learning in other contexts.

Research has determined that reading strategy knowledge was the best predictor of reading achievement with fifteen 3rd- and 5th-grade students (Ramos, 1996), twenty-two 3rd-grade students and thirty-eight 6th-grade students (Lenhart, 1994), 86 middle and high school students (Yu, 1997), 379 junior high school students (Wolters, 1997), eighty-one 11th-grade social studies students (Ward-Washington, 2002), and with 106 college students (Hess, 1997). Studying the effectiveness of metacognitive strategy instruction with 152 White and Hispanic, lower middle class Arizona 6th-grade students using a nonequivalent pretest-posttest control group design, Tregaskes and Daines (1989) concluded that students taught with comprehension strategies increased their reading comprehension over the control group who received no instruction with strategies. Walkovic (2004) studied 8th-graders and found that student reported use of reading strategies accounted for 45% of the variance on the 8th-grade Pennsylvania System of School Assessment reading test. Therefore, reading strategy instruction appears to improve students' comprehension of texts.

Reading strategy instruction provides significant gains (Mothus, 2004; Simmonds, 1992), even for higher reading level students (Ferguson, 2001). Evaluating strategy intervention to increase ninety-eight 8th-grade students' comprehension, Mothus (2004) found that students participating in the intervention increased comprehension achievement scores more than one grade level, significantly more than the control group. Further, significant predictors of school failure included reading comprehension. Studying 24 New York State resource room teachers and their use of reading strategies, Simmonds (1992) determined that reading strategy instruction improved comprehension by nearly two standard deviations among 240 resource room students in grades one through nine. In determining the effect of metacognitive strategy instruction on twenty 6th-grade social studies students' content area reading comprehension, Ferguson (2001) found significant differences in the effectiveness of metacognitive strategy instruction on comprehension for high-level readers, as well as low- and average-level readers.

Investigating the effectiveness of teaching different strategies for identifying important concepts in content area reading through two different studies, Carriedo and Alonso-Tapia (1995) explored strategy use with thirty-one 11 and 12 year olds and one hundred-four 11 through 14 year olds. They concluded that the measures for which training was directed garnered significant improvement, including knowledge of the topic and main idea characteristics, graphical representation of relations among text ideas, knowledge of text structures, and summarizing, all strategies outlined by the NRP (2000). In the second study with 11 through 14 year olds under direct instruction, students perceived the main idea and topic of passages better than students without instruction. Additionally, students with direct instruction were more aware of cognitive processes, more able to represent text structure, and had

developed higher metacognitive knowledge than students without direct instruction in reading strategies.

Teachers' Use of Strategies

Career and technical education teachers focus on their content area as the primary priority. While this focus is justifiable, secondary priorities also exist. One of these secondary priorities may be to implement content area reading strategies when using texts as learning tools in order to facilitate students' learning from texts. Highly qualified CTE teachers would not allow students to use power tools or expensive computer technology without first learning the necessary instruction for safe and efficient operation. Similarly, scaffolding instruction to enable students to efficiently create meaning from texts is also vitally important for student learning from texts. In essence, by providing comprehension instruction that is deeply connected to content area learning, comprehension increases (Snow, 2002).

Yet, teachers are often reluctant to implement content area reading strategies in their content areas. Several reasons have been identified, including a lack of confidence in handling reading problems, the attitude that reading instruction infringes on content time, and the denial of the importance of reading for learning in the content area (Barry, 2002; Bean, 1997; Bintz, 1997; Durkin, 1978; Ivey, 2002; Moore et al., 1999; Snow, 2002; Stewart, 1990; Stewart & O'Brien, 1989). Among all content area teachers, agricultural science teachers have been demonstrated to hold problematic views of reading in the content area. O'Brien and Stewart (1990) found that 85% of preservice agricultural science teachers rejected content area reading. These teachers felt they reinforced content area reading and needed little instruction in strategies.

As a relatively small proportion of all teachers, CTE teachers in general, and agricultural science education teachers specifically, have not been studied to determine the factors that are associated with their attitudes toward reading and content area reading strategy instruction. What are the factors that are associated with agricultural science teachers' attitudes toward reading in agricultural science? Are gender, educational attainment, completion of a college reading course, and other factors associated with teachers' knowledge of content area reading strategies, frequency of content area reading strategy, and text use in their agricultural science courses?

Operational Description of Variables

Knowledge of content area reading strategies was assessed by participants' responses to how much knowledge they possessed about specific strategies in a list of 11 common strategies. Strategies consisted of collaborative strategic reading; Cornell notes; directed reading-thinking activities; graphic organizers; guided reading procedures; jig-sawing; Know-Want-Learned (K-W-L) charts; reciprocal

teaching; Socratic seminar; Survey, Question, Read, Recite, Review (SQ3R); and study guides.

Confidence in reading strategy use was assessed by the participants' responses to how much confidence they possessed with use of specific strategies in the same list of 11 common strategies. The strategies were the same as those identified for *knowledge of content area reading strategies*.

Frequency of strategy use was determined by participants' responses about how many times per week they used each of the individual strategies. Again, the strategies were the same as those identified for *knowledge of content area reading strategies*.

Personal attitude towards reading was defined as the respondent's general attitude towards reading. The researchers were attempting to ascertain the teacher's disposition towards reading as a tool for learning. Statements related to this construct included: *I enjoy reading*, *reading for pleasure is one of my hobbies*, *reading is almost always boring* (reverse coded), *reading has been useful for my personal development*, *a person learns very little from reading* (reverse coded), *books help us understand other people and ideas*, and *I make time for reading every day*.

Attitude towards reading in agricultural science was operationally defined as the teacher's predisposition towards using reading as a tool for learning in agricultural science courses. Statements related to this construct included (a) *reading is important in school-based agricultural education*; (b) *reading textbooks, magazines, and other publications is necessary for success in school-based agricultural education*; (c) *school-based agricultural education teachers are not responsible for developing students' reading skills* (reverse coded); (d) *good instruction in school-based agricultural education involves teaching reading strategies*; (e) *school-based agricultural education teachers are responsible for teaching reading skills*; (f) *reading is not important to success in school-based agricultural education*; and (g) *school-based agricultural education teachers should reinforce effective reading strategies*.

General approach to reading was operationally defined as the nonspecific instructional methodology with which a teacher engages students with texts. Items used to define this construct included the stem, "In my agricultural science courses, students are taught to..." with the endings of *...identify their purpose for reading*, *...preview texts before reading*, *...make predictions before reading*, *...think aloud while reading*, *...activate background knowledge for reading*, *...use text structure to build comprehension*, *...use more than one reading strategy*, *...determine important ideas in the reading*, *...generate questions about the text*, *...summarize what they read*, *...define unfamiliar words during reading*, *...monitor comprehension during reading*, and *...create visual representations to aid comprehension and recall*.

Purpose and Objectives

The purpose of the national survey of teachers who were members of the National Association of Agricultural Educators (NAAE) was to explore the relationships among practices and attitudes associated with reading in agricultural science. The objective of this study was to determine the characteristics of agricultural science teachers that best predicted the teacher's (a) attitudes toward reading in agricultural science, (b) general reading practices associated with reading in agricultural science, (c) knowledge of content area reading strategies, (d) frequency of content area reading strategy use in agricultural science, and (e) total text use in agricultural science.

Procedures

As part of a larger research endeavor, this study used a sample of the population of active and life members of the NAAE as listed in the 2003-04 database of membership provided by the NAAE ($N = 6,586$). From the accessible population, a random sample of 367 members was selected to estimate the distribution of characteristics within the population (Dillman, 2000). All members were listed in a Microsoft Excel database worksheet in alphabetical order by state affiliation. Using the random number generator, each individual was assigned a number. The database was then sorted by assigned random number and the 367 individuals with the highest random numbers were selected as the sample. The following calculation was performed to determine sample size:

$$N_s = \frac{(N_p)(p)(1-p)}{[(N_p - 1)(B/C)^2 + (p)(1-p)]}$$

Where: N_s = completed sample size needed for the desired level of precision

N_p = size of population

p = proportion of population expected to choose one of the two response categories

B = acceptable amount of sampling error; $.03 = \pm 3\%$ of the true population value

C = Z-statistic associated with confidence level; 1.96 corresponds to the 95% level

$$N_s = \frac{(6,586)(.50)(1-.50)}{[(6,586 - 1)(.05/1.96)^2 + (.50)(1-.50)]} = 363 (\sim 367, \text{ from Dillman, 2000})$$

To develop the questionnaire, the researchers reviewed literature and other instruments of a similar nature, including those of Baldwin, Johnson, and Beer (1980) and Duke and Pearson (2002). Both of the instruments that were reviewed were problematic in their original forms. The Baldwin, Johnson, and Beer instrument was targeted at students and focused on reading for pleasure. Duke and Pearson provided an overview of general strategies (nonspecific to agricultural science

teachers) used by content area teachers. Thus, these instruments provided the basis for the instrument, as did the general literature review regarding teachers' use of content area reading strategies.

The questionnaire consisted of items related to the objectives of the study and was developed through numerous iterations as part of a survey methodology course project. The initial pool consisted of more than 150 items. Participants rated their knowledge and confidence in strategy use on a 6-point summated ratings scale, similar to a Likert-type scale, with "0" representing *none*, and "5" representing *expert* knowledge. Participants' responses were summated from the list of individual items representing each construct (see Table 1).

Face and content validity were assessed by a literacy professor at the University, a faculty member in education whose research focus is survey methodology, and two teacher educators in agricultural science education. To estimate validity and reliability, the survey instrument was administered to 14 agricultural science teachers. Reliability coefficients for the attitudinal and behavioral items ranged from .70 to .90 (see Table 1). Further, *post hoc* reliability analyses were conducted due to the insufficient number of participants in the pilot survey. Reliability did not vary to a large extent for any of the constructs; therefore, the researchers were reasonably assured of the instrument's reliability. Because items outside of these constructs involved those items for which respondents had "an accurate, ready-made answer" (Dillman, 2000, p. 37), they did not elicit demands for considerable time, thought, or variation, and, therefore, posed no considerable reliability risk.

Table 1
Reliability of individual questionnaire items

Variable	Number of items	Pilot α	Post hoc α
General approach to reading strategies	13	.90	.90
Confidence in use of reading strategy	11	.84	.84
Knowledge of reading strategies	11	.83	.83
Frequency of reading strategy use	11	.83	.83
Frequency of text use	17	.78	.78
Personal value of reading	9	.76	.76
Attitude towards reading in agriscience	7	.70	.71

The data were collected from February through May. The study was administered via the tailored survey design with a mailed questionnaire as outlined by Dillman (2000). A postcard was mailed to the participants alerting them about their selection for participation in the survey. Five days later, the initial questionnaires were mailed to the participants. Included in this mailing were a cover letter from the investigators, a letter from the National FFA Advisor, the

questionnaire, and a two-dollar incentive to enhance responses. Twelve days following the initial mailing, a reminder postcard was mailed to all participants who had not returned a questionnaire asking for their expedited responses. Ten days later, those participants who had not responded were mailed another questionnaire and asked to return it promptly. Again, six days after the questionnaire mailing, a reminder postcard was mailed to the participants. The participants were then contacted a final time in mid-April to remind them to return their questionnaires. The final questionnaires were returned in May prior to data analysis. This methodology resulted in a total of 216 returned usable questionnaires for a 58.9% response rate.

To control for nonresponse error, the researchers compared the early and late respondents (Ary, Jacobs, & Razavieh, 2002; Linder, Murphy, & Briers, 2001). Research has shown that late respondents are often similar to early respondents (Goldhor, 1974; Krushat & Molnar, 1993). Early respondents were those participants who returned their surveys prior to mailing the reminder postcard, while late respondents were those who responded after the second questionnaire was mailed. The respondents were compared based on gender, years of teaching experience, education level, college reading course completion, and the mean summated ratings of personal attitudes toward reading, attitudes toward reading in agricultural science, and general approach to reading. No significant differences existed between the early and late respondents.

The data were analyzed using the SPSS[®] for Windows[™] statistical package, version 13.0 (2005). For each of the constructs, the total mean summated rating was calculated by summing the responses from each item in the construct and dividing that sum by the total number of items in the construct. Initially, descriptive statistical analyses, including means and standard deviations, were calculated to describe the sample. Within the major constructs, mean summated ratings were used to describe the variables. Thus, mean responses were calculated by summing the responses to individual items. Bivariate correlation analysis was performed on the major variables in the study. *T*-tests were conducted to compare the demographic variables of college reading course completion and gender with knowledge, confidence, and frequency of content area reading strategy use. It was determined *a priori* that statistical significance would be indicated for $\alpha \leq 0.05$. According to Agresti and Finlay (1997), stepwise regression is appropriate for exploratory research, or when attempting to “simply find a good set of predictors” (p. 522). Therefore, stepwise regression was used to select predictor variables from the larger pool of correlated variables (Licht, 2004).

Findings

The respondents represented 44 states and consisted of 84.7% males who held standard or permanent teaching licenses (96.6%). Years of teaching experience ranged from 1 to 39 years and averaged 17.3 years. High school teachers represented 80.1% of the sample. On average, teachers taught 6.03 agricultural science courses

and .25 non-agricultural science courses. Over one-third (36%, $n = 75$) of the sample held bachelor's degrees, 63% ($n = 131$) held master's degrees, and 1% ($n = 2$) held degrees above the master's level. A college content area reading course was completed by 39.2% of teachers.

Agricultural science teachers' mean knowledge of content area reading strategies and mean confidence in content area reading strategy use were 1.76 ($SD = .62$) and 1.71 ($SD = .64$), respectively (see Table 2). The mean frequency of use of individual content area reading strategies ranged from 0 to 3.55 with an overall mean of .62 ($SD = .62$). Teachers valued reading from a personal standpoint ($M = 3.98$, $SD = .58$), but placed higher value on the importance of reading in agricultural science ($M = 4.10$, $SD = .53$). *General approach to reading in agriscience* was defined as how teachers approach text from a learning standpoint. Items comprising this construct included the stem, "In my agricultural science courses, students are taught to...", followed with "...identify their purpose for reading, ...preview texts before reading, ...make predictions before reading, ...activate background knowledge for reading, ...determine important ideas in the reading, and ...monitor comprehension during reading," among others. Teachers used general approaches to reading with more frequency ($M = 3.13$, $SD = .74$). On average, teachers used text in 53% of their classes ($SD = .22$). Teachers used text for a mean of 17.64 minutes per use ($SD = 4.49$). Cumulatively, teachers used text for 290.3 minutes per week ($SD = 162.7$)

Table 2
Summary of Variables Related to Agricultural Science Teachers' Use of Content Area Reading Strategies and Text

	<i>n</i>	Range	<i>M</i>	<i>SD</i>
Knowledge of reading strategies ^a	210	.82 – 3.55	1.76	.62
Confidence in reading strategy use ^b	210	.00 – 3.55	1.71	.64
Frequency of reading strategy use ^c	210	.00 – 2.64	.62	.62
Personal value of reading ^d	210	2.00 – 5.00	3.98	.58
Attitude towards reading in agriscience ^e	210	2.43 – 5.00	4.10	.53
General approach to reading in agriscience ^f	210	.00 – 5.00	3.13	.74
Frequency of text use ^g	202	.10 – 1.00	.53	.22
Intensity of text use ^h	199	5.00 – 25.00	17.64	4.49
Cumulative use of text in agriscience ⁱ	198	28.10 – 721.90	290.30	162.70

^a Mean summated rating, 0 = none, 5 = expert. ^b Mean summated rating, 0 = none, 5 = expert.
^c Number of times per week per class. ^d Mean summated rating for 9 items. ^e Mean summated rating for 7 items. ^f Mean summated rating for 13 items. ^g Percent of classes. ^h Minutes per use.
ⁱ Minutes per week

Using the mean frequency and intensity of textbook use, the total amount and percent of class time per week spent using texts based on 1,500 minutes of

instruction per week were computed. The researchers arrived at 1,500 minutes of instruction by calculating the following formula:

$$50 \text{ minutes/traditional period} * 6 \text{ periods / day} * 5 \text{ days / week} = 1,500.$$

While instructional time may vary depending upon the class schedule, instructional time for each teacher on a weekly basis should be approximately the same. On average, agricultural science teachers used texts as learning tools in 52.6% of class periods per week, or 15.78 periods, and 17.64 minutes per use. Within 30 periods of instruction per week, teachers have the opportunity to teach for 1,500 minutes per week. Based on these figures, teachers use text for 290.3 minutes per week (19.35% of instructional time).

Correlation analyses were conducted comparing demographic variables to constructs of interest related to teachers' attitudes toward reading (see Tables 3 and 4) and used the conventions provided by Davis (1971). Davis described *negligible* relationships as those with a correlation of .01 to .09, *low* relationships as those with a correlation of .10 to .29, *moderate* relationships as those with a correlation of .30 to .49, *substantial* relationships as those with a correlation of .50 to .69, and *very high* relationships as those with a correlation of .70 to .99. For the purposes of correlation analysis, males, standard/permanent licensure, and completion of a college reading course were coded with a "1" and responses that were female, held a temporary licensure, and lacked a college reading course were coded with a "0". A *very high* positive correlation (i.e., $r = .84$ and $r = .77$) was discovered between knowledge of content area reading strategies and both confidence in and frequency of using content area reading strategies, as well as between confidence in and frequency of use of content area reading strategies. *Moderate* positive correlations (i.e., $r = .43$) were discovered between frequency and intensity of text use, gender and years teaching experience; and general approach to reading and frequency of, knowledge of, and confidence in content area reading strategy use. Further, a *moderate* positive correlation (i.e., $r = .32$) was discovered between personal value of reading and attitudes toward reading in agricultural science.

A teacher's general approach to reading in agricultural science showed a *low* positive correlation between both attitude towards reading in agricultural science (i.e., $r = .26$), frequency of text use (i.e., $r = .23$), and the teacher's personal value of reading (i.e., $r = .14$). Knowledge of content area reading strategies had a *low* positive correlation between completion of a college reading course (i.e., $r = .23$), the teacher's attitude towards reading in agricultural science (i.e., $r = -.02$), and intensity of text use (i.e., $r = .10$). Frequency of content area reading strategy use had a *low* positive correlation between frequency of text use (i.e., $r = .25$), completion of a college reading course (i.e., $r = .21$), the teacher's attitude towards reading in agriscience (i.e., $r = .20$), and intensity of text use (i.e., $r = .16$). Completion of a college reading course had a *low* positive correlation (i.e., $r = .16$) with confidence in use of content area reading strategies. Confidence in content area reading strategy use had a *low* positive correlation with the teacher's attitude towards reading in agricultural science (i.e., $r = .15$) and frequency of text use (i.e., $r = .14$). Years of

teaching exhibited a *low* positive correlation with education (i.e., $r = .21$), licensure (i.e., $r = .21$), and teacher's attitude towards reading in agriscience (i.e., $r = .15$). Frequency of text use was also positively correlated with both intensity of text use (i.e., $r = .43$) and personal value of reading (i.e., $r = .15$).

Table 3
Correlations between Demographic Variables and Reading Criteria

	1	2	3	4	5	6	7	8	9	10
1. Years teaching experience	---	-.17*	-.18*	.01	.06	.15*	.00	.00	.07	.03
2. Knowledge of reading strategies		---	.84*	.77*	.12	.19*	.35*	.13	.15*	.14
3. Confidence in use of reading strategies			---	.70*	.11	.15*	.32*	.14*	.14	.14*
4. Frequency of use of reading strategies				---	.09	.20*	.38*	.25*	.16*	.25*
5. Personal value of reading					---	.32*	.14*	.15*	.03	.12
6. Attitude towards reading in agriscience						---	.26*	.09	.07	.12
7. General approach to reading							---	.23*	.21*	.26*
8. Frequency of text use								---	.43*	.91*
9. Intensity of text use									---	.72*
10. Total text use (time)										---

* $p \leq .05$.

Low negative correlations were discovered between licensure and knowledge (i.e., $r = -.20$), confidence (i.e., $r = -.22$), and frequency of content area reading strategy use (i.e., $r = -.23$). Gender exhibited a *low* negative correlation with knowledge (i.e., $r = -.21$) and confidence in content area reading strategies (i.e., $r =$

-.17). Years teaching experience had a *low* negative correlation with knowledge (i.e., $r = -.17$) and confidence in content area reading strategies (i.e., $r = -.18$).

Table 4
Point-Biserial Correlations Between Categorical and Continuous Variables

	Gender	Education	College reading course	License
Gender	---	-.03	-.04	.07
Education ^a		---	-.07	.08
College reading course			---	-.07
License				---
Years teaching experience	.40*	.21*	-.13	.21*
Knowledge of reading strategies	-.21*	.05	.23*	-.20*
Confidence in reading strategy use	-.17*	.06	.16*	-.22*
Frequency in use of reading strategies	.03	.01	.21*	-.23*
Personal value of reading	-.09	.12	.01	.12
Attitude towards reading in agriscience	.01	.06	-.02	.02
General approach to reading	.03	.13	.13	-.05
Frequency of text use in agriscience	.02	-.05	.08	-.12
Intensity of text use in agriscience	-.05	-.04	.10	-.05
Total text use (time)	-.01	-.06	.06	-.14

^aBachelor's degree = 1, master's degree = 2, doctoral degree = 3.

* $p \leq .05$.

Based upon the findings from the correlation analyses, *t*-tests were conducted to determine differences between completion of a college reading course and gender with knowledge, confidence, and frequency of content area reading strategy use. Teachers completing a college reading course as part of their teacher preparation programs responded with higher confidence, frequency, and knowledge of content area reading strategies (see Table 5). The effect size for completion of a college reading course on knowledge of content area reading strategies was $d = .47$ (Gall, Gall, & Borg, 2003). Additionally, the effect size for completion of a college reading course on confidence in use of content area reading strategies was $d = .32$. Further, the effect size for completion of a college reading course on frequency of use of content area reading strategies was $d = .43$.

Female teachers demonstrated higher confidence in content area reading strategies than did males (see Table 6). Females' mean confidence in content area reading strategies was 1.97 ($SD = .72$) compared to males with 1.66 ($SD = .62$).

Females also demonstrated greater knowledge of content area reading strategies than did their male counterparts. Females rated their knowledge of content area reading strategies with a mean of 2.06 ($SD = .69$), while males rated their knowledge with a mean of 1.76 ($SD = .62$). The effect size for gender on knowledge of content area reading strategies was $d = .55$ (Gall et al., 2003). The effect size for gender on confidence in use of content area reading strategies was $d = .46$. As there was no significant difference between males and females related to frequency of strategy use, there was no significant effect size.

Table 5
Significant Differences in Enrollment of College Reading Courses and Confidence, Frequency, and Knowledge of Content Area Reading Strategy Use

	College Reading Course				<i>df</i>	<i>t</i>	<i>p</i>	95% CI of mean difference
	Yes		No					
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>				
Knowledge	1.94	.71	1.65	.53	207	2.32	.02	.12-.46
Confidence	1.84	.70	1.63	.59	207	3.11	.00	.03-.39
Frequency	.79	.72	.52	.53	207	3.41	.00	.10-.44

Table 6
Significant Differences Between Gender and Confidence, Frequency, and Knowledge of Content Area Reading Strategy Use

	Gender				<i>df</i>	<i>t</i>	<i>p</i>	95% CI of mean difference
	Female		Male					
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>				
Knowledge	2.06	.69	1.71	.59	207	3.02	.00	.12-.58
Confidence	1.97	.72	1.66	.62	207	2.49	.01	.06-.54
Frequency	.58	.50	.63	.64	207	-.43	.67	-.29-.18

Objectives

In the first objective, the researchers sought to determine the characteristics of agricultural science teachers that best predicted their attitudes toward reading in agricultural science. Years of teaching experience, knowledge of content area reading strategies, confidence in content area reading strategy use, frequency of content area reading strategy use, personal value of reading, and general approach to using reading were entered into a backward stepwise regression equation to determine which variables best predicted teachers' attitudes. The resulting equation, consisting of the teacher's personal value of reading, general approach to using reading, years of teaching experience, and knowledge of content area reading strategies, explained

17% of the variance in attitude towards reading in agricultural science (see Table 7). Personal value of reading explained the largest amount of variance (R^2 change = .10).

Table 7
Attitudes Toward Reading in Agricultural Science

	<i>B</i>	<i>SE</i>	β	<i>t</i>	R^2 change
(Constant)	2.34	.27	---	8.71	---
Personal value of reading	.24*	.06	.27	4.15	.10
General approach to reading	.14*	.05	.19	2.81	.05
Years teaching	.01*	.00	.16	2.41	.02
Knowledge of reading strategies	.11*	.06	.13	1.91	.00

Note. Adjusted $R^2 = .17, p \leq .05$.

* $p \leq .05$.

With Objective 2, the researchers sought to determine the characteristics of agricultural science teachers that best predicted their general approach to reading in agricultural science. Knowledge of content area reading strategies, confidence in content area reading strategies, frequency of content area reading strategy use, personal value of reading, attitude towards reading in agriscience, frequency of text use, intensity of text use, and total text use were initially used in the model. Using backward stepwise regression, the resulting model explained 20% of the variance (see Table 8), and consisted of frequency of content area reading strategy use, attitude towards reading in agriscience, and intensity of text use. Frequency explained the most variance (R^2 change = .15).

Table 8
General Approach to Using Reading Strategies in Agricultural Science

	<i>B</i>	<i>SE</i>	β	<i>t</i>	R^2 change
(Constant)	1.43	.39	---	3.68	---
Frequency of reading strategy use	.38*	.08	.32	4.90	.15
Attitude towards reading in agricultural science	.26*	.09	.20	3.01	.04
Intensity of text use	.02*	.01	.15	2.29	.02

Note. Adjusted $R^2 = .20, p \leq .05$.

* $p \leq .05$.

In Objective 3, the researchers sought to predict teachers' knowledge of content area reading strategies (see Table 9). The regression equation explained 22% of the variance. Originally, gender, years of teaching experience, completion of a college reading course, licensure, attitude towards reading in agricultural science,

and general approach to using reading were included in the model. Although they were significantly correlated, confidence and frequency of content area reading strategy use were not included in the model, because they were determined to be products of knowledge. Five variables explained 24% of the variance in knowledge of content area reading strategies: general approach to using reading, gender, licensure, completing a college reading course, and attitude towards reading in agricultural science.

Table 9
Knowledge of Content Area Reading Strategies

	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>R</i> ² change
(Constant)	1.08	.38	---	2.83	---
General approach to reading	.22*	.06	.25	3.79	.12
Gender	-.33*	.11	-.20	-3.10	.05
License	-.59*	.21	-.18	-2.80	.03
College reading course	.21*	.08	.17	2.61	.03
Attitude towards reading in agricultural science	.19*	.08	.16	2.46	.02

Note. Adjusted $R^2 = 0.24$, $p \leq .05$.

* $p \leq .05$.

In Objective 4, the researchers sought to determine the characteristics of agricultural science teachers that best predicted their frequency of content area reading strategy use. Completion of a college reading course, licensure, knowledge of content area reading strategies, confidence in content area reading strategy use, attitude towards reading in agricultural science, general approach to reading, and frequency, intensity, and cumulative text use were originally included in the model. The regression equation predicted 67% of the variance using five variables: (a) knowledge of content area reading strategies, (b) total time of text use, (c) general approach to using reading in agricultural science, (d) confidence in content area reading strategy use, and (e) the intensity of text use (see Table 10).

Through the final objective, the researchers sought to determine the characteristics of agricultural science teachers that best predicted their cumulative use of text in agricultural science courses. The regression model initially included licensure, confidence in content area reading strategy use, frequency of content area reading strategy use, general approach to reading, frequency of text use, and intensity of text use. Confidence in content area reading strategy use, frequency of reading strategy use, and general approach to reading were removed from the final equation because they lacked statistical significance in predicting variance. A regression equation consisting of frequency of text use, intensity of text use, and licensure predicted 96% of the variance in cumulative text use (see Table 11).

Table 10
Frequency of Specific Content Area Reading Strategy Use

	<i>B</i>	<i>SE</i>	β	<i>t</i>	R^2 change
(Constant)	-.96	.15	---	-6.54	---
Knowledge of reading strategies	.63*	.08	.63	8.32	.64
Total time of text use	.00*	.00	.19	3.25	.02
General approach to reading	.10*	.04	.11	2.54	.01
Confidence in reading strategy use	.14*	.07	.14	1.84	.00
Intensity of text use	-.02*	.01	-.11	-1.90	.00

Note. Adjusted $R^2 = 0.67$, $p \leq .05$.

* $p \leq .05$.

Table 11
Total Text Use (Time)

	<i>B</i>	<i>SE</i>	β	<i>t</i>	R^2 change
(Constant)	-218.87*	16.74	---	-13.08	---
Frequency of text use	534.00*	12.15	.73	43.97	.82
Intensity of text use	14.52*	.60	.40	24.27	.13
License	-27.92*	13.24	-.03	-2.11	.00

Note. Adjusted $R^2 = .96$, $p \leq .05$.

* $p \leq .05$.

Conclusions, Discussion, and Implications

When reflecting on the findings of this research, the teacher's place within the sociocultural context of the classroom and his or her influence upon students are the main foci. Thus, when viewed from this perspective, the findings indicated something about how agricultural science teachers not only value reading and text as learning tools, but also how those values manifested themselves through the teacher's classroom instruction.

In this national survey, the data suggested that agricultural science teachers do value reading from a personal standpoint and as a learning tool in their agricultural science courses. This contradicts previous findings about agricultural science teachers' perceptions toward reading and literacy suggesting that content area teachers tend to devalue learning from text (D'Arcangelo, 2002; Forget & Bottoms, 2000; Moore et al., 1999; Snow, 2002), especially those in agricultural science (O'Brien & Stewart, 1990). Perhaps today's teachers who have completed college reading courses are using newer editions of text that are more reader-friendly, and/or these teachers have adopted the stance that *reading is fundamental*. Regardless, the

positive approach to reading and enhancing reading instruction should aid all students in improving their reading comprehension and literacy (Forget & Bottoms, 2000; Ivey, 2002; NRP, 2000; Rhoder, 2002). As a powerful force within the sociocultural context of the classroom (Snow, 2002), teachers who value reading should demonstrate it to students through their instructional practices.

Although teachers valued reading, their overall knowledge and confidence in content area reading strategies were low. However, these variables were *very highly* correlated, therefore, a low value in one area could indicate low values in other areas. Further, the frequency of content area reading strategy use appeared low among these teachers. On average, agricultural science teachers used content area reading strategies less than two times per class for every three weeks of instruction. While the frequency of use of strategies seemed low, it may be appropriate given the kinds of learning that occur within a CTE classroom. Perhaps teachers use strategies in an acceptable proportion with their other instructional practices. Observations of classroom practices with special focus on literacy instruction could shed light on this issue. The important consideration is that while teachers generally valued reading, especially in the CTE area, they lacked the knowledge and confidence to use content area reading strategies with high frequency.

Frequency of text use was *moderately* correlated with intensity of text use and *very highly* correlated with total text use. Additionally, intensity of text use was *very highly* correlated with total text use. These findings were supported in other research where engagement in reading episodes was positively associated with student gains in comprehension and reading ability (Snow, 2002). Within the activity of reading (Snow, 2002), one hopes that CTE teachers would assist their students in learning from text and, thereby, implement content area reading strategies alongside of text use.

When considering the gender of teachers, females demonstrated a *low* positive correlation with knowledge of content area reading strategies and confidence in content area reading strategy use. Female teachers appeared to be more knowledgeable and confident in reinforcing and teaching with text and content area reading strategies. While the literacy prowess of female agricultural science teachers should be celebrated, the comparable shortfall of reading knowledge and confidence among male teachers is cause for alarm. As agricultural science education remains a male-dominated discipline, many students may not be experiencing an agricultural science teacher who is knowledgeable and confident when using text as a learning tool.

Completion of a college reading course also demonstrated *low* positive correlations with knowledge of, confidence in, and frequency of content area reading strategy use, and yielded effect sizes of .47, .32, and .43 for knowledge, confidence, and frequency of strategy use, respectively. Many teacher preparation institutions require completion of a college reading course for teacher certification. Oftentimes, this course has been separate from other teaching methods courses; therefore, some students may not have seen the connection between use of literacy strategies and

planning for instruction. However, the findings in this study indicated that the reading course did have an impact on the use of content area reading strategies in CTE courses. The data reinforced the value of requiring completion of content area reading courses for teacher certification. Those teachers completing college reading courses demonstrated higher levels of knowledge, confidence, and frequency of text use in their agricultural science courses. While the college reading course difference was *statistically* significant for completers versus noncompleters, did it have *practical* significance, especially concerning the frequency of content area reading strategy use?

The difference in frequency of content area reading strategy use between college reading course completers and noncompleters was .27 times per course per week. This did not seem to have practical significance until that difference was multiplied by the number of weeks in the school year, 36, which resulted in a year long difference in the number of content area reading strategies of 9.72. Teachers who completed a college reading course used nearly 10 more content area reading strategies per course per year than their counterparts who did not complete a college reading course. That was nearly 10 more episodes of active engagement with text per course. Is this practically significant? Yes, it appears to be. Therefore, this may be evidence supporting that a teacher's preparation with reading strategies influences the activity of reading and learning from text for students enrolled in CTE courses (Snow, 2002).

Objective 1 sought to determine the significant factors associated with teachers' attitudes toward reading in agricultural science. While the entire model consisting of three variables explained 15% of the variance, the major contributor to this portion of explained variance was the teachers' personal value of reading. When teachers personally value reading and are themselves readers, they translate these factors into classroom practice (Dillon, 2003; Yore, 1991). Therefore, improving the culture of reading in career and technical classes may be dependent on the teacher's personal attitude towards reading, especially as a learning tool.

Objective 2 sought to determine the significant factors associated with agricultural science teachers' general approach to using reading strategies. Again, despite the small explained variance (17%), the model was comprised of two factors: frequency of content area reading strategy use and attitude towards reading in agricultural science. Therefore, if teachers were using content area reading strategies, then they were generally approaching text as a learning tool. Again, this reinforces the idea that the teacher contributes to the sociocultural environment of the classroom, which in turn impacts how students engage in the activity of reading (Snow, 2002).

Objective 3 sought to explain the variables associated with knowledge of content area reading strategies. Five variables, including general approach to reading in agriscience, gender, completion of a college reading course, licensure, and attitude towards reading in agricultural science explained 22% of the variance. Female teachers who held professional licenses, completed a college reading course, used

effective general approaches to reading, and were positively predisposed to using reading as a learning tool were likely to be more knowledgeable about content area reading strategies. Again, the completion of a college reading course influences the teacher's knowledge of reading strategies.

Perhaps the most interesting conclusion emerged from objective 4. A model consisting of knowledge of content area reading strategies, frequency of text use, confidence in content area reading strategies, and general approach to reading explained 67% of the variance in frequency of content area reading strategy use. Of those variables, knowledge of content area reading strategies explained nearly 64% of the variance by itself. Knowledge of reading strategies influences the teacher's use of strategies in the classroom context, which impacts a student's use of reading strategies, or the activities associated with reading (Snow, 2002). Therefore, it could be concluded that increased teachers' knowledge of content area reading strategies increased the frequency with which they taught students to use content area reading strategies as learning tools. This is clearly within the realm of CTE teacher education programs. If CTE teacher education programs added parameters to check preservice teachers' knowledge of content area reading strategies, then they may be able to influence positively content area reading strategy use in high school CTE classrooms. When teachers know how to use content area reading strategies, they use them. In contrast, lacking knowledge of content area reading strategies, teachers will not use them effectively.

The final objective sought to determine the variables associated with cumulative use of text in agricultural science courses. In agricultural science education, total time of text use was primarily a function of frequency of text use (R^2 change = 0.824). This seems to be a logical conclusion. Further, as teachers use text more frequently, texts are more often used as learning tools. Therefore, if teachers want to demonstrate the value of text by implementing additional text opportunities, then they may not necessarily spend a lot of time per instance in text use, but use texts frequently in their CTE courses. This would increase the time engaged in the activity of reading (Snow, 2002).

Limitations of the Study

This study had two major limitations. First, the membership of NAAE may not have been representative of the nearly 10,000 agricultural science teachers across the nation. However, the sampling frame of more than 6,500 NAAE members represented the most available and an efficient frame for a national survey of agricultural science teachers. The cooperation and assistance demonstrated by the NAAE and its membership was appreciated. Secondly, this survey garnered a response rate (58.9%) that was less than desirable. Therefore, although early and late respondents revealed no significant differences in their responses to individual items on the questionnaire, the possibility still exists that respondents could have responded somewhat differently than nonrespondents. These practical limitations, however, do

not necessarily limit the appropriateness of the methods used in and results of the study.

Recommendations

Several recommendations are offered based upon the results of the national survey of agricultural science teachers. First, career and technical education teacher education institutions, especially those preparing the nation's agricultural science teachers, should continue to require college reading courses as part of teacher certification. Further, because knowledge and confidence of content area reading strategies appear to enhance the frequency of content area reading strategy use, then teacher educators should model appropriate reading strategies in teaching methods courses and other courses when reading is used as a learning tool.

Because personal value and attitude toward reading in agricultural science were significant variables in many of the regression models in this study, these attitudinal factors should be considered during teacher preparation. Preservice teachers should examine their own attitudes regarding reading, both from a personal and an instructional standpoint. In fact, several studies have suggested that the teacher is a significant factor in students' reading culture (Bintz, 1997; Guthrie, Schafer, Wang, & Afflerbach, 1995; Moje, 1996; NRP, 2000; Sanchez, 2003; Snow, 2002).

This study stimulates questions for further research. For example, do agricultural science teachers compare with other CTE teachers in their attitudes toward reading, preparation for instruction with reading, and knowledge, confidence, and frequency of text use? Additionally, why do teachers seem to value reading and literacy, yet fail to implement reading and use of reading strategies with great frequency in their CTE courses? Further, is the frequency with which teachers use content area reading strategies appropriate for the context and learning that occur in CTE courses? Also, if confidence and knowledge are limiting factors, what models of professional development would prepare teachers with improved knowledge and confidence in the use of content area reading strategies? Finally, for the teachers who are currently using reading strategies in their instruction, how effectively is the use of content area reading strategies for improving student achievement in reading and learning in CTE? These and other questions are important to answer in the CTE research community. Future investigations will likely lead to expanded theory and improved practice in the CTE field.

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Work-Based Learning and Social Support: Relative Influences on High School Seniors' Occupational Engagement Orientations

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Abstract

This study examined the efforts of a large, urban school district to reduce future occupational disengagement risks by requiring all high school students to complete 60 hours of work-based internships. The hypothesis was that social support from adult supervisors and mentors positively affected students' occupational engagement orientations over and above the influence that programmatic experiences provided. The survey data for this study were collected from all seniors in the district's 17 high schools (N = 1,741). Ordinary Least Squares (OLS) was applied in a hierarchical regression in four stages. The findings indicated that opportunities to receive social support, especially having a mentor, contributed most to seniors' future dispositions toward occupational engagement. District career and technical education (CTE) students also experienced greater social support than non-CTE students. The recommendations focused on the need for comprehensive high schools to provide more access to supportive adults and personalized supportive learning environments.

Introduction

Students benefit when schools enable them to take part in learning opportunities beyond the traditional classroom that can transform their minds and build their personal capacity toward future possibilities (Dewey, 1916). In educating youth for socially and economically productive adult roles within a democratic society, public schools play a significant role in assisting youth in clarifying future goals, determining a career orientation, preparing for pro-social participation, and cultivating civic- and occupational-oriented competencies (Cotterell, 1996). Continuing low academic performance in the face of a rapidly changing global economy, rising fears about future global competitiveness, and trends for political and community disengagement have fueled growing concerns that today's youth, especially those in urban, higher-poverty, and lower academically achieving contexts, are unprepared for socially and economically productive adult roles vital to democratic citizenship and stability (Putnam, 2000; Rosenbaum 1996; Steinberg, 1998).

The evolution of the modern American and global economies poses significant challenges to urban youth who may lack adequate employment-search knowledge, resourceful social ties, and support. Many students have high, if not exaggerated and

unrealistic, occupational aspirations (Roy & Rosenbaum, 1996). A national study of 6th-graders, for example, reported that 80% plan to pursue occupations that require education beyond high school including four-year college or advanced degrees (Csikszentmihalyi & Schneider, 2000). Despite high occupational aspirations, these same young people generally viewed schooling as not relevant to their career plans. Unrealizable ambition gives way to disillusionment, discouragement, and disaffection as young persons have limited career knowledge and opportunities to “talk seriously with adults, or each other, about how the present and future connects, how present clues provide insights into future life-styles or careers” (Steinberg, 1998, p. 7). These students likely lacked a basic sense of what adult work entails.

Given the economic challenges, urban youth are required to become economically productive and self-sufficient adults capable of adapting to rapidly changing and fluctuating labor markets (Rosenbaum, 1996). Continuous technological innovations, increased employer demands for higher skills and competencies, corporate restructuring, downsizing, underemployment, real living wage decline, the flight of manufacturing abroad, and gradually weakening labor unions, characterize the turbulent labor market context that 16-24 year old young adults face (Sum, Fogg, & Mangum, 2000). Outside of low-wage jobs with minimal security benefits, fewer opportunities exist to achieve economic independence and self-sufficiency for those without higher education (Rosenbaum, 1996). As inflation has continued to rise faster than the living wage since the 1970s, and with the sharpest decline in relative income among those in the lowest quartile, the poor are only getting poorer (Baker, 2005; Pollin, 2003).

Based on data collected by the Bureau of Labor Statistics, the decline in inflation-adjusted real earnings since 1981 has particularly affected those with less formal education (-25%), no high school diploma (-38.8%) compared to those with a bachelor's or higher degree (-2%) (Sum et al., 2000). These economic conditions diminish the capacity for meeting basic family needs and increase the likelihood for family economic distress and harmful youth developmental effects, found to be disproportionate among urban ethnic minorities (Barrera, Caples, & Tein, 2001; Elder, Eccles, Ardelt, & Lord, 1995; Schneewind, 1995).

Difficulties for labor market entry and access will continue to rise as the number of 16-24 year olds is projected to increase 21% between 1995-2010 (Sum et al., 2000). Two-thirds of this group will be Non-Whites and Hispanics, who typically have lower formal education levels and limited English proficiency (Sum et al., 2000). Unemployment among 16-24 year olds (-5.2%) far exceeds levels among all other age groups. Out-of-school young adults, especially males, face formidable challenges to gaining labor market access without formal education and basic skills (Sum et al., 2000; Sum, Khatiwada, Palma, & Perron, 2004). Such young adults are occupationally unprepared and likely to “spend the better part of their twenties somewhat adrift and disengaged” (Rhodes, Grossman, & Roffman, 2002, p. 17). As occupationally disengaged adults, these individuals are “unlikely to earn a decent

living” and “face bleak prospects of dead-end work, interrupted by periods of unemployment, with little chance to climb a career ladder” (United States Department of Labor, 1991 p. iii).

More young people are also growing up in socially and economically disadvantaged families and environments where they are likely to experience social isolation, limited access to information, and lack of pro-social modeling (Gephart, 1997; Masten & Coatesworth, 1998; Rhodes et al., 2002). Limited social resources prevent these transitional youth from overcoming the occupational disengagement risks increasingly permeating American society.

For decades, American education, particularly traditional American comprehensive high schools, have been criticized for perpetuating youth risks for adult occupational disengagement by failing to produce young adults with “mature and informed judgment needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself” (United States Department of Education, 1983, p. 1). In response, educational reform policies, such as the No Child Left Behind Act (2001), have emphasized increased expectations, academic performance, and educational attainment for every American child in a high standards, competency-building learning environment. Generally, policies emphasize “walled-in” or building-centered education reform strategies and tend to be problematic as they generally do not engage socially and economically disadvantaged students deeply enough on external environmental and developmental levels (Anderson-Butcher, Lawson, Bean, Boone, & Kwiatkowski, 2004). More purposeful interventions are needed especially in these contexts.

In order to combat the risks of occupational disengagement, many educational leaders and policymakers have implemented high school programs that encourage career exploration, preparation, and development activities or “*work-based learning*” (Bailey, Hughes, & Moore, 2004, p. 6; Northwest Regional Educational Laboratory, 1996) through which future career and life-path orientations are critically shaped (Cotterell, 1996). These high school programs have also become increasingly infused into education standards and high school graduation requirements (RMC Research Corporation, 2002; Shumer & Cook 1999; Skinner & Chapman, 1999).

School districts may adopt mandatory work-based learning requirements to increase students’ occupational engagement orientations by the end of high school. However, evidence is lacking regarding the efficacy of such policies in socially and economically disadvantaged contexts and school districts in crises. The investigation of the Internship Program in the study addresses this critical need.

The Problem

In 1998, the school board of the “Midwestern City Schools,” a large urban school district in this study, approved a work-based learning graduation requirement

to reform its high schools and address occupational disengagement risks. The school district was faced with meeting only 3 of 18 state academic performance standards, a 62% high school graduation rate, and a pending rating of “academic emergency” by the state.

Through an initiative known as the *Internship Program*, 11th- and 12th-grade high school students were required to earn a minimum of 60 hours in out-of-class work-based internships according to their intended career choices or interests. The district advised schools to identify a teacher, usually designated as “on special assignment,” to assist students in selecting internships. Students were required to complete 30 hours through unpaid internships in the 11th-grade and 30 hours through paid internships in the 12th-grade. Although students were required to complete unpaid and paid internships, high schools were not required to provide students with these placements. The district defined an internship as an “actual first-hand professional experience outside the classroom,” which is designed to “give students an up-close look at the world of work” and a “useful link to the market” (Midwestern City Schools, 1998).

Beyond meeting employer demands and job-specific responsibilities, students were not required to complete any additional activities or objectives at their worksites required by the school or work-based learning plans. It was strongly recommended that students work with mentors who could provide one-on-one job training to achieve a more intensive job exploration. However, no specific structures were provided to ensure that this happened for all district students. Additionally, no districtwide plans were made to provide students release time to complete their internships during the school day. Moreover, the district did not provide any special preparation or training regarding the work they were expected to perform in these internships.

Purpose of the Study and Research Questions

The Class of 2002 became the first district graduating class with the Internship Program requirement. This study examined the efficacy of the Internship Program with respect to promoting positive occupational engagement orientations at the end of high school. Bringing a theoretical perspective, the study also examined the influence of socially supportive relationships experienced by students as they fulfilled program requirements on their occupational engagement orientations. Specifically, three specific research questions were of interest:

1. How much do student demographic characteristics (e.g., gender, ethnicity, Socioeconomic Status [SES], Grade Point Average [GPA], English as a Second Language [ESL]) account for high school seniors’ orientations toward occupational engagement?

2. To what extent, does completion of work-based internships (i.e., unpaid internships, paid internships) influence high school seniors' occupational engagement orientations?
3. How influential is social support in enhancing high school seniors' occupational engagement orientations over and above the influence that work-based internships provide?

Theoretical Framework

The theoretical framework guiding this study regarding the relative influences of work-based learning and social support on occupational engagement orientations at the end of high school was based on a theoretical model in the research and literature (see Figure 1). Each frame in the model is explained below.

Occupational Engagement Orientation

Economically engaged and productive young adults have developed an orientation towards a distinct career or occupational pathway, enabling them to become economically self-sufficient (Hamilton & Hamilton, 1997; Orr, 1996; Röhrle & Sommer, 1994). The young person typically accomplishes this transformational process through meaningful work-based learning experiences, achieving occupational goal clarity along with the confidence, drive, and capacity to develop a career plan based on individual goals, values, and strengths (Zeldin & Charner, 1996). Through meaningful work-based learning experiences, high school students gain an understanding of career options, steps, and the skills necessary to attain occupational goals (Bailey et al., 2004; Clausen, 1991; Csikszentmihalyi & Schneider, 2000).

Developing and identifying an occupational pathway during high school enables students to develop a motivating self-image or vision of the future person they wish to become (Bailey et al., 2004). A focused self-concept buffers the young person against formidable environmental stress or other negative external stimuli that may deter them from pursuit of certain occupational pathways. Instead, they gain employment-oriented skills and information about employment options needed to reach occupational goals. Competency-building experiences that increase motivation and drive for certain occupational pathways during high school enhance self-confidence, self-worth, and identity essential in making a successful transition to adulthood (Zeldin & Charner, 1996). These skills, dispositions, and competencies lead high school students to develop occupational engagement orientations (Hamilton & Hamilton, 1997; Orr, 1996; Röhrle & Sommer, 1994).

As depicted by the top box in Figure 1, occupational engagement orientations (OEO) at the end of high school reduce the risk of adult occupational disengagement. As the principal Internship Program outcome, OEO indicates that seniors have

clarified career interests, confidence, and skills to pursue a defined career pathway. The lower-middle box frames the mandatory work-based learning requirement (i.e., unpaid internships in the 11th-grade, paid internships in the 12th-grade), which potentially assists students in achieving positive occupational engagement orientations. These relationships are indicated by arrow *b*.

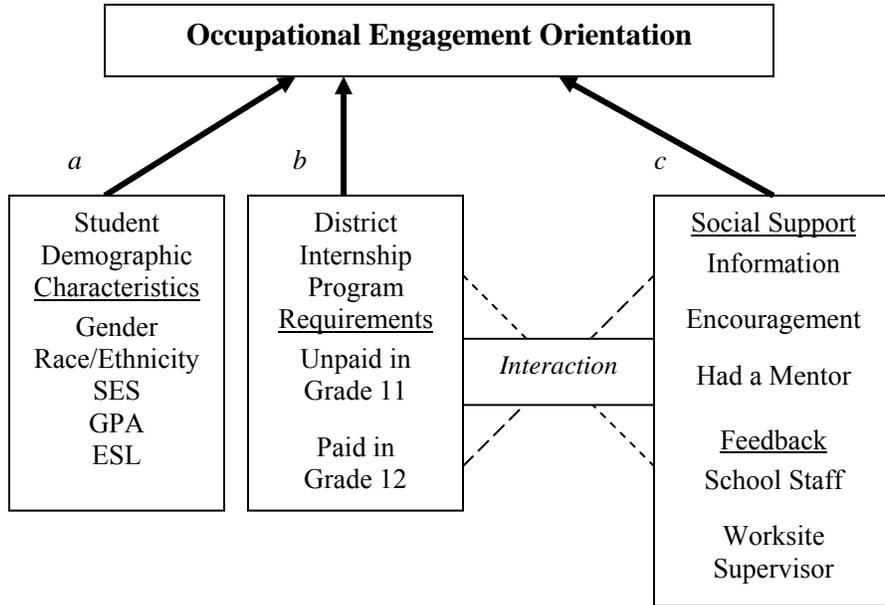


Figure 1. Theoretical model for the relative influences of Internship Program requirements and social support on high school seniors’ occupational engagement orientations.

The Role of Social Support

Building positive orientations to occupational engagement in high school, students require “purposely creating environments”, which provide an “array of opportunities” and “constructive, affirmative, and more encouraging relationships” with community adults (Perkins, Borden, Keith, Hooppe-Rooney, & Villarruel, 2003, p. 6). These environments, opportunities, and relationships enable high school students “to build their own competencies and become engaged partners in their own development as well as the development of their communities” (Perkins et al., p. 6). The drive of high school youth to assert greater independence results in the developmental necessity to form more social ties with pro-social adults in networks apart from family, neighborhood, and childhood friendship circles (Gottlieb & Sylvestre, 1994). Pro-social adults are supportive role models who provide guidance

and feedback as they supervise young people's activities especially at critical adolescent developmental transitions (Takanishi, 2000). Further, supportive relationships with mature, caring, pro-social adults offer instrumental access to educational resources providing education and adult-oriented guidance and encouragement. They provide high school students with advice and skills essential to performing adult roles (Lee & Croninger, 1996).

For students experiencing familial distress, relationships with significant, nonfamilial socially supportive adults can enhance self-esteem, academic engagement, aspirations for higher achievement, social adaptation, and integration into the wider community (Cochran & Bö, 1989; Cotterell, 1996; Gottlieb & Sylvestre, 1994). Successful individuals, despite experiencing childhood deprivation, commonly point to the beneficial influence of supportive adults who provide advice, encouragement, and assistance (Hamilton, 1990; Wilson, 1996). Additionally, socially supportive adults provide high school students with structural supports for important resources, models, emotional support, and feedback (Pianta, Stuhlman, & Hamre, 2002). Furthermore, interpersonal ties, within functional social networks offer high school students needed support, resources, and information (Cotterell, 1996; Granovetter, 1975). As part of such networks, caring, pro-social adult relationships can provide these students with a needed "convoy" or delivery system of developmental resources to help promote occupational purpose (Cotterell, 1996, p. 1).

Types of Social Support. Many scholars argue that resources stem from supportive relationships with adults to the extent they contain *informational support* (i.e., providing advice, assisting in goal clarification), *emotional support* (i.e., providing encouragement), *feedback* (i.e., feedback performance on work-related tasks), and involvement with an adult *mentor* (Cauce, Mason, Gonzales, Hiraga, & Liu, 1996; Hamilton & Hamilton, 1997; Pianta et al., 2002; Sandler & Twohey, 1998). The image of adult careers alone does not have enough magnetic pull to motivate most young persons into taking control of their lives without direct involvement and intervention by supportive adults and mentors (Larson, 2000).

Mentors assist high school students by serving as an important bridge between their social worlds and the work of adulthood (Lee & Croninger, 1996). Accordingly, mentoring relationships most often involve one-to-one instruction within a structural setting. Although interactions with significant, supportive, nonfamilial adults are helpful, it is not until these relationships achieve a mentoring status that student preparation for adult pro-social and productive roles is most effective (DuBois, Nelville, Parra, & Pugh-Lilly, 2002; LoSciuto, Rajala, Townsend, & Taylor, 1996).

Mentor social support during the high school years leads to higher self-esteem, coping skills, and greater personal competencies, that strengthens individual identity and resolve that one has a bright future and can make a difference in the world (Sandler, 2001). When high school students achieve this level of development, they manifest a capacity for executing a course of action to reach a desired goal and

exercising the necessary energy and motivation despite challenges, obstacles, or difficulties (Bandura, 1995, 1997). The stronger this capacity becomes, the more likely significant tasks will be accomplished (Stipek, 1993). With this sense of achievement, individuals become more persistent in their efforts to excel in challenging situations (Hoy & Miskel, 2001).

Receiving adult social support (i.e., information/advice, encouragement, feedback from worksite supervisors, school staff, mentoring) during the high school years is vital to students, as decisions concerning educational and occupational pursuits may appear daunting and confusing. This is especially critical in environments with patterns of mass social disengagement where fewer opportunities for contact with competent, resourceful role models may lead to unrealistic or limited life choices and opportunities (Smith & Carlson, 1997). Ideally, work-based learning and the Internship Program would provide the important convoys of social support. The following section describes the critical role of socially supportive interactions with caring adults and the potential benefits of student participation in work-based internships.

A Moderating Relationship. The success of work-based learning experiences depends upon the social support that students receive (Bailey et al., 2004). Students are likely to feel an even stronger connection with supportive adults in the workplace than at school (Steinberg, 1998). Students are more apt to view workplace adults as having valuable information relevant to perceived needs and interests or as more personal and interested in individual student interests and goals. In any case, work-based learning enables youth to experience generally supportive positive relationships with adults that they would not otherwise have (Bailey et al., 2004; Hughes, Bailey, & Merchur, 2001; Wenger, 1998). Early in-school work experiences have proven to be a worthwhile human capital investment by enhancing school relevancy, increasing graduation rates, and producing favorable labor market results for young adults, particularly for ethnic minorities and the economically disadvantaged (Sum et al., 2000; Sum et al., 2004).

High school work-based learning programs operationalize essential components of youth development during the high school years including (a) opportunities to experience new roles; (b) occasions for receiving social support (i.e., information, encouragement, feedback); and (c) access to strategic relational networks (Zeldin & Charner, 1996). Although the general character of comprehensive high schools does not encourage in-depth occupational exploration, work-based learning initiatives that connect students to schooling and workplace learning environments have a potentially profound effect (Hamilton & Hamilton, 2000; Shanahan, Mortimer, & Krüger, 2002).

The box on the lower right in Figure 1 shows the systems of social support that may influence the efficacy of the Internship Program requirement as well as contribute independently to the Internship Program outcome. Student participants in the Internship Program can experience occasions of social support in the form of

career information sharing, encouragement, mentoring, and performance feedback from worksite supervisors and school staff. Information sharing includes discussing career plans with parents and supportive nonfamilial adults (e.g., teachers, counselors, other school personnel). Encouragement is the boost that parents and supportive nonfamilial adults can provide to students motivating them to participate in and complete program components. Mentoring provides personal guidance, including educational and career planning assistance. Students should receive written and verbal feedback about their internship performance from school-based and work-based supervisors. These relationships are indicated by arrow *c*.

The dotted arrow connecting the lower-middle and right boxes in Figure 1 indicates the possibility of an interaction between the Internship Program requirement and the social support that the students experience. As the literature regarding youth development and occupational engagement orientations during the high school years has suggested, work-based activities can create a system of social support for students when they participate in and complete unpaid and paid internship experiences.

Demographic Characteristics

Although urban and racial ethnic minority students have similar occupational aspirations as other groups, they often demonstrate lower levels of information about available careers and are likely to have lower expectations about those occupations they may explore (Constantine, Erickson, Banks, & Timberlake, 1998). Additionally, females perceive greater barriers to the development of their career goals than do their male counterparts (McWhirter, 1997). Further, young adults with limited English proficiency may face many occupational barriers because of lower formal education levels (Sum et al., 2000).

Despite their backgrounds and perceptions, high school students benefit by valuable employment-related information and contacts (Kasinitz & Rosenberg, 1996; Putnam, 2000; Wilson, 1996). This knowledge promotes greater stability in occupational aspirations (Shu & Marini, 1998). For example, students with higher SES and GPAs often have better experiences in this regard and, therefore, encounter fewer barriers (Clausen, 1991; Rindfuss, Cooksey, & Sutterlin, 1999). High schools students tend not to be aware of the influence of their demographic and background characteristics related to future occupational aspirations; they will continue to bear their negative effects well into adulthood without direct interventions (Johnson, 2002).

Student demographic background characteristics (e.g., gender, race/ethnicity, SES, GPA, and speaking English as a second language) may affect participants' access to career information, encouragement, and motivation to pursue a certain occupational pathway and, consequently, their orientations toward occupational engagement. The box on the lower left in Figure 1 indicates the influence of student

demographic characteristics with respect to the Internship Program outcome. Demographic background constructs may have a direct relationship to seniors' occupational engagement orientations, as suggested by arrow *a*.

The theoretical framework suggests that internship experiences alone are insufficient to produce the desired occupational engagement orientations unless social support for student efforts accompany them. Therefore, the following hypotheses were formulated: (a) student participation in work-based internships enhances seniors' future occupational engagement orientations; (b) social support from adult supervisors and mentors positively affects students' occupational engagement orientations; and (c) the social support high school seniors receive in their work-based learning enhances the effect of their paid and unpaid internship experiences.

Methodology

Population and Sample

The target population was high school seniors in a Midwestern district's 17 high schools who were required to complete a mandatory Internship Program. The Class of 2002 was the first class to have experienced the entire Internship Program during their high school years. In order to assess their cumulative experiences in the Internship Program by the end of their senior year, the school district requested that all students receive, complete, and return survey questionnaires during the Spring of 2002 (Hawley & Marks, 2003).

Of the 1,741 seniors returning the surveys, 56% were female and 44% were male (see Table 1). African-American (50%) seniors constituted the largest racial/ethnic group followed by Whites (35%), Asian/Pacific Islanders (7%), Hispanics (5%), and Native Americans (3%). Total district student enrollment was 49% female and 51% male. The district student enrollment comprised 61% African Americans, 34% Whites, 2% Hispanics, 2% Asians or Pacific Islanders, less than 1% Multiracial, and less than 1% Native Americans or Alaskan Natives.

Students reported performing well academically with 84% having greater than a 2.01 GPA and over 51% of the seniors having better than a 3.0 GPA by the end of their senior year. Although self-reported GPA inflation may exist, particularly among students in the lowest GPA quartile (Dobbins, Farh, & Werbel, 1993; Frucot & Cook, 1994), the overall use of self-reported cumulative GPAs is highly reliable (Cassady, 2001). The academic success of these seniors may be attributed to being among the 59% in the school district who graduated in 2002, as reported by the school district. Perhaps, these "survivors" were the academically proficient who successfully navigated the high school experience unlike many of their peers who did not.

Table 1
District High School Seniors' Demographic Characteristics (N = 1,741)

Demographic Characteristics	District High School Seniors
Female	55.8%
Male	44.2%
Asian or Pacific Islander	6.8 %
Hispanic	5.2%
Black, Non-Hispanic	50.4%
White, Non-Hispanic	35.0%
American Indian	2.6%
Parent Levels of Education	
No college	59.1%
Some college	19.8%
College graduate	21.1%
Speaks English as a Second Language	9.5%
Students attending career centers	20.7%

Most students had a parent who never attended a college/university or pursued formal education beyond high school (59%). Some had a parent (17%) who did not graduate from high school. Nearly 20% of the students had a parent who attended some college or education beyond high school. Students with a parent attending a vocational or trade school (5%) were also included in this category. Other students had a parent who was a college graduate (21%). For 10% of the students, English was spoken as a second language. Many students (21%) in the sample attended one of the district's five career centers to pursue a career and technical curriculum for part of or the entire school day outside of their home high schools.

Instrumentation

To anchor and compare the students' responses nationally, some survey items were drawn from the *National Education Longitudinal Study of 1988* (NELS:88) and from the *Community Participation and U.S. High School Students Survey* (as cited in Marks, 2000). Additional items were created by the researcher for this study. The resulting survey consisted of 62 items and was divided into four sections (Bennett, 2008). Only the portions specifically related to this study are reported here.

In Section 1, respondents were queried extensively about the work-based learning requirement and in which grade they completed it. For example, respondents were asked to identify in which grade they completed specific unpaid internships, paid internships, whether they perceived themselves as personally benefiting from involvement, their specific occupational and educational plans, and the individuals who have influenced these plans.

Sections 2 and 3 focused on aspects of the career internship requirement in the 11th- and 12th-grades (one section for each grade). Respondents explained their internships, how they found out about them, the type of performance feedback they received, and the specific skill-related activities performed. In a subsequent section, respondents were asked about their experiences with mentors, aspects regarding neighborhood life, and beliefs and views with respect to community involvement. They described views toward neighborhood adults, neighborhood conditions, government, politics, access to political knowledge, and intentions to perform future volunteer service and influence public policy. Finally, respondents were asked to identify various aspects of their demographics (e.g., gender, race/ethnicity, parents' education, English as a Second Language).

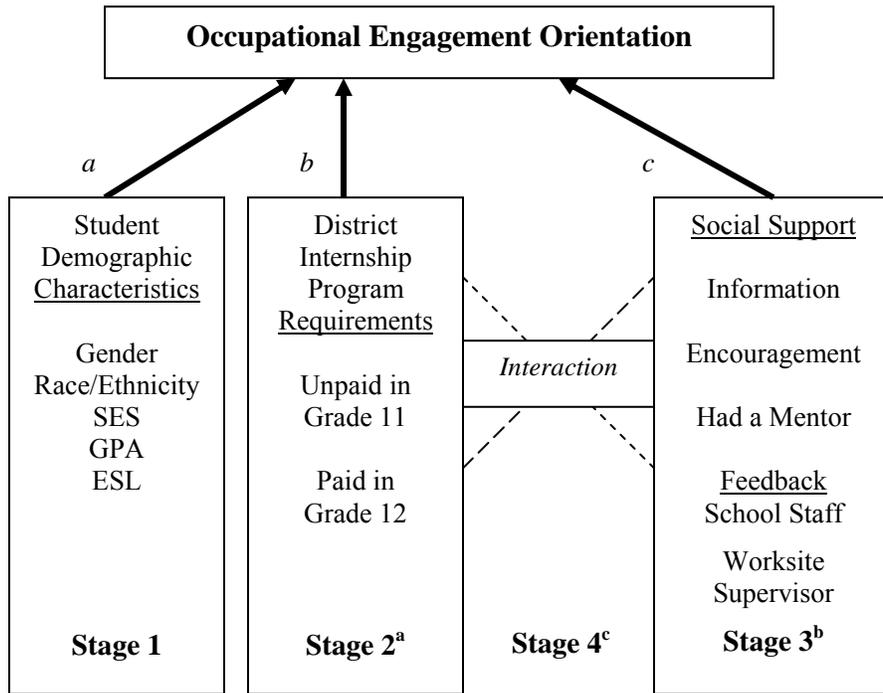
Data Collection

The surveys were administered by internship coordinators or classroom teachers at each of the district's 17 high schools in May, 2002. The district's Internship Program supervisors were instrumental in soliciting the assistance of building level internship coordinators to access the eligible 2,598 students. Sixty-seven percent of the senior class, representing 1,741 students, responded to the surveys. As each school was responsible for survey administration, some schools were more successful than others in obtaining student responses. Individual school response rates ranged from 19 % to 91%. The median response rate by school was 75%.

Data Analysis

The method of Ordinary Least Squares (OLS) was applied in a hierarchical regression to determine how much variance in the dependent variable was explained sequentially in the following four stages: (a) student demographic background characteristics, (b) unpaid and paid work-based internships in grades 11 and 12, (c) social support over and above the influence of the independent variables, and (d) the interaction that occurred between the program and social support variables (see Figure 2). This method examined the significance of the change in the Adjusted R^2 , which indicated the extent of contribution to the variance in the dependent variable. This method also enabled examination of the specific relationship between each predictor variable and the dependent variable or the individual contribution to the

model. The hierarchical regression analysis was conducted using Statistical Packages for the Social Sciences (SPSS, 2000).



^a Includes variables modeled in stage 1. ^b Includes variables modeled in stages 1 and 2. ^c Includes variables modeled in stages 1, 2, and 3.

Figure 2. Hierarchical multiple regression analysis of the theoretical model in stages.

In the first stage, various student demographic background characteristics were introduced that were likely to influence Internship Program outcomes independent of the work-based learning elements and social support. Gender, race/ethnicity, and speaking ESL were dummy variables coded '1' = Yes and '0' = No. Family SES (parents' education) and GPA were two continuous variables and each was standardized ($M = 1, SD = 0$).

In stage 2, unpaid and paid work-based internships in both grades 11 and 12 were introduced as two independent variables. The extent of their influence, independent of any controls for demographic background on high school seniors' occupational engagement orientations was the subject for this stage of analysis.

Independent variables also included two dummy variables, coded '1' = Yes and '0' = No, measuring respondents' completion of high school work-based internships (i.e., unpaid internships in grade 11, paid internships in grade 12) as intended by program guidelines.

The third stage of the analysis posited a moderating relationship of socially supportive interactions with adults, such as supervisors and mentors, in addition to the influence of programmatic elements. As one indicator of social support, *informational support* or career planning advice was constructed as a factor. The measure was standardized ($M = 0, SD = 1$). Its reliability or internal consistency, as measured by Cronbach's alpha, was .66. Although this variable may be questionable as it fell below the widely acceptable .70 (George & Mallery, 2006), it was retained in the model given its importance in the literature. Additional indicators of social support included one categorical variable that described whether students worked with the mentor, and one dummy variable that described the encouragement or *emotional support* received during the senior year. *Feedback support* was measured by two continuous variables, *school staff feedback* and *worksite supervisor feedback*, and standardized ($M = 0, SD = 1$).

As indicated by the crossed lines between the stage 2 and 3 variables, the model led to the hypothesis that it was possible seniors' participation in paid and unpaid internships would enhance or diminish the social support they experience. Thus, in the fourth stage, the interaction between the students' Internship Program experiences and social support were tested. One dependent variable measured district high school seniors' OEO. Occupational engagement orientations were constructed through factor analysis using principal components analysis with varimax rotation. The measure was standardized ($M = 0, SD = 1$). Its internal consistency reliability as measured by Cronbach's alpha was .87.

Findings

Demographic Characteristics

English as a Second Language was the only demographic characteristic in the first stage (Model 1) significantly related to seniors' OEO (see Table 2). Seniors' demographic background explained 6% in the proportion of variance in OEO in stage 1 (Model 1). Speaking English as a Second Language was indeed a barrier to achieving positive occupational engagement orientations at the end of high school. This did not improve even with opportunities to experience paid internships. If the school district had limited capacity to provide opportunities for interactions with supportive adults, it may have been inadequate in addressing students' language needs within their work-based learning experiences.

Table 2
 Summary of Hierarchical Regression Analysis for Variables Predicting Seniors' OEO Scores ($N = 1,279$)

Variable	Model 1			Model 2			Model 3		
	B	SEB	β	B	SEB	β	B	SEB	β
Intercept	-0.32	0.11		-0.42	0.11		-0.57	0.12	
African American	0.03	0.07	0.02	0.01	0.12	0.01	0.01	0.07	0.00
Asian	0.18	0.14	0.05	0.14	0.07	0.04	0.10	0.14	0.03
Hispanic, Non-Black	0.06	0.15	0.01	0.06	0.14	0.01	-0.04	0.14	-0.01
Female gender	0.09	0.06	0.05	0.07	0.15	0.04	0.07	0.06	0.03
English as a Second Language	-0.26	0.12	-0.08*	-0.28	0.06	-0.08*	-0.23	0.12	-0.07*
Family SES ^a	0.05	0.04	0.05	0.06	0.12	0.04	0.08	0.04	0.07*
12th-grade GPA ^a	0.02	0.03	0.02	0.04	0.04	0.04	0.03	0.03	0.03
Unpaid internships in 11th-grade				0.39	0.06	0.19***	0.30	0.06	0.14***
Paid internships in 12th-grade				0.11	0.06	0.05	0.08	0.06	0.04
Information support ^a							0.07	0.03	0.07*
Encouragement during senior year							0.14	0.07	0.06*
Had a mentor							0.32	0.06	0.16***
Supervisor feedback ^a							0.14	0.03	0.14***
School staff feedback ^a							0.08	0.03	0.08*
Adjusted R^2		0.06***			0.09			0.14	
F for change in R^2		7.82***			9.61***			14.07***	

^aStandardized variable ($M = 1, SD = 0$)
 * $p < .05$. ** $p < .01$. *** $p < .001$.

District Internship Program Requirements

The findings regarding the impact of district Internship Program requirements were mixed. In the second stage (Model 2), the unpaid internship in the 11th-grade was the only program requirement significantly related to OEO and had the largest effect. Additionally, ESL subject to the work-based learning requirements, also contributed to the dependent variable. The proportion of variance explained by OEO was 9%.

The varied results of paid versus unpaid internships were somewhat surprising and suggested potential problems in the Internship Program. Although unpaid internships did not increase seniors' OEO scores as social support measures, they were more beneficial than paid internships. Perhaps, participating in an internship without pay encouraged students to focus on pursuing work opportunities motivated by career interests rather than the extrinsic rewards of having a paid job. Highly motivated students may have sought quality learning opportunities and supportive adults instrumental in enhancing their future occupational engagement orientations.

The finding that paid internships were not significantly related to seniors' occupational engagement orientations was troubling, especially as paid internships directly preceded graduation and the formal pursuit of occupational plans. Paid internship experiences may not have been as personally meaningful for seniors. Although the employment may have been unrelated to their career plans, students may have considered after school jobs as paid internships. Consequently, these jobs may not have provided meaningful exploration of career pathways. Further, the internship coordinators may not have assisted seniors as expected in selecting suitable worksites consistent with their career goals and interests. Students would have benefited from selecting opportunities according to an individualized work-based learning plan, emphasizing specific activities and objectives to be accomplished at the worksite.

School staff members may not have known about seniors' paid internship activities and may have had few positive interactions. This would have decreased the likelihood they were providing appropriate feedback and making connections between students' work-based learning experiences and classroom learning. It was also alarming that students who completed the paid internship requirement in the 12th-grade and received feedback from school staff had lower OEO levels than those students who did not receive feedback. Too few opportunities may have existed for this supportive interaction at school.

Social Support

Stage 3 (Model 3) indicated the moderating influence of all social support measures on seniors' occupational engagement orientations. Having a mentor had the strongest effect on OEO and exceeded the contributions of performance feedback from worksite supervisors, school staff, and encouragement during the senior year.

Unpaid internships in the 11th-grade, family SES, and ESL, while controlling for social support, also contributed to OEO. The proportion of variance in OEO explained by this step was 15%. All forms of social support enhanced seniors' OEO scores over and above the influence of the programmatic components except unpaid internships. However, having a mentor was the only social support measure that exceeded unpaid internships in magnitude.

The cross-product interaction terms were entered into the regression analysis to test for significant interactions between the Internship Program requirements and the social support variables in the fourth stage (Model 4) of the analysis. Only one was found to be significant (see Table 3). The cross-product interaction occurred between students completing a paid internship in the 12th-grade and receiving performance feedback from school staff, which resulted in lower OEO scores.

Table 3
Summary of Stage 4 Hierarchical Regression Analysis for Variables and Cross-Product Interaction Terms Predicting Seniors' OEO Scores (N = 1,279)

Variable	Model 4		
	<i>B</i>	<i>SE B</i>	β
Intercept	-0.65	0.14	
African American	0.00	0.07	0.00
Asian	0.10	0.14	0.03
Hispanic, Non-Black	-0.02	0.14	-0.01
Female gender	0.06	0.06	0.03
English as a Second Language	-0.26	0.12	-0.08*
Family SES ^a	0.09	0.04	0.07*
12th-grade GPA ^a	0.03	0.03	0.03
Unpaid internships in 11th-grade	0.35	0.09	0.17***
Paid internships in 12th-grade	0.09	0.09	0.05
Information support ^a	-0.01	0.07	-0.01
Encouragement during senior year	0.16	0.14	0.07
Had a mentor	0.40	0.14	0.20**
Supervisor feedback ^a	0.22	0.08	0.22**
School staff feedback ^a	0.20	0.07	0.20**
<i>Staff feedback * Paid internships in the 12th -grade</i>	-0.20	0.07	-0.11**
Adjusted R^2	.15		
F for Change in R^2	1.44		

^aStandardized variable ($M = 1, SD = 0$)

* $p < .05$. ** $p < .01$. *** $p < .001$.

Career and Technical Education Students

Because the sample was comprised of many students attending the district's career and technical education centers, an additional analysis using one-way Analysis of Variance (ANOVA) and crosstabulation was performed. It revealed statistically significant differences in the social support students received and in their occupational engagement orientations (see Table 4). The CTE students had higher OEO scores ($M = .44$) than other high school students ($M = -.11$). A greater proportion of career center students received mentoring (49% compared to 40%) and encouragement (34% compared to 28%). The CTE students also experienced more performance feedback ($M = .21$) from school staff than other high school students ($M = -.06$). Additionally, they experienced a more personalized, supportive learning environment than the regular comprehensive high school students and were better prepared for their occupational futures.

Table 4
Occupational Engagement Orientations and Social Support of Career Center Students

Variable	Career Center Students ($n = 361$)	Non-Career Students ($n = 1,321$)	Sig. Level
Dependent Variable			
Occupational Engagement Orientation ^b	.44	-.11	***
Social Support			
Had a mentor ^a	.49	.40	**
Received encouragement during senior year ^a	.34	.28	*
Received school staff feedback ^b	.21	-.06	***
Received worksite supervisor feedback ^b	.03	.00	ns

Note. ns = not significant

^aMeans computed using crosstabulation. ^bStandardized, $M = 0$, $SD = 1$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Conclusions and Implications

School districts such as the Midwestern City Schools should be concerned about the preparation of their students for future occupational engagement in the 21st Century. Current economic trends, labor market challenges of academically disengaged young adults, erosion of community social ties, and limited social resources among many students have increased youth risk for occupational disengagement. These trends afford American high schools tremendous opportunities and responsibilities for educating youth for adult occupational engagement especially

in diverse, and socially and economically disadvantaged school districts. To reduce these occupational disengagement risks, the Midwestern City Schools beset by low academic performance and low graduation rates required all of its high school students to complete 60 hours of work-based internships (i.e., paid, unpaid). The Class of 2002 became the first senior class in the school district to experience the Internship Program and to graduate with this requirement.

First, this study examined how much student demographic characteristics (i.e., gender, ethnicity, SES, GPA, English as a Second Language) accounted for seniors' occupational engagement orientations. No other demographic characteristic was significantly related to seniors' OEO except English as a Second Language. These students experienced lower OEO levels, which suggests that the Internship Program failed to reduce the occupational disengagement risks likely to follow them well into adulthood. Limited English proficiency was associated with difficulties for labor market entry and access (Sum et al., 2000); this issue will increasingly become more persistent as the population continues to rise.

Second, this study investigated the relative influences of seniors' participation in paid and unpaid internships and the social support (i.e., information, encouragement, mentoring, feedback) they received on their occupational engagement orientations at the end of high school. Although one hypothesis predicted that both paid and unpaid requirements would lead to significantly higher OEO levels, only the unpaid internships produced these results. This may indicate several Internship Program deficiencies, from community partners offering too few paid internships to inadequate adult supervision in the selection of internship opportunities. Additionally, students received no preparation or training by the school district that would help them to satisfy the demands of a paid internship. Further, community partners may have considered unpaid internships more preferable. Also, unpaid internships may have attracted highly motivated students who needed minimal district supervision and assistance. This may have been problematic for many economically disadvantaged students whose families needed the extra income from paid internship opportunities. These families already have limited transportation and few social resources to assist students to choose more stimulating paid work environments relevant to their career plans. Therefore, the Internship Program was limited in its efficacy to reduce the occupational disengagement risks for which it was intended.

Third, the social support experienced by seniors during their Internship Program experiences accounted for the largest proportion of the variance in OEO without the influence of work-based learning and student demographic characteristics. This study underscores the moderating effect of social support, particularly having a mentor, in enhancing the efficacy of work-based learning (Bailey et al., 2004). Despite the value-added benefits of social support, the Midwestern City Schools did not purposely structure or plan the Internship Program for this to happen equitably. As a result, many students did not receive this essential

support. Without more school district intervention and systemic planning to increase social support for students in work-based learning, occupational disengagement risks will likely remain despite the noble intentions of the Internship Program.

Schools have long been criticized for promoting an impersonalized, departmentalized, and evaluative atmosphere inconsistent with individual youth needs and capacities (Cotterell, 1996; Pianta et al., 2002). The inadequate response of schools to youth developmental needs may lead to a “new form of alienation” characterized by “lack of purpose, lack of direction, and difficulties forming career identities, and future commitments” (Conger & Peterson, 1984, p. 607). High schools, as key socializing institutions in American society, have the potential to enhance transition to socially productive adulthood and reinforce disengagement barriers (Coleman, 1993; Furstenberg, 2000). Implementation of mandatory work-based learning requirements at the school district level appears to do little to improve students’ future occupational engagement orientations without specific attention to improving systems of social support within and beyond the school walls.

Recommendations

There are some limitations that may affect the generalizability of the findings to all high school students in the Midwestern Internship Program and for other school districts that require work-based learning. The findings were limited by the self-reported nature of the instrument used. Additionally, the survey was administered only in English, therefore, ESL students may have encountered barriers in their responses. Further, 23% of the senior class did not respond to the surveys. Also, senior attendance rates declined rapidly in May, which created further difficulties for administering the surveys and follow-up with students. May was chosen by the school district as the time frame to administer the survey with the assumption that most seniors would have completed all requirements by the end of the school year, thereby, yielding the most complete information about their cumulative experiences. Of the 1,741 respondents, only 602 provided all the responses to the items on the survey. To determine whether the missing data were randomly distributed, the differences between the “missing” and “non-missing” student groups on each measure were tested using one-way ANOVA for continuous variables and cross-tabulation for categorical variables. Although the data were not randomly distributed, the decision was made to use pairwise rather than listwise deletion. However, it risked entering significant bias in the analyses and may have diminished generalizability to the Class of 2002. Consequently, listwise deletion reduced the sample size ($n = 602$) by nearly two-thirds.

Several recommendations are offered to increase the efficacy of internship programs. These recommendations emphasize improving school district capacity to provide equitable student access to quality work-based learning opportunities and

supportive adults. Several areas are highlighted for further school district inquiry and educational research.

The school district should investigate the barriers encountered by its students speaking English as a Second Language. For example, these barriers may exist in identifying and selecting meaningful internship opportunities within the community. Too few internship opportunities may exist for ESL students. More culturally and linguistically diverse community partners are likely needed to provide work-based learning opportunities for students. Business community leaders and Chambers of Commerce should support recruiting efforts with incentives. Additionally, internship coordinators may need more training and support for ESL students. Increased collaboration between internship coordinators and district ESL staff is likely necessary.

Further inquiry is needed to determine why paid internships are less beneficial to seniors' occupational engagement orientations than unpaid internships. To ensure that students select quality paid internships, the practices of building-level internship coordinators in school districts should be further examined. Specifically, school districts should examine how coordinators supervise students in selecting internship opportunities according to individualized career plans and monitor students' completion of program requirements. District policies are needed that require students and internship coordinators to design and follow individualized work-based learning plans. These plans should address specific internship activities and objectives as preparation for the tasks and skills that are required. Students should be prepared by the district for the work they are expected to perform in the internships.

School personnel who are knowledgeable about work settings and carefully plan and monitor student activities are vital to improving the efficacy of work-based learning and the mapping of future career pathways for students (Brown, 2001; Chadd & Anderson, 2005). Efforts aimed at improving the capacity of internship coordinators to provide students more personalized attention and supervision must include increasing the number of properly trained and licensed internship coordinators in high schools. However, this option may be challenging in financially struggling urban districts experiencing academic crises. Students need more personalized interaction with supportive adult professionals or faculty beyond internship coordinators within high schools. Additionally, systems should be designed that enable faculty to increase their awareness of internship activities. Students could be assigned to faculty-student advisory committees (Steinberg, 1998) to regularly review and discuss internship experiences and occupational goals within a structured setting and time during the school day. School districts are advised to further investigate the social support that students receive in their career centers and high schools. Differences in internship selection, monitoring, and mentoring practices may exist that are potentially transferable among schools.

Schools should establish formal mentoring programs with local area businesses and their employees to supplement school faculty advisory programs.

Students in the 11th- and 12th-grades also need release time from the regular school day to pursue these activities, formal mentoring programs, and quality learning experiences at work sites, limited by only evening and weekend availability. Schools must forge stronger ties with caring, socially supportive adults to adequately prepare students for their socially and economically productive futures (Decker, Decker, & Brown, 2007; Perkins et al., 2003). Districts should examine how their high schools cultivate relationships with adults who may become internship mentors. Specifically, school districts need to analyze the skills, orientations, and practices of internship coordinators, teachers, and district administrators. This can result in building and sustaining community partnerships through which quality worksites and mentors may be more readily available to students. However, to further facilitate equitable student access to social support, these structures, systems, and strategies require formal district policy and should not be left to occur serendipitously. Partnerships should be in place before a school district implements mandatory work-based learning.

Greater understanding is needed among policymakers, community members, educational leaders, and researchers about the role of social support in educating high school students for future occupational engagement in socially and economically disadvantaged contexts. Contemporary education policy and accountability pressures may cause high schools and school districts to divert too much attention and resources away from this important social responsibility. The inherent value of socially supportive systems within more purposeful, structured work-based learning programs should not be a lower priority than preparation for standardized testing in the education of high school students. For high school seniors in large, urban school districts such as Midwestern City Schools, equitable access to socially supportive systems throughout work-based learning enhances future occupational engagement orientations. Midwestern students are likely not alone in this need.

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Acknowledgements

I wish to acknowledge the many contributions of Dr. Helen Marks and Dr. Joshua Hawley of The Ohio State University who were instrumental in obtaining the data for this study and directing my doctoral dissertation research from which this work was drawn. I am deeply grateful for the encouragement and editorial comments of University of Arizona friends and colleagues, Dr. Jeff Milem and Dr. Kris Bosworth.

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ISSN 1554-754X (print)

ISSN 1554-7558 (online)

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