A Review and Synthesis of Scholarly Research in Cooperative Education and Internships
Part I. An Analysis of Quantitative Research Published Outside the Journal of Cooperative Education and Internships.

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Abstract
Prior reviews have documented the nature, scope, and quality of cooperative education and internship research. Some have focused on quality issues while others presented annotated bibliographies or thoughtful commentaries on the status of research in the discipline. By facilitating an efficient evaluation of research issues, these reviews serve to assist scholars and provide direction for future studies. Despite these contributions, however, at least one gap remains in the review process; namely, an analysis of the research published outside the Journal of Cooperative Education. The purpose of this review is to address this issue by examining research articles published in alternative journals between the years 1987 and 2006. In doing so, the results provide a foundation for comparing the quality of research published in the Journal of Cooperative Education and Internships with those of other journals.

Prior reviews have documented the status of research in the area of cooperative education and internships. An analysis of these reviews indicates at least three major approaches. First, some reviews have evaluated research quality. In this regard, Wilson (1988) noted that cooperative education "has fallen short of the ideal of scientific inquiry to illuminate relationships, predict effects, explain findings in the light of existing theory, or contribute to theory development." (83) Ricks, Van Gyn, Branton, Cutt, Loken, & Ney (1990) and Ricks and Cutt (1990) reviewed theory and practice and found a lack of integration between theory, research and practice in the literature base. Bartkus and Stull (1997, p. 13; 2004) also commented on the quality of research and concluded that "the challenge for cooperative education is to evolve beyond merely descriptive studies and generate theory."

A second approach has been to provide an historical commentary on the evolution of research. Bowman (1989), for example, commented on 25 years of scholarship in the *Journal of Cooperative Education*. Hartley (1986) discussed the evolution of the *Journal of Cooperative Education* and the impact that its editors have had on the discipline while Harris (1989) discussed 25 years of service provided by the *Journal*.

A third approach involves summaries of research published in the *Journal of Cooperative Education*. Principle among these are Wilson and Pratt (1972) who provided the first annotated bibliography, Goff and Hartley (1983) who updated the bibliography through 1983, and Pullin (1998) who completed the most recent update through 1997. While these reviews do not provide a formal critique of cooperative education and internship research, they nonetheless provide an efficient means for evaluating the scope of research in this area.

Finally, it is interesting to note that all of these reviews have at least one thing in common; namely, they focus almost exclusively on research published in the *Journal of Cooperative Education* (now, the *Journal of Cooperative Education and Internships*)[1]. This approach is logical given that the *Journal* has historically been regarded as one of the leading scholarly and practitioner publications for this area of study.

Although these reviews have made important contributions to our understanding of research in cooperative education and internships, several important questions remain. First, what is the *overall* quality of cooperative education and internship research? While prior reviews have provided preliminary answers to this question, the responses have largely focused on illustrative examples and researcher's expert opinions than more systematic analysis. As a result, the contributions represent an important step in the

[1] For brevity, the remainder of this review will reference only the *Journal of Cooperative Education and Internships* with the understanding that it includes reference to the previous title of the journal as well.

review process, but should be viewed from the perspective in which they were conducted.

A second question concerns the quality of research published in journals other than the *Journal of Cooperative Education and Internships (*hereafter *JCEI).* Since existing reviews have already commented on the quality of research in this journal, it might be helpful to develop a better understanding of research published in alternative journals. In doing so, the discipline would have a more comprehensive basis for evaluating the overall status of cooperative education and internship research. Furthermore, the results could then be compared with those of *JCEI*.

Finally, it would be useful to determine the *quantity* of research published in alternative journals. In doing so, the extent to which cooperative education and internship research has been received in the scholarly community can be assessed.

In sum, answers to these questions can provide the discipline with an important clarification regarding the nature, scope, and quality of research published in the area of cooperative education and internships. The purpose of this study, therefore, is to evaluate a representative sample of scholarly research that has been published on topics relevant to the study of cooperative education and internships and published in journals other than *JCEI*. In this regard, the current study represents Part I of a proposed three-part research plan. It covers *quantitative* research published in journals other than the *Journal of Cooperative Education and Internships.* Part II will review quantitative research in the *Journal of Cooperative Education and Internships* and Part III will review *qualitative* research in the area of cooperative education and internships from all publication sources. In all, the three reviews will provide a comprehensive analysis of research in the area and serve as a reference for scholars.

SUMMARY OF RESEARCH ISSUES

This study will address four major issues related to the nature, scope, and quality of the research:

1. Research Quantity: How much research has been published during the time interval studied?
2. Diversity of Research Outlets: How many and what types of journals are publishing cooperative education and internship research?
3. Diversity of Research Themes: What types of issues are being examined in the research?
4. Quality of Research: To assess the quality of the research, six factors were examined:
   - A. The characteristics of the sample: Did the study use a convenience sample or a random sample? How large was the sample? Were any limitations noted?
   - B. Use of control groups for experimental research: If the study did not use a control group, was this limitation noted?
   - C. Integration of theory: Was there a theoretical basis for the study established?
   - D. Acceptable selection and application of the statistical method: Was the statistical method appropriate and was it applied correctly?
   - E. Acceptable reporting of statistical data: Did the researchers adequately report statistical data or was relevant information missing from the analysis?
   - F. Acceptable reporting of the results: Did the authors report results in a manner that was consistent with the actual findings?

METHOD OF REVIEW

Developing guidelines for selection of articles was the first step in the research process. Since there are no firmly established guidelines from prior research, this study attempts to develop a template that can be used for the current study as well as future evaluations.

The first issue to be addressed is the appropriate *time period* to use. It was decided to study the period between 1987 and 2006. The starting date of 1987 was selected for several reasons. First, it represents a period when information technology (e.g., advances in personal computers, databases, statistical software, etc.) was quickly evolving. As such, it provides a general benchmark for the *modern* era of research. Second, it also allows for a reasonable time frame to be evaluated (i.e., two decades of research).

A second guideline concerns the appropriate *criteria* for harvesting research articles. In this regard, a number of questions needed to be answered. Should the criteria include commentaries and opinion-related articles as well as empirical research? Should the review include *indirectly* related articles (i.e., ones where cooperative education or internships are merely a tangential part of the research) or should the review be limited only to those articles directly related to cooperative education or internships? It was decided to limit the selection to research-driven articles and ones where cooperative education and internship issues are directly relevant to the research. As such, reviews of *how-to* articles and case study approaches were omitted from this review but it is acknowledged that they should be considered in future reviews.

Additionally, articles that describe one particular program or explain how a specific program was implemented or administered at a particular institution were omitted from the review. This criterion is not intended to imply that such articles are unimportant or uninformative; instead, it is used to make the review more manageable and relevant to the stated purpose.

Articles where internships or cooperative education are regarded as a historical component of the *educational discipline* were also omitted. This review does not exclude research that uses samples from programs that have historically required internship or cooperative education component as integral part of particular program unless it can also be reasonably determined that the entire discipline participates. Hence, teaching, medical, and other clinical internships were precluded because they have traditionally required internship participation as part of the overall program of study and, as such, are not typically examined in the same context as other co-op and internship research. Additionally, this review will only include articles that relate to student internships and cooperative education at the high school or undergraduate level. Professional internships, such as those conducted at the graduate level, will be omitted.

A third set of guidelines involves the *appropriate method* of analyzing the research. On the one hand, the inclusion of an abstract for each article would appear to be one important guideline. On the other hand, an abstract itself is probably not sufficient if one wants to develop comprehensive understanding of the nature and scope of the research. Furthermore, abstracts do not typically provide the depth of information that would allow an adequate evaluation of the quality of the research. For example, abstracts often omit basic characteristics of the sample. Abstracts also do not typically mention the limitations of the study. For example, an abstract might report that the study found a relationship between grade point average and internship experiences, but fail to mention that certain limitations make that finding tentative.

It was determined, therefore, that a review and presentation of abstracts will not meet the objectives of this study. Hence, this review examines each article in its entirety and includes a report on the basic characteristics of the sample, the foundation for the study, and a commentary on the method of analysis and the validity of the research outcomes. Relevant limitations are also noted.

Finally, developing criteria for the article search is needed. Given advances in information technology, it seemed logical to use electronic databases from a library that operates within a university rated as a Carnegie Research-Intensive institution. In doing so, it helps ensure a more efficient and effective literature search and retrieval of articles. The databases used were those related to: *engineering, science, social science citation, arts and humanities, business*, and *education*. Key search words included*: interns, internships, cooperative education, work-integrated, work-based, experiential learning,* and *experiential education,* as well as variations of these terms (e.g., singular versus plural versions of the keywords and the use of the conjunction "and" between keywords). It was anticipated that by utilizing a relatively wide description of cooperative education and internship terminology there would be a greater likelihood of obtaining a more complete census of the population of interest. Of course, it was also anticipated that it would result in numerous articles that were not directly relevant and, as such, these articles would ultimately need to be *reviewed-out* of the sample.

ANALYSIS

Using the search criteria established in the method section, the literature search resulted in the identification of 72 research articles related to the fields of cooperative education and/or internships. While every effort was made to procure a complete census of articles published, it should be noted that it is possible that some articles were inadvertently excluded. Additionally, since some of the research articles initially reviewed had a relatively minor focus on cooperative education or internships, they were excluded. It is possible that another reviewer might include more articles. To help control for this, this review sought to be overly inclusive rather than overly exclusive. As such, some of the articles are more heavily focused on cooperative education and internships than others. An appendix is provided at the conclusion of this study that summarizes the issues for each individual study. Included are the authors, the characteristics of the sample, and general comments on the study.

In general, the research covered a range of important issues from ethics and job-related outcomes, to descriptions and perceptions of cooperative education and internship programs. From this observation, it is apparent that the research stream is consistent with the major goals and objective of the discipline. As such, the research forms a good foundation for understanding cooperative education and internships and for the development of future research projects.

With that in mind, the following synthesizes the major research issues.

Research Issue 1: Quantity of Publications

The 72 articles represent an average of slightly less than 4 articles a year for the time period 1987 to 2006. However, given that these articles are research-driven and not commentaries, case studies, *how-to* papers, or other similar reports suggest that the number of articles

could be significantly higher. Future reviews will help verify this proposition. In any event, the identification of 72 research articles provides some evidence that cooperative education and internship research has been accepted throughout the scholarly community.

A descriptive review of publications per year suggests a slightly upward trend in output during the time period. Using a simple regression analysis with an ordinary least square procedure, the F-value is 29.1 ($p<.01$) with a regression coefficient of .23 ($p<.05$, standard error = .04) and variance explained (R^2) .62, suggesting that the number of articles published during the measure time interval increased by approximately 1 article every four years.

To help ensure that autocorrelation of the residual error terms did not influence the results, a Durbin-Watson (DW) test statistic was calculated. The DW statistic tests whether each error term in the regression equation is correlated with the error term immediately preceding it. The DW statistic provides a test for the null hypothesis that the autocorrelation is zero. A positive autocorrelation can produce a downward bias of estimates for error variance (i.e., the standard errors) resulting in confidence intervals that are too narrow, whereas a negative autocorrelation tends to bias the estimate of the error variance upward, resulting in confidence intervals that are too wide. As a result, significant positive autocorrelation tends to help reject the null hypothesis and a significant negative autocorrelation tends to help accept the null hypothesis.

In either case, the existence of autocorrelation can bias the results (For a more comprehensive assessment of the Durbin-Watson statistic see Judge, Griffiths, Hill, Lütkepohl, & Lee, 1985). For the current data, the DW statistic for autocorrelation is 2.1 ($p=.52$ for positive autocorrelation and .48 for negative autocorrelation). As such, the null hypothesis of no autocorrelation is supported and the results from the ordinary least squares model are accepted.

Readers are cautioned, however, not to over-interpret this result. The fact that the number of publications increased during the time interval could reflect an increased interest in cooperative education and internship research in alternative journals or it could mean that there was an increasing number of articles published overall. Without additional information, no definitive conclusions can be made.

Research Issue 2: Diversity of Publication Outlets

Table 1 presents a list of the journal and the respective authors. In total, the 72 articles represent 48 separate journals. A descriptive review of the journals' characteristics provides some insights into the types of journal selected and the reasons. Of the 48 journals, 26 use the term *education* (or some related term such as *teaching* or *student*) in their title. Forty-four articles (approximately 61 percent of the total) were published in these journals. Additionally, 6 other journals appear to reflect an emphasis on work-based learning/guidance (e.g., *Journal of Work-Place Learning*). One journal reflects both a work-based learning focus and an educational focus (i.e., *Education + Guidance*). As such, it was counted in both of the above categories. Sixteen journal titles reflect no expressed emphasis on either education or work-based learning/guidance representing approximately 33 percent of the journals. Altogether, the journals titles suggest that authors tended to target their research toward journals that emphasize some aspects of education or work-based learning.

It is also apparent that the number of articles per scholar is relatively low, with the mode equal to 1. Only 21 of the 151 authors published more than one article and most of these articles are co-authored with the same authors. The average number of authors per article is approximately 2.4. Thirteen of the articles were single-authored and an additional 27 were dual-authored. Twenty-five of the articles had 3 authors and 5 of the articles had 4 authors. Only 2 of the articles had more that 4 authors with 1 having five authors and another having 8.

TABLE 1 – Summary of Journals and Authors

Journal Name	Authors
Accounting and Finance	Dellaportas, Cooper & Leung, 2006
Accounting Review	Knechel & Snowball, 1987
Annals of the American Academy of Political and Social Science	Cappelli, Shapiro & Shumanis, 1998
Asia-Pacific Journal of Cooperative Education	Coll, Pinyonatthagarn & Pramoolsook, 2003
Assessment and Evaluation in Higher Education	Rainsbury, Hodges, Sutherford & Barrow, 1998
British Journal of Educational Psychology	de Jong, Weirstra & Hermanussen, 2006
College Student Journal	Avis & Trice, 1991; Eyler, 1995; Blair & Millea, 2004; Wesley & Bickle, 2005
Computer Science Education	Lancaster & Smith, 1994
Delta Pi Epsilon Journal	Spinks & Wells, 1994
Economics of Education Review	Stern, Finkelstein & Cagampang, 1997
Education + Training	Garavan & Murphy, 2001; Callanan & Benzing, 2004

Education Evaluation and Policy Analysis	Stasz & Brewer, 1998; Bailey, Hughes & Barr, 2000
Financial Practice and Education	Maskooki, Rama & Raghunandan, 1998
Guidance and Counseling	Morton, Unger & Laing, 1997; Morton, Dawson & Laing, 1993
International Journal of Engineering Education	Haag, Guilbeau & Goble, 2006; Brumm, Hanneman & Mickelson, 2006
International Journal of Physical Distribution and Logistics Management	Knemeyer & Murphy, 2002
Issues in Accounting Education	Siegel & Rigsby, 1988; English & Koeppen, 1993
Journal of Air Transportation	Ruiz, 2004
Journal of Applied Psychology	Taylor, 1988
Journal of Business Ethics	DuPont & Craig, 1996
Journal of Career Planning and Employment	Nagle & Collins, 1999
Journal of College Student Development	Nnadozie, Ishiyama & Chon, 2001
Journal of Construction Education	Chapin, Roudebush & Krone, 2003
Journal of Education for Business	Hornsby & Johnson, 1991; Randall & Good, 1991; Raymond & McNabb, 1993; Cannon & Arnold, 1998; Kaupins, 2002; Cook, Parker & Pettijohn, 2004; Dixon, Cunningham, Sagas, Turner & Kent, 2005
Journal of Education Psychology	Kardash, 2000
Journal of Employment Counseling	Harris, Tanner & Knouse 1996; Knouse, Tanner & Harris, 1999
Journal of Engineering Education	Blair, Millea & Hammer, 2004; Parsons, Caylor & Simmons, 2005
Journal of Family and Consumer Services	Hymon-Parker, 1998; Paulins, 2001
Journal of Geography in Higher Education	Sublett & Mattingly, 1995
Journal of Marketing Education	Gault, Redington & Schlager, 2000; Karns, 2005
Journal of Research in Science Teaching	Scholz, Steiner & Hansmann, 2004
Journal of Social Issues	Singer, King, Green, and Barr 2002
Journal of Sports Management	Cunningham, Dixon, Kent &Turner, 2005
Journal of Vocational Education Research	Trach & Harney, 1998; Chin, Munby, Hutchinson, Steiner-Bell, 2000; Hutchinson, Munby, Chin, Edwards, Steiner-Bell, Chapman, Ho & Mills de España, 2001
Journal of Vocational Behavior	Linnehan, 2001; Linn, Ferguson & Egart, 2004
Journal of Work-place Learning	Savoie-Zajc & Dolbec, 2003
Journalism and Mass Communication Education	Hilt & Lipschultz, 1996
Journalism Education	Keenan, 1992
Marketing Education Review	Hall, Stiles, Kuzma & Elliott 1995
Physical Education	Cunningham & Sagas, 2004
Planning and Changing	Brown-Welty & Patterson, 2002
Psychological Reports	Rothman, 2003
Public Relations Review	Maynard, 1990; Maynard, 1997
Research in Higher Education	Buller & Stull, 1990; Sagen, Dallam & Laverty, 2000
Review of Public Personnel Administration	Douglas & Brewer, 1999
Social Science Quarterly	Fuller & Schoenberger, 1991
Teaching Sociology	Neopolitan, 1992
Transportation Journal	Knemeyer, Murphy & Poist, 1999; Knemeyer & Murphy, 2001
Journal of Social Issues	Singer, King, Green, and Barr 2002
Journal of Sports Management	Cunningham, Dixon, Kent &Turner, 2005
Journal of Vocational Education Research	Trach & Harney, 1998; Chin, Munby, Hutchinson, Steiner-Bell, 2000; Hutchinson, Munby, Chin, Edwards, Steiner-Bell, Chapman, Ho & Mills de España, 2001
Journal of Vocational Behavior	Linnehan, 2001; Linn, Ferguson & Egart, 2004
Journal of Work-place Learning	Savoie-Zajc & Dolbec, 2003

Journalism and Mass Communication Education	Hilt & Lipschultz, 1996
Journalism Education	Keenan, 1992
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Physical Education	Cunningham & Sagas, 2004
Planning and Changing	Brown-Welty & Patterson, 2002
Psychological Reports	Rothman, 2003
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Review of Public Personnel Administration	Douglas & Brewer, 1999
Social Science Quarterly	Fuller & Schoenberger, 1991
Teaching Sociology	Neopolitan, 1992
Transportation Journal	Knemeyer, Murphy & Poist, 1999; Knemeyer & Murphy, 2001
Journalism and Mass Communication Education	Hilt & Lipschultz, 1996
Journalism Education	Keenan, 1992
Marketing Education Review	Hall, Stiles, Kuzma & Elliott 1995
Physical Education	Cunningham & Sagas, 2004
Planning and Changing	Brown-Welty & Patterson, 2002
Psychological Reports	Rothman, 2003
Public Relations Review	Maynard, 1990; Maynard, 1997
Research in Higher Education	Buller & Stull, 1990; Sagen, Dallam & Laverty, 2000
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Social Science Quarterly	Fuller & Schoenberger, 1991
Teaching Sociology	Neopolitan, 1992
Transportation Journal	Knemeyer, Murphy & Poist, 1999; Knemeyer & Murphy, 2001

Research Issues 3: Diversity of Research Themes

Numerous themes were identified in the research. Principle among these is a focus on outcomes such as *grade point average* (e.g., Hornsby & Johnson, 1991; English & Koeppen, 1993; Harris, Tanner, & Knouse, 1996; Knouse, Tanner, & Harris, 1999; Blair & Millea, 2004), *salary* (e.g., Taylor, 1988; Fuller & Schoenberger, 1991; Blair & Millea, 2004), *job performance* (e.g., Siegel & Rigsby, 1988; Douglas & Brewer, 1999) and *employment success* (e.g., Knouse, Tanner, & Harris, 1999; Sagen, Dallam, & Laverty, 2000; Callanan and Benzing, 2004).

Other themes include the development of *skills and competencies* (e.g., Morton, Dawson, & Laing, 1993; Garavan & Murphy, 2001; Haag & Goble, 2006), the *perceived benefits and challenges of co-op and internships* (e.g., Hymon-Parker, 1998; Lancaster & Smith, 1994; Parsons, Caylor, & Simmons, 2005), *evaluations* of cooperative education and internship experiences by decision makers (e.g., Avis & Trice, 1991; Maynard, 1997), *ethical developments* resulting from cooperative education and internship experiences (e.g., , DuPont & Craig, 1996; Dellaportas, Cooper, & Leung, 2006), *descriptions* of programs (Cappelli, Shapiro & Shumanis, 1998; Chapin, Roudebush, and Krone, 2003), and employer and student *perceptions* of cooperative education and internship experiences (e.g., Keenan, 1992; Maskooki, Rama & Raghunandan, 1998; Chapin, Roudebush & Krone, 2003).

A category for miscellaneous research related to cooperative education and internships was also identified. For example, one study sought to explain why students participated in a cooperative education program during high school (Chin, Munby, Hutchinson, Steiner-Bell, 2000). Another study surveyed student attitudes toward internships (Cook, Parker, and Pettijohn, 2004).

In all, the research appears to be rather diverse both in terms of the types of programs examined (i.e., cooperative education, internships) and the issues researched (e.g., ethics, perceptions, outcomes).

Research Issue 4: Quality of Research

With regard to quality, the analysis took the position that the value of research is based largely on its ability to produce evidence that is valid and reliable. This means that the research used generally accepted principles of research design and administration. Six major principles were used for the analysis: (1) the type of sample, (2) the research design, (3) the theoretical foundation, (4) the statistical method, (5)

reporting of statistical data, and (6) reporting of the results.

Quality Issue 1: The Type of Sample

Overall, the articles were found to be diverse in terms of the samples used. Of the 72 articles, 46 used student samples related to internships (e.g., Maynard, 1997) while 19 involved student samples related to cooperative education (e.g., Rainsbury, Hodges, Sutherford, & Barrow, 1998). In three studies, the research involved student samples related to *both* internships and cooperative education (e.g., Sagen, Dallam, & Laverty, 2000). In a few cases, the sample consisted of other stakeholders. For example, Spinks and Wells (1994) surveyed college dean's perceptions of the importance of internship programs. Other research used employers or relevant others (e.g., educators) as part of the sample (e.g., Brumm, Hanneman, & Mickelson, 2006).

Aside from the distinction between cooperative education and internship samples, the terminology used to describe the sample varied as well. For example, Cappelli, Shapiro, and Shumanis (1998) examined the extent to which employers participate in *school-to-work* partnerships and *work-based learning*. Stasz and Brewer (1998) and de Jong, Wierstra, and Hermanussen (2006) also conducted research in the context of work-based learning while Linnehan (2001) examined participation in a *work-based mentoring* program in relation to academic performance and school attendance behavior. Brown-Welty and Peterson (2002) examined the benefits and challenges of offering college degree programs in collaboration with private corporations (which they referred to as *collaborative degree programs*). Finally, Kardash (2000) studied the influence of *undergraduate research experiences* on the acquisition of research skills.

With regard to how the sample was obtained, it was found that the majority were convenience samples. Approximately 95 percent (n=68) of the studies used this type of sample. In one of those studies (i.e., Maynard, 1997), the author reported that the sample was a census, which was correct, but only in the sense that it was a census of a *sub-sample* of a larger population. Only 2 of the studies used a random sample. Two other studies used secondary data but did not provide information on how the sample was collected. For example, Stern, Finkelstein, and Cagampang (1997) merely referred readers to another research article to find details about the sample. Although this notation may have been useful, it is not a substitute for describing the characteristics of the sample. Sample descriptions should cover basic information such as the size of the sample and how the data were collected.

Although the use of convenience samples is not optimal from a research perspective, their use is relatively common and understandable in social science research given the difficult of securing random samples. As such, there appears to be no over-riding stigma associated using them. However, it is appropriate for researchers who use convenience samples to at least acknowledge this fact along with related limitations, particularly with regard to its inability to generalize to the broader population. This in no way compromises the integrity of the study since its purpose is to put the results in proper context. In the absence of such disclosure, readers are left to infer the limitations on their own.

Of those using convenience samples, only 47 percent (n=32) acknowledged this fact. In some cases, the acknowledgement was implied rather than explicit which required this reader to examine the documentation more carefully than should have been the case. In general, readers should not have to search for the proverbial *needle in a haystack*.

The fact that so many studies neglected to acknowledge the limitations of convenience samplings is somewhat troubling. Although there is no reason to believe that researchers intentionally omit such information, the relatively large number of omissions suggests that journal editors and manuscript reviewers should be remind authors to include an acknowledgement.

With regard to samples size, the analysis indicates that most samples were relatively small. Approximately 12 percent (i.e., 9 of the 72 studies) used samples of less than 50. Those with samples of between 50 and 100 represented approximately 32 percent of the studies (n=23). This means that nearly 44 percent of the studies used samples that can generally be regarded as small in size. Furthermore, some of the samples represented experiments where the sample size in each group was often less than 30 and in some cases less than 20.

Of samples above 100, approximately 20 percent ranged from 101 to 200 while another 22 percent had samples of between 201 and 500. Approximately 13 percent (or 9 studies) had sample sizes greater than 500. Overall, the samples sizes for individual groups ranged from 3 to over 4,000. In cases where the sample sizes were relatively small, researchers often noted the limitation, although this was not always done. Researchers are reminded to acknowledge limitations associated with sample sizes and journal editors and reviewers should insist on such notation before accepting manuscripts for publication.

Finally, in situations were the sample size is very large researchers should acknowledge that the significance of statistical tests can be affected because standard errors decrease as sample size increases. In

very large samples, statistical differences may be found even when the actual magnitude of the differences is quite small. There were several studies that fell into this category (e.g., Blair and Millea 2004). In such cases it is important for the researcher to acknowledge the sample size effect and to remind readers that a more appropriate way to evaluate statistical differences is by the magnitude of the differences rather than the significance of the test statistic. In doing so, the results will be presented in their proper perspective. As with earlier comments, part of the responsibility for proper reporting comes from journal editors and manuscript reviewers.

Quality Issue 2: Research Design

Twenty six of the studies utilized an experimental design. Experimental designs are studies that seek to determine the influence of a treatment effect. In order to control for the possibility that other factors might influence the results, a control group is standard procedure. In essence, control groups allow the researcher to determine if any change that occurs as a result of a treatment (e.g., internship experience) can be attributable to that treatment. Without a control group, the researcher has nothing to compare the findings to and, as such, is unable to validate the results of the experiment.

Consider, for example, a study that wants to examine the effect of internship experiences on student grade point average. In this case, the researcher would want to obtain a relevant sample of both intern *and* non-intern students. In doing so, the researcher can more objectively attribute any changes in grade point average to the treatment (e.g., internship experience). If grade point averages increase for intern students but not for non-intern students, the researcher can conclude (with greater certainty), that the internship contributed to higher grades. The *greater certainty* issue assumes that the researcher has implemented reasonable safeguards for the effects of other variables, such as age, SAT scores, college major, and gender.

In the absence of a control group, however, the researcher would be unable to assert that the treatment influenced the grade point average because a non-treatment group could also have shown an increase in grades. In this way, the control group serves as an important means of validating the research results.

Unfortunately, only 17 of the 26 studies (65 percent of the total) that utilized an experimental design used a control group. Of the 9 (34 percent) studies that did not use a control group, only 4 acknowledged this as a limitation. As with the use of convenience sampling, researchers should be careful to explain relevant limitations and, to the extent that they do not, editors and reviewers should ensure that authors make such acknowledgement before a manuscript is accepted for publication. Such acknowledgement should also note the exploratory nature of the study. Failure to do so can lead to some readers accepting the results as more valid than might actually be the case.

Quality Issue 3: Theoretical Foundation

Prior reviews have expressed a need for more theory in cooperative education and internship research (e.g., Wilson, 1988; Bartkus & Stull, 1997). This review supports this position and notes that the overwhelming majority of the research evaluated in this study sought to address research questions without providing a strong theoretical foundation. In this sense, much of the research was descriptive in nature. For example, some research sought to describe the characteristics of internship and/or cooperative education programs while others sought to describe student perceptions or expectations of internship experiences.

Other research sought to discover relationships between internship or cooperative education experiences and presumed outcomes. The use of the terms “discover” and “presumed” are used to clarify the point that while the research methods used in the study might have been very similar to those used in theory-driven research, the use of a particular statistical method is not, in and of itself, sufficient reason to call a research study theory-driven. Instead, such studies must do more than simply report the results of prior research. They must seek to explain, by way of established or proposed theories, the hypothesized relationships. These theories might be related to cooperative education and internship research or they might be bridged from other research domains. The point is that for research to be theory driven, it must incorporate rationale that provides a systematic means of explaining phenomena (Bartkus & Stull, 1997).

Consider, for example, the presumed relationship between cooperative education and outcomes such as starting salaries or grade point averages. While one might like to believe that such an experience will ultimately lead to one or more of these outcomes, it is not enough to simply test the relationship. Even if it is shown a thousand times in a thousand different studies that cooperative education leads to higher starting salaries, it is not theory-driven research unless one can provide some theoretical (not simply intuitive) rationale for the relationship. Otherwise, we are simply providing evidence of an empirical regularity which, as important as it is to theory development, is not a theory.

Although some of the research reviewed in this study initially appeared to have theoretical content, a more careful analysis revealed that many of these studies merely discussed and/or summarized prior research results that were not expressly identified as theory.

Hence, they were not classified as theory-driven. To qualify under the criteria of this study, theories needed to be formally discussed along with testable hypotheses. Few of the studies provided such evidence, although many of them could have provided more in this context.

In total, approximately 14 percent of the studies (n=10) provided evidence of being theory-driven. Another 11 percent (n=8) provided partial evidence of a theoretical foundation meaning that, overall, only 25 percent of the studies integrated a meaningful amount of theory.

Quality Issue 4: The Statistical Method

The review examined the extent to which the research appropriately applied the correct statistical method. Although most of the research had at least one limitation, the severity differed significantly. In some cases, the limitations were relatively minor and in others they were more significant. For example, several studies conducted a correlation analysis where one or more of the variables was binary in nature (i.e., data with only two points) (e.g., Knemeyer & Murphy, 2001; Callanan & Benzing, 2004). Because the data were categorical, a more correct method would have been a test for mean differences (t-test) or an analysis of variance. Additionally, if the intent was to identify how many responses were in each category (a comment that was reported in one study to justify the use of binary data) a more appropriate method would have been an examination of the frequency distributions. Lancaster and Smith (1994) examined gender differences involving outcomes resulting from cooperative education experiences and used a cross-tabulation test based on the frequency of responses to Likert categories (after unnecessarily collapsing some of the categories). A more robust test would have been one based on a t-test or analysis of variance without compressing the data.

Other researchers also adjusted the data prior to analysis. Knemeyer, Murphy, and Poist (1999) collapsed categories from a Likert scale prior to using the data in a cross-tabulation analysis. The authors argued that this was necessary since there were not enough data points in some categories. This adjustment is unnecessary since the issue could have been resolved through a multivariate analysis of variance. While it is unknown if the results would have changed using this method, adjusting data to fit a particular technique of analysis is generally not recommended when an acceptable alternative is available.

It was also revealed that some studies used unbalanced response categories. Unbalanced means that the response categories are skewed in either a positive or negative direction. As such, the are source of bias because they tend to lead the respondent to answer in one direction. A balanced scale eliminates this potential.

Several studies used unbalanced scales. Brumm, Hannemann, and Mickelson (2006) had categories with the following points: 5=essential; 4=very important; 3=important; 2=useful, but not essential; 1 unnecessary. At least three of the five categories are worded in a positive direction and, as such, the scale is not properly balanced. A balanced scale would have something like the following: 5=very important; 4=somewhat important; 3=neither important nor unimportant; 2 somewhat unimportant; 1 very unimportant. In this example, there is a neutral position, two positive and two negative response categories.

Others scales appeared to be unbalanced but this could not be fully confirmed since only end-points were reported. For example, Lancaster and Smith (1994) used a five-point scale with categories ranging from *not helpful* to *extremely helpful*. For this scale to be balanced, the first end-point should have been *extremely unhelpful*. Similarly, Brown-Welty, and Patterson (2002) used a scale with end-points ranging from *extremely important* to *not important at all*. For the scale to have been balanced, the second end-point should have been *extremely unimportant*.

While the distinction between end points such as *not helpful* and *extremely unhelpful* may appear trivial, they are important because they determine whether or not the remaining categories are equally divided between positively and negatively worded responses. For example, if *not helpful* is used as an end-point it would be difficult to find another negatively worded response category. However, if you used *extremely unhelpful* as a category, the next response option could be something like *somewhat unhelpful*.

In summary, it is important to use the most appropriate method of analysis whenever possible. While the most appropriate method can be the debated among reasonable scholars, research methods that substantially deviate from accepted practice compromise the validity of the results. At a minimum, researchers should disclose the rationale for a particular method of analysis in clear and unambiguous terms so that readers can be in a better position to interpret the meaning of the results. Additionally, the researcher should neither over report or under report the rationale for the method, but when in doubt, more information in better than less. In this regard, journal editors and manuscript reviewers can be particularly helpful in providing guidance.

Quality Issue 5: Reporting of Statistical Data

Some of the research omitted important statistical data such as standard deviations (e.g., Spinks & Wells,

1994; Cannon & Arnold, 1998; Nagle & Collins, 1999; Knemeyer & Murphy, 2001; Kaupins, 2002; Scholz, Steiner, & Hansmann, 2004; Karns, 2005; Brumm, Hannaman, & Mickelson, 2006) or test diagnostics for the statistical tests (Stern, Finkelstein, Urquiola & Cagampang, 1997) In other cases, the means were not provided at all and only frequencies for the response categories were reported (Stasz & Brewer, 1998; Cook, Parker & Pettijohn, 2004). Note that one of the major reasons for using Likert scales (e.g., 7-point scales from 1=strongly disagree to 7=strongly agree) is to obtain sufficient variance to be able to test differences between groups or relationships among variables. Failure to utilize the data in this form can lead to suboptimal results.

In a few cases, the internal consistency of scales was not evaluated (e.g., Parsons, Caylor, & Simmons, 2005). Measures of internal consistency, such a Cronbach's alpha, are relatively easy to calculate and should be included.

Although this review reminds researchers to be more careful in the reporting and use of statistics, it should also be noted that journal editors and manuscript reviewers and have a responsibility to ensure that researchers are utilizing the appropriate technique and report the statistical data in a meaningful way.

Quality Issue 6: Reporting of Results

Once a test of the data has been run, it is important to provide an objective reporting of the results. In some cases, researchers reported significant findings when tests for statistical significance were not transparently conducted (e.g., Hornsby & Johnson, 1991; Brumm, Hanneman, & Mickelson, 2006) or the interpretation was based on a subjective assessment of the data (e.g., Lancaster & Smith, 1994; Bailey, Hughes, & Barr, 2000).

Finally, some of the authors published similar articles using the same sample, the same method, and the same focus. In doing so, readers conducting a literature review might be led to believe that the accumulated evidence is greater than it actually is unless similarities can be readily identified. For example, Blair and Millea (2004a & 2004b) published reports of the relationship between cooperative education experiences and grade point average, length of time in school, and starting salary. Ironically, the second citation is a publication in the *Journal of Cooperative Education and Internships.* Had one of the publications been a conference proceeding, this would be less of an issue since conferences are often regarded as places to *test market* research. However, when the research is published in competing journals, the effect can be regarded as an over-reporting of the data unless the audiences are substantially different. To be fair, a review of the editorial policy for the *Journal of Cooperative Education and Internships* and the *College Student Journal* indicates no requirement that the research be original. As such, the authors did not technically violate the specific editorial policies of either journal. Nonetheless, professional courtesy suggests that the authors should have acknowledged the dual publication. Overall, the published results of Blair and Millia should be considered the findings of one study, not two.

DISCUSSION

This review sought to synthesize and provide constructive comments on 72 research articles published between 1987 and 2006. Although limitations were highlighted, it is important to note that the accumulated research has contributed to our knowledge of cooperative education and internships and has provided a good foundation for future research efforts. For example, the focus on *outcomes* (e.g., job employment, salaries) has provided evidence on the link between work-based learning experiences and tangible outcomes. Other research issues, such as those dealing with skills development, ethical issues, program descriptions, personal experiences, benefits and challenges of programs, and how the experiences are perceived by students and employers are equally important and serve to advance an important goal of the discipline; to advance the state of knowledge about cooperative education and internships.

With regard to limitations, it is important to note that those listed in this review are not exclusive to the study of cooperative education and internship research. Indeed, there is probably no such thing as a completely error-free research project. All research is limited in some way and a primary objective of this review was merely to identify some of the major issues in this area. The rationale centers on the belief that if we do not acknowledge our limitations, we are bound to repeat them in future research.

With that said, the limitations can be summarized as follows. First, many of the studies did not use a control group even though it was apparent that the research was based on an experimental design. This suggests that either the research should have been more carefully evaluated during the review process or that the journals should have insisted that the limitation be noted within the text of the manuscript. Without such clarification, some readers might rely on the results and research design to justify future research and/or policy. In some cases, the lack of a control group might be justified if the results are exploratory and the limitations of the study noted. In too many cases, however, these acknowledgements were not provided.

Second, the lack of theoretical integration is one that has hampered research in cooperative education and

internships for some time. While other reviews have criticized the general lack of theory in articles published in the *Journal of Cooperative Education and Internships*, this review extends the analysis to research published in other journals. This review also joins the call for more integration of theory. While descriptive research is certainly valid, along with exploratory research that seeks to identify empirical relationships, if the status of cooperative education and internship research is to evolve, additional attention is needed in the area of theory development and testing.

Third, researchers need to utilize appropriate methods of analysis. In too many instances, it was apparent that the method was sub-optimal and compromised the validity and interpretation of the results. In other cases, the method was overly-complicated making an interpretation of results more difficult than it needed to be. Researchers should use the most appropriate method and not over-analyze the data.

Journal editors and reviewers are reminded that since some readers might not have a strong statistical background, accepting manuscripts without noting any relevant limitations might result in providing *de facto* validation for the procedures used. Hence, journals reviewers and editors share responsibility for ensuring that proper statistical procedures are selected and administered. At a minimum, relevant limitations should be reported by the authors prior to publication.

Fourth, statistical results need to be adequately reported. Some of the reviewed research tended to under-report key data. As a result, some degree of caution needs to be exercised when interpreting the validity of the results. Researchers should be reminded to provide all appropriate information.

Fifth, researchers should not over-report the significance and importance of the results. There is nothing virtuous about over-claiming modest research results and nothing unethical about trumpeting significant ones. When in doubt, researchers should exercise moderation.

Finally, this review identified research that was published multiple times by the same authors, using the same sample, and examining the same issues. While this can sometimes be helpful in disseminating research to different audiences, it also warrants caution. Journal editors and reviewers have a fiduciary responsibility to remind authors that research should be original and not previously published or under review at other journals. At a minimum and as a courtesy to readers, researchers who publish the same or very similar researcher results using the same data should acknowledge prior journal publications, even if the journals themselves do not expressly prohibit dual publications. It is recommended that the Journal of Cooperative Education and Internships include a policy statement to clarify this issue and reduce potential problems in the future.

Limitations and Directions for Future Research

All studies contain limitations and this study is no exception. First, this review only covered articles in publications other than the *Journal of Cooperative Education and Internships*. To develop a more comprehensive understanding of the nature, scope, and quality of research in cooperative education and internships, future reviews should compare the results of this study with those from a review of articles published in this journal. Additionally, an analysis dedicated to qualitative research should also be conducted.

Second, the articles selected for review were intended to reflect a representative sample of *quantitative research* published in alternative journals. Given the vagaries of literature reviews, there are perhaps additional articles that simply *slipped through the cracks*. This was not intentional on the part of the reviewer and concerted efforts were made to secure as complete a record of published articles as was reasonably possible. While this study may not be a complete audit of all articles published in alternative journals, it is nonetheless believed to be a reasonable representation of this literature. To the extent that other relevant articles exist, this study acknowledges this limitation.

Third, the reviews are not intended to provide a complete analysis of each and every article. Nor was the intent to conduct a complete analysis of the data. To do so would have resulted in a rather unwieldy study. For the sake of parsimony and to ensure that the study could be completed in a timely manner, the review intentionally focused on selected issues. Therefore, it is acknowledged that other streams of research could have been evaluated as well and that additional analysis of the data would have been performed. For example, the literature is replete with articles that provide commentaries on cooperative education and internship programs. Other research has focused on case studies and descriptions of program techniques. While a review of this literature might be more challenging, it would likely reveal additional insights and trends regarding the status of research in cooperative education and internships.

Finally, this review attempted to provide an accurate and objective review of the literature. Nonetheless, reasonable reviewers can come to different conclusions regarding the nature, scope, and quality of research. This is respectfully acknowledged.

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APPENDIX A
OUTCOMES: GRADE POINT AVERAGE AND SALARY

AUTHOR	SAMPLE	COMMENTS ON RESULTS
Blair and Millea (2004a)	Convenience sample of 780 students who had participated in a cooperative education experience and 4,726 students who had not. All students were from a single public university. Limitation of using a convenience sample was noted.	The study examines the effect of cooperative education on grade point average, length of time in school, and starting salary. The authors report significant effects on all three measures. However, since statistical significance can be affected by sample size (i.e., standard error and sample size are inversely related), the results need to be interpreted cautiously. The sub-samples used for mean salary comparisons appear more appropriate (n=359 and 164 respectively for co-op and non-co-op). Co-op was measured using dummy variables; one for 3 or more semesters and one for less than 3 semesters. This may have affected the results as the only significant result came from 3 or more semesters. The magnitude of difference in GPA was modest (i.e., .12) but it should be noted that GPA was measured on an ordinal scale and not actual GPA. The regression equations also used different dummy variables for race. In one equation, the used black/non-black and in another they used white/non-white. No explanation was provided. Overall, the results provide some preliminary information on outcomes, but the limitations strongly suggest that the results be viewed cautiously.
Blair, Millea, and Hammer (2004)	Sub-sample of 773 engineering students from the sample used in Blair and Millea (2004a). Limitation of using a convenience sample noted.	The study is very similar to Blair and Millea (2004a and b) except that the sample is a subset of the ones used in those studies. The study examined the influence of cooperative education experiences on grade point average, length of time in school, and starting salary. The authors report significant effects on all three measures but most of the limitations in Blair and Millea (2004a) apply to this study as well.
Cannon and Arnold (1998)	Convenience sample of 165 marketing majors from three different universities. No reporting of the number of students that had participated in an intern experience. Limitations of the convenience sample were not reported.	Descriptive study that examined students' expectations of internship programs. The results of the t-tests indicate that students with lower GPAs are more likely to believe that an internship should lead to a permanent job offer. Additionally students with lower GPAs are less likely to expect that a writing assignment will be required as part of the internship experience. Mean scores were given but not the standard deviations. A subsequent analysis of mean differences between students who had internship experience and those who did not revealed that interns reported stronger agreement that: (1) having a full-time internship is beneficial, (2) that it will lead to a full-time job, and (3) that formal training is provided at the beginning of the internship.
English and Koeppen (1993)	Convenience sample of 57 accounting students who completed an accounting internship and 57 accounting students who did not	The study examined the relationship between accounting internships and academic performance. The mean hours and GPAs for the two groups were similar at 103.9 hours for interns and 101.6 hours for non-interns and 3.23 GPA for interns and 3.24 GPA for non-interns. The results of the analysis of covariance model for the pre- and post-GPA test reveals that the GPA for interns was increased for the interns but not for the non-interns. A more in-depth analysis revealed that grades in

	participate in an internship. The limitations of using a convenience sample were reported.	the subject area of accounting increased more for the intern students, but there was not a significant difference between the two groups for other business and non-business courses. Since the interns subsequently took accounting classes related to their work experience, it was logical to expect that their grades would have benefited from this experience.
Fuller and Schoenberger (1991)	Convenience sample of 230 business graduates (123 males and 107 females). It is not known how many of these students had participated in an internship experience. The limitations of using a convenience groups were reported.	Examined the relationship between an internship experience and salaries for women using regression analysis. When accounting for major, GPA, age, work experience, and work related to major, it was found that internship experience still had a positive effect on starting salaries for women ($p<.05$), but not for men ($p>.05$ but less than .10). Internship experience was not found to be a factor in long term salaries. The low r-square for the equation was acknowledged by the authors as limiting importance of the results. Also, since the number of students who had participated in an internship experience is not known, it is possible that this might have contributed to the results.
Gault, Redington and Schlager (2000)	Convenience sample of business alumni from a public university. Ninety-eight had intern experience and 46 did not. The sample was drawn from a single public university. The authors acknowledged the limitations of using a convenience sample.	Examined the advantages of internships using a multivariate analysis of variance model. The results indicate that the average time between graduation and employment was approximately 2 months for interns and slightly over 4 months for non-interns. Interns also reported higher starting salaries and higher current salaries, but the difference in current salaries may be due to when the students were hired. It could not be discerned whether the work experience variable was defined in terms of total work experience or only experience prior to employment after graduation. The authors acknowledged the exploratory nature of the study. Means were reported for individual variables but their respective standard deviations were not.
Hornsby and Johnson (1991)	Convenience sample of 25 students participating in a computer lab work experience at the university. A control group was needed, but not used. Limitations were not addressed by the authors.	The authors reported that GPA increased during the internship, but since there was no control group and a statistical test for differences in means GPAs was not conducted, the validity of this finding remains unknown. Since 33 percent of the interns (approximately 8 of 25) reported lower GPAs, this finding should be viewed as preliminary. The study surveyed perceptions of job satisfaction and motivation potential as well as perceptions of the internships impact on the job search process using Likert scales. Means were reported with their respective standard deviations. However, since no control group was used, the results need to be viewed cautiously until they can be validated through an experimental design.
Knechel and Snowball (1987)	Convenience sample of 108 students who had completed an intern experience in accounting (with most in an auditing	Examined the relationship between accounting internships and academic performance using an analysis of covariance model. Pre-GPA was 3.366 for the interns and 3.375 for the non-interns. GPAs dropped for both groups during the period of the internship ($p<.05$). But the difference between groups was not significant. However, the authors note that the drop in GPA contradicts Koehler (1974) who reported that GPA increases

	area). The control group was 108 non-intern students. It is unknown whether or not the control group consisted of accounting students. Limitations of using a convenience sample were acknowledged.	with an internship. When examined by individual course, it was found that the grade in auditing was significantly increased for interns. This is attributable to the proposition that the auditing course is most directly related to internship experience and is taken afterwards rather than beforehand.
Knouse, Tanner, and Harris (1999)	Convenience sample of 1,117 business alumni from one university. Of these, 346 had participated in an internship experience. The limitations of using a convenience sample were reported by the authors.	Examined the relationship between internships and college performance and subsequent job opportunities. The results reveal that the interns had a higher GPA upon graduation than non-interns (2.97 versus 2.91). However, because the sample was relatively large, the results should probably be viewed from the context of effect size. A difference of .06 does not appear very meaningful. Furthermore, GPA was measured using an ordinal scale (i.e., categories = 1, 2, 3, 4). This appears to have been unnecessary since the author report having had the actual GPAs. The results also show that for those students who had a job at graduation, more had participated in an internship (55%). However, of those who did not have a job at graduation, 36 percent had participated in an internship. The follow-up survey six months later revealed that the reported employment advantage had disappeared as most of the sample was employed or in graduate school. The authors note that students involved in internships might simply be more motivated and this might explain greater employment success and higher GPAs. Further research is needed in this area.
Linnehan (2001)	Convenience sample of 202 African-American high school students involved in a work-based mentoring program. A control group was not used. The limitations were acknowledged by the authors.	Theory driven study that examined participation in a work-based mentoring program in relation to academic performance and behavior. Results of the regression analysis indicated that participating in the program for more than half the academic year had a significant, positive relation with students' grade point averages and attendance rate's after controlling for their previous-year GPA and attendance. This relationship was not significant for those who participated in the program over a shorter period of time.
Maynard (1999)	Convenience sample of 132 public relations and communication majors who completed an internship. The author did not acknowledge the limitation of	Examined the validity of the 3.0 GPA eligibility standard used for public relations internships. The study cites sources documenting the prevalence of a 3.0 standard among industry leaders. The author contends that the results of this study indicate that higher GPAs tend to result in higher grades in the internship experience. However, the test was conducted based on pass/fail where pass equaled a grade of A and fail equaled a grade of B or less. This artificial coding of the data appears inappropriate and may have affected the results. Although the author proposes reducing the GPA requirement to 2.7, the

	convenience groups.	results should be viewed tentatively given the manner in which the test was conducted.
Stern, Finkelstein, Urquiola, and Cagampang (1997)	The sample was not defined in much detail. Readers were referred to another article for more information. It appears to be a convenience sample that included both co-op students and non co-op students. Limitations of using a convenience sample were not acknowledged.	Examined the relationship between cooperative education experience, hours worked, GPA and other variables. The results of the analysis indicate a stronger negative association between hours worked and GPA for students in non-school supervised jobs than those in cooperative education programs. However, the co-op groups had lower starting GPAs which may have contributed to this finding. The relationship between GPA and grades was monotonic for students in non-school supervised jobs. For co-op students, the GPA tended to rise slightly during the first 20 hours but dropped after that indicating that co-op experiences have a negative effect on GPAs only when hours exceed 20. High school co-op experiences also led to higher wages soon after graduation, mainly because (1) co-op students are less likely to enroll in higher education and (2) recent graduates who are enrolled in higher education earn lower wages than those who work full time. Means and standard deviations were also provided, but few other diagnostics were reported. As such, the goodness of fit is difficult to verify. The fact that variance explained ranged from slightly over 1 to only 15 percent for the equations suggests that other factors need to be considered.

APPENDIX B
OUTCOMES: JOB PERFORMANCE AND EMPLOYMENT

AUTHOR	SAMPLE	COMMENTS
Callanan and Benzing (2004)	Convenience sample of 163 seniors graduating with a business degree from a large public university in the mid-Atlantic region of the U.S. A total of 88 had completed an internship while 75 had not. The limitation of using a convenience sample was noted by the authors.	Assessed the role of internships in the career-oriented employment of graduating college students. Using logistic regression, the authors report that the completion of an internship assignment and the number of interviews were both linked with finding career-oriented employment. The completion of an internship was not associated with confidence that the selected position was correct for the student. A correlation analysis was also provided based on the categorical data (i.e., two categories) and, as such, cannot be properly interpreted. An explanation of how the dummy variables were used could have been better explained.
Douglas and Brewer (1999)	Random sample consisted of 2,093 public managers who had hired new employees during the previous two years. Ninety seven of the hires were from cooperative education programs	The study examined managers' perceptions of the performance of cooperative education employees working in federal agencies. The results of the chi-square test indicate that the performance ratings for co-op conversion hires and non-co-op hires were not significantly different along any of the dimensions rated. However, it was found that co-op conversions performed better than employees hired from "OPM" certificates programs or veterans readjustment appointments, but these groups tend to produce lower quality recruits. A review of the statistical data reported in Table 2 indicates that the values are not correctly reported.
Linn, Ferguson, and Egart (2004)	Convenience sample of 73 former cooperative education students who graduated from a liberal arts college between the years 1946 and 1955. The limitations of using a convenience samples were noted along with those associated with not using a control group.	The study examined the relationships between the occupational categories of cooperative education jobs taken in college and subsequent work histories. The results of the work history indicate that most graduates took post-graduate jobs in occupational functions and contexts they had explored as co-op students. High levels of individuality in use of the co-op program and in career paths were found. Four coop-to-career patterns were described, based on the degree to which functions and contexts were explored during college and career. A case study was included to exemplify each pattern. Gender differences were revealed in the patterns, but not the group data. Job context was found to be particularly important in defining these patterns. The authors note that, given the lack of a control group, the characteristics of the study sample, and the particularities of the historical era studied, the ability to generalize beyond the study sample is limited.
Nnadozie, Ishiyama, and Chon (2001)	Convenience sample of 35 (of 157) key informants from McNair graduate programs. The limitation of using a convenience	A descriptive study that examined the relationship between the rigor of an internship experience and future success in graduate school. Results show that respondents consider undergraduate "research" internships to be the most effective of the three elements considered for admission of to their graduate program. Internship "rigor" (as measured in terms of placement, secured funding, and completion), was shown to be positively related to success in graduate school. However, the

	sample was acknowledged	p-values are not significant (i.e., p>.05, but less than .10). As such, the results should be viewed with caution. Results also show three elements - preparation, presentation, and publication – are keys to successful undergraduate research experience, but no statistical test was conducted to confirm this proposition.
Sagen, Dallam, and Laverty (2000)	Convenience sample of 1,012 graduates from one public university. Of these, it appears that 293 had participated in an internship experience and 111 had participated in a cooperative education program. These numbers were calculated from percentages provided by the authors. The limitation of using a convenience sample was acknowledged.	Examined whether supplementary career preparation experiences were associated with initial employment success. Using a survey instrument, the results of the logistic regression indicate that supplemental career preparation experiences explain very little variance in initial employment success (R^2=.06). The internship coefficient was significant, but the magnitude of the coefficient was marginal (i.e., .08). The effect of cooperative education was not significant. Internships were significant (b=.23, P<.05) for conditional effects (i.e., interaction with specialized occupational preparation for the natural or hard sciences) but not for cooperative education. Since numerous other career preparation factors were found to be significant, they authors caution against general endorsements of career preparation experiences for purposes of employment.
Siegel and Rigsby (1988)	Convenience sample consisted of 132 auditors who had an auditing internship prior to full-time employment with the firm and 598 auditors who did not complete an internship prior to full-time employment. The limitation of using a convenience sample was not reported.	Longitudinal examination of the relationship between accounting internships and subsequent professional performance. To control for work experience, the non-intern sample consisted only of individuals who had no prior work experience before employment with the firm. The results of the performance evaluations for the three years indicate that auditors with internship experience received significantly higher annual performance evaluations. Additionally, the mean performance evaluations (in absolute terms) for those with intern experience trended upward during the three years while the evaluations for those without the intern experience trended downward. The level of the change, however, was not statistically significant. Finally, the results indicate that those with internship experience advance faster than those without such experience. The authors caution that it is possible that other intervening factors could have influenced the results. A comparison of GPA scores indicated no difference between the two groups suggesting that at least one potentially important intervening variable can be excluded from consideration.
Taylor (1988)	Study 1: 32 interns and 35 non-interns from a public university. The Sample was cross-sectional in terms of major. Study 2 consisted of a sample of 128 recruiters. The	Study 1 examined differences in job outcomes between interns and non-interns. The results indicate that interns reported higher starting salaries and greater satisfaction with their salaries than the non-intern group. However, the groups did not differ with regard to number of job offers received or satisfaction with the accepted position. There was also no difference in the percentage of students who had accepted a job at the time of graduation. In study 2, recruiters evaluated mock resumes where the presence or absence of an internship experience was manipulated. The results indicate that the

	limitation of using convenience samples was acknowledged.	resumes with internship experience were rated significantly higher than resumes without such experience. The author acknowledged the limitation associated with small samples.

APPENDIX C
SKILLS AND COMPETENCIES

AUTHOR	SAMPLE	COMMENTS
Brumm, Hanneman, and Mickelson (2006)	A convenience sample of 67 stakeholders (e.g., students, employers, faculty) of a college of engineering at one public university. Limitations of using a convenience sample not reported.	A descriptive study using a survey instrument with Likert-format questions for 14 competencies. The authors contend that co-op/internship experiences are considered the second best place to develop and demonstrate such competencies (behind the workplace). However, no standard deviations for the means were provided nor were statistical tests for mean differences conducted on the data. Additionally, the response categories were positively skewed with only 1 of 5 categories worded in a negative direction.
Garavon and Murphy (2001)	Convenience sample of 6 cooperative education students majoring in either business the humanities or engineering. Limitation of using a convenience sample was reported	A descriptive study using a qualitative method that investigated the perspectives of third-level cooperative education students with regard to the student socialization process (getting into the organization, breaking in, settling in). Although the authors contend that the results of the content analysis show that cooperative education allows students to acquire essential practical skills through exposure to the real world, it is more likely that the results of this exploratory study simply provide some insights into the perceptions of the socialization of 6 interns that might be useful in future research. The authors also present a conceptual model of cooperative education student socialization.
Eyler (1995)	Convenience sample of 219 graduates who had participated in one of 2 internship programs in college. One was described as "academically intensive" and the other "loosely structured". A control groups was not used and the author did not report the limitations of using a convenience sample.	A descriptive study that examined the perceived benefits of internship programs. Analysis of responses to open-ended questions revealed twelve categories of benefits. High among these are: organizational understanding, recruitment edge, reinforcement or discouragement of job choice, and job skills. The 12 categories were then subjectively placed in one of three major groups: Career (5), Learning (6), and Personal growth (1). This was not surprising given the number of categories in each group: learning ranked first, career second and personal growth third. Limitations: "reinforcement" and "discouragement" categories were subjectively combined so the extent to which the internship might have dissuaded students from a career path is unknown. Subjective categorization was then evaluated using a chi-square goodness of fit statistic. P-levels of .10 were reported as significant. Finally, although the abstract implies a sample of 298, the actual sample appears to be only 219. The limitations associated with the interpretation of qualitative data were not reported.
Haag, Guilbeau, and Goble (2006)	Convenience sample of 40 industry managers in the field of engineering. Limitation of using	A descriptive study that utilized a survey questionnaire using Likert scale items. The questionnaire was designed to measure outcomes of internship programs based on criteria established by ABET (Accreditation Board for Engineering and Technology) The authors report using a non-parametric test (i.e., Mann-Whitney) but the statistical results were not presented. Although

	a convenience sample was not acknowledged.	they report that the results indicate that both undergraduate and graduate students of the programs possess the majority of skills defined in the ABET a-k competencies, this cannot be confirmed. Similarly, although the authors report no significant differences between undergraduate and graduate students, the method of analysis was not described and the statistical results not reported (other than the means and standard deviations). The results should be viewed cautiously.
Kardash (2000)	Convenience sample of 57 college students who participated in an undergraduate research experience (URE) under faculty supervision. The use of a convenience samples was not reported as a limitation, but the lack of a control group was reported.	Theory-driven study that examined the extent to which research skills were perceived to be enhanced by an internship experience. Based on t-test comparisons of expected outcomes (pre-test) and perceived outcomes (post-text), results show significant differences with outcomes falling below expectations on all skill items measured. No mean differences in perceived skill levels were found in the pre-test, but male scored higher than females in the post-test for the ability to "understand contemporary concepts in your field". T-tests for differences between student self-ratings and mentor ratings revealed only one significant difference. Although the study did not use a control group, it did use appropriate statistical techniques and presented the results thoroughly.

APPENDIX D
PERCEIVED BENEFITS AND CHALLENGES

AUTHOR	SAMPLE	COMMENTS
Brown-Welty and Patterson (2002)	Convenience samples. For phase 1, sample of 26 institutional leaders, faculty, students, and human resources specialists. In phase 2, sample of administrators and human resource directors from corporate universities. In phase 3, a survey was administered to a sample of 33 key informants from corporate universities. The limitation associated with the use of convenience samples was acknowledged.	Examined the benefits and challenges of offering college degree programs in collaboration with private corporations (e.g., Marquette University and Harley-Davidson). The qualitative analysis revealed benefits such as: meeting goals and experiences, developing employees, and building relationships between universities and corporations. The 14 corporations that had not formed a collaborative relationship with a university were asked why they hadn't. Based on frequency of responses, the authors report the highest frequencies for: the university does not understand our goals/objectives (f=8), the corporations can do a better job on their own (f=8), the university wants too much control over the curriculum (f=7), there is too much university bureaucracy (f=7), and the curriculum is irrelevant f=6), the university cannot customize curriculum for us (f=6), our training is too company specific (f=6), our training is too private corporation specific (f=6). The survey data used Likert-format questions and provided mean responses to 25 items based on importance. The means were ranked but were not statistically evaluated. As such, the rankings should be viewed cautiously. Additionally, given a sample size of 33, the results of the t-test comparisons showed only 1 difference between the groups. The scale response categories appear unbalanced.
Lancaster and Smith (1994)	Convenience sample of 69 alumni from one university who had majored in computer science and had participated in a cooperative education experience. The limitation associated with the use of a convenience sample was not acknowledged. The study did not use a control group, although it would have been appropriate. This was not acknowledged.	This study used a survey method to evaluate perceptions of 13 cooperative education outcomes (1=not helpful to 5 = extremely helpful). The authors rank-ordered the responses and provided commentary on the significance of the ranks. However, because no statistical test was conducted, these should be viewed as the subjective interpretations of the authors. A subsequent series of chi-square tests for gender differences were conducted on the frequency distributions of the responses for each item. Three of the 13 were shown to be different, but two response categories were combined to facilitate the analysis resulting in an unnecessary manipulation of the data. Additionally, the response categories had a positive response bias as only one response was in the negative direction and four in the positive direction. Although the reported results indicate that there were no differences in self confidence with regard to the outcome of the cooperative education experience, the authors contend that cooperative education can serve to retain women in the field of computer science by enhancing self confidence. Since the relationship between self confidence and retention was not directly measured, this proposition should be viewed as the subjective opinion of the authors. An alternative test for gender differences would have been a t-test or analysis of variance.

Neopolitan (1992)	Convenience sample of 30 sociology majors who participated in an internship experience in a variety of social service, criminal justice, government, and private agencies. The sample also included 30 non-interns as a control group. The limitation associated with the use of a convenience sample was not acknowledged.	Examined the relationship between the internship experience and career choice using the Career Decision Scale. The initial results indicate differences on 5 of 16 items suggesting that the intern experience helps clarify career choice by providing information on occupations. The secondary analysis was based on the potential for a change in increased certainty anduncertainty about the career choice. To conduct this analysis, the author omitted some information from the analysis (i.e., students who reported end points of 1 or 4 in the response categories during the pre-test were omitted on those items since the post-test could not extend below 1 for increased uncertainty or above 4 for increased certainty). The rationale provided is not compelling. In fact, the restriction in variance was not necessary as the test could and should have been conducted using difference scores (between the pre and pot test). In either method, there are underlying assumptions, but the use of difference scores requires a more conservative set of assumptions. The authors also reported comparisons with the control group, but the control group was only measured during the post period.
Parsons, Caylor, Simmons (2005)	Convenience sample of 88 engineering students who were enrolled in a cooperative education program at a mid-sized university in the southeast U.S. A control group was appropriate but was not used. Limitations associated with the use of convenience samples and not using a control group were not noted.	Examined the role of individual differences and early employment experiences on learning outcomes and subjective well-being for first-term cooperative education students. Data were collected during pre-employment, mid-semester, and post-employment using surveys. A principal component analysis was conducted on learning outcomes. The factor pattern exhibited high cross-loadings that were not adequately explained. Nonetheless, individual factors were subjectively identified and used in a subsequent regression equation. Additionally, rank-order effects were reported without statistical justification. Interval data was mis-identified as continuous. Scales were not evaluated for internal consistency (i.e., reliability). The results of the study should be viewed very cautiously.
Hymon-Parker (1998)	Convenience samples. The first sample consisted of 25 educators at colleges and universities that offered a major in fashion merchandising. The second sample consisted of 41 key informants from retail stores. The author noted that this was not a	The study examined the benefits and limitations of internships from the perspective of educators and retailers. Three questions were asked: (1) what are the benefits (strengths) of your internship program, (2) What are the limitations (weaknesses of your internship program, and (3) what changes, if any, do you recommended for improving the retail internships? Frequency responses were provided in the analysis. Among the reported strengths were high quality of experience (educators) and preparation to the business (retailers). Reported weaknesses included lack of adequate placement sites for study (educators) and lack of structure/planning (retailers). Changes recommended by retailers for improving internships focused on the need to get more faculty involvement have interns more involved with customers and buyers. Changes recommended by educators for

	convenience sample since the respondents were the entire population of the program.	improving internships focused on locating more internship sites and improving site visits. It was a relatively small sample in a narrowly defined geographic area. Given that the author stated that the sample was the population, generalizations should not have been made to other programs. It appears, however, that these were convenient samples and the limitations associated with them should have been acknowledged.

APPENDIX E
EVALUATIONS

Author	Sample	Comments on Results
Avis and Trice (1991)	Convenience sample of 54 individuals with responsibility for hiring decisions in their organization. The occupational fields included hospitality, retail sales, and magazine publishing. The limitation of using a convenience sample was not acknowledged.	The study examined the influence of college major and internship experience on evaluations of six hypothetical undergraduate women's resumes. Using an analysis of variance model, the results indicate that resumes with hospitality internships were rated higher than those with no internships at all. Using a three-way analysis of variance model, it was found that resumes that included sales and publishing internships were not rated as significantly different from no internships. Individuals who worked in publishing evaluated the resumes lower than individuals who worked in sales and hospitality. It was also found that the strongest ratings were for those resumes that were in the evaluator's occupational field. When the resume included an internship outside the rater's occupational field, it was selected no more often that resumes with no internships. The sample size was relatively small.
Maynard (1997)	Convenience sample using a census of letters sent from companies to the internship director of a communications program at one university. Of the 145 letters, 72 were for unpaid student internships and 73 were for paid student internships.	A descriptive study that examined differences in benefit appeal involving two sets of letters written by the business community to the internship director. These were essentially "pitch" letters designed to attract students. Using semantic network analysis (i.e., analyzing text to determine some measure of the extent to which words are related), it was found that with the unpaid set, the promise of "opportunity" co-occurred more often with appeals such as "for credit," "flexible schedule" and "supervision." In the paid set, emphasis was placed on writing skills and work related tasks. The author cautioned readers to "avoid over-interpreting the data".
Stasz and Brewer (1998)	Convenience samples of 55 and 44 high school students participating in two different work-based learning programs (WBL). The authors did not acknowledge limitations of convenience samples but did acknowledge the limitations of a small sample.	The study examined differences between two different WBL programs. One program (MMHS) provided unpaid internships each year of high school while the other (WEP) provided paid work experience for one semester. Students in the WEP program were more likely to be seniors (89 and 31 percent respectively). T-tests for differences included issues related to cognitive complexity, physical complexity and social competence. For cognitive complexity, not differences were found, but the authors still commented on differences in the means levels without conducting a formal test of ranks. The WEP group was found to provide a more physical challenge (i.e., the extent to which students worked with their hands or tools). With regard to social competence, the WEP group reported a higher mean score for working "with others of own age". WEP students also reported greater conflict with school, but this may be because such students worked, one average, about 13 hours more per week than MMHS students. WEP students also reported a greater likelihood of wanting to quit school as a result of the WBL but the results might have been affected by the fact that more WEP students were seniors and were working more hours. Not surprisingly, the WEP students reported that they have more monetary resources, but see

		their friends less often. This is likely to be attributable to the fact that they were in paid internships worked longer hours than MMHS students. Some of the scale response categories were unbalanced. Frequencies were reported as significant without statistical support.
Trach and Harney (1998)	Convenience sample of 14 college students who completed a cooperative education experience and a control group of 14 who had not. For each groups, 7 of the subjects had a physical impairment, sensory impairment, or learning disability.	The study compared aspects of self-esteem and career development among four groups of community college students, defined by disability status and cooperative educational experience. A 2-way ANOVA performed on the mean scores revealed no significant group differences except for the subtask "Lifestyle Planning" where co-op students without disabilities scored significantly higher than co-op students with disabilities. It is still unknown whether more significant results would have been found if a larger sample were used.

APPENDIX F
ETHICS

Dellaportas, Cooper, and Leung (2006)	Convenience sample of 97 accounting students during a 4 year study (Year 1=18, Year 2=20, Year 3=12, Year 4=47). Limitation of the convenience sample was acknowledged. Lack of control group was not.	Using Kohlberg's theory of cognitive moral reasoning and development, the study examined the moral judgment levels of students over a 4 year period using two separate test instruments, the DIT and a context-specific instrument (Welton test). The results of the longitudinal study indicate that the students' moral development increased with years of formal education (based on the DIT but not the Welton test). The authors note that the difference in test scores was highest during cooperative education but no specific test was conducted to verify this claim and no control group was used. Finally, the scores for the two tests were *not* significantly different in year 4 indicating that any differences that might be ascribed to the cooperative education experience are short lived.
DuPont and Craig (1996)	Convenience sample consisted of 33 students who were participating in a retail merchandising internship and 51 recent graduates of the program. No control group was used. Limitation of the convenience sample and lack of control group not acknowledged.	Examined the ethical perceptions of internship students compared to supervisors. The results suggest that internship programs have little influence on the ethical perceptions of participants. The authors indicate that tests for the effect of intervening variables (such as having taken an ethics class or participated in a training program) were conducted, but the statistical results were not readily presented in this study. The authors report numerous findings that do not appear to be validated in the text of the article. As such, any results reported in this study other than those with statistical support should be viewed tentatively.
Paulins (2001)	Convenience sample consisted of 37 student interns working in a retail merchandising environment and 25 supervisors.	The study examined perceptions of ethical environments in retail internship sites. The results of the survey indicate that students perceive more unethical behavior than supervisors and that unethical behavior is needed if one is to succeed in the company. The means scores, however, are relatively low on both of these items indicating that perceived unethical behavior as well as the need for unethical behavior is, in general, low. Supervisors are more likely (compared to interns) to report that top management has let it be known that unethical behavior will not be tolerated. Both means scores were relatively high. Standard deviations were not reported. No differences were found between the groups with regard to perception of penalties for unethical behavior. Both groups reported relatively high levels of agreement that offenders will be penalized. Comparisons between corporate and retail site reveal no differences in perceptions but the small cell sizes (e.g., 10, 8, 14, 5) may have contributed to this.

APPENDIX G
DESCRIPTION OF PROGRAMS

Cappelli, Shapiro, and Shumanis (1998)	Reporting based on secondary data from two surveys that examined employers who were participating in a school-to-work program.	Examined the extent to which employers participate in school-to-work partnerships and work-based learning, using data from the National Employer Survey (NES). Seventeen percent of the employers had internships opportunities and 11 percent had cooperative education programs. It is not known how many had both. Additional tables report school-to-work participation based on firm size and industry.
Chapin, Roudebush, and Krone (2003)	Convenience sample of 54 of 88 construction management programs.	The study described construction management programs and found that 91% have some type of cooperative education program and that 58% require it. Most programs were found to have one of two types of work terms (i.e., semester or quarter) of coop that earn between 3-4 credit hours per term. The level of satisfaction among students, faculty and employers is very high.
de Jong, Wierstra, and Hermanussen (2006)	The relevant sample was 266 students involved in work-based learning programs. It was a convenience sample. A larger sample was also included, but the respondents only completed one of the two measurement instruments. The limitation associated with a convenience sample was not noted.	Theory-driven study that examined the relationships between school-based (academic) and work-based (experiential) learning approaches of students in vocational education programs. Using factor analysis and cluster analysis, items and students were grouped. The study identified two academic learning dimensions (constructive learning and reproductive learning), and three experiential learning dimensions (analysis, initiative, and immersion). The factor analysis results did not conform to *a priori* theory. Additionally, the factors for the work-based scale were nested (subscales were formed with the individual subscale items and then used in the factor analysis). This should have been better explained. Also, no explanation was given for the rotation method used in the analysis (i.e., promax versus orthogonal). Nonetheless, the authors used the results of the analysis to conduct tests of differences between the factors. Cluster analysis resulted in the identification of three school-based learning orientations and three work-based learning orientations using the larger samples. The results were then applied to the sub-sample of 266 without any additional verification of the clusters. Given the lack of fit between the theory constructs and the data, along with the limited explanation, the results should be evaluated cautiously.
Hutchinson, Munby, Chin, Edwards, Steiner-Bell, Chapman, Ho, and Mills de Espana (2001)	Sample of nine school districts' documents on cooperative education and the policy document on cooperative education obtained from the Ontario Ministry of Education and Training	This study analyzed the two forms of policy documents using a qualitative technique. The results indicate that while both prescribe co-op education as a means of career preparation and an alternate mode of delivery for academic subject knowledge, there were some important differences between local district policies and the Ministry's intent that cooperative education be related to academic outcomes. For example, evaluation forms showed no examples of evaluating subject knowledge. Additionally, difficulties in the cooperative education experience were described in terms of truancy or poor attitude and not in terms of lack of subject knowledge.
Keenan (1992)	Sample of 82 of 109 schools that were identified with advertising programs and	The study described characteristics of advertising internship programs. Results indicate that the majority of programs limit academic credit to 3 hours or less. In terms of grading practices, approximately 50 percent of the programs use a letter grade while slightly less than 45 percent use pass/fail or credit/ no credit. Of

	descriptions of 2,385 internships from these programs.	2,385 internships, 67 percent resulted in no employment offer. Finally, unpaid internships outnumbered paid internships by almost two-to-one.
Knemeyer and Murphy (2001)	Convenience sample of 64 key informants from companies that had hired interns in logistics and 31 from companies that had not hired interns. Limitation of convenience samples not acknowledged nor limitations associated with small samples.	Using a survey instrument, the study examined perceptions of internship issues from the employer perspective. The analysis, however, has some important limitations. Most importantly, correlation analysis was conducted for variables that were binary in nature (i.e., 0 and1). The appropriate test in such cases would be an analysis of variance model (or multiple t-tests). Secondly, the authors report frequencies for only 2 categories (i.e., agree and strongly agree). Means and standard deviations for the variables were not provided. Significance was reported at the p=.10 level. Given these limitations, the results should be evaluated cautiously.
Maskooki, Rama, and Raghunandan (1998)	Convenience sample of 93 finance programs at AACSB accredited colleges and universities	The study described undergraduate internship programs in finance. The authors report that 74 percent of the schools offer internships. Of those, almost 45 percent of the programs have no minimum GPA requirement. Additionally, less than 25 percent of finance undergraduates participate in the majority of schools
Nagle and Collins (1999)	Reported results from a study conducted by NACE using a sample of 430 employers who were members of the association. Unknown whether or not the sample was random.	A descriptive survey of experiential education programs. The results indicate that 365 (84.9%) of the companies surveyed offered some type program in this area. Of those that have programs, 58.1 percent offer cooperative education programs, 87.7 percent offer internships, and 52.1 percent offer summer employment. Slightly more than 30 percent offer all three types of programs. In terms of perceived effectiveness (based on a 1-5 scale with higher numbers indicating greater perceived effectiveness), cooperative education programs were rated 4.05, internship programs 3.97, and summer employment 3.29. However, because standard deviations were not provided, it is unknown whether or not these rating are significantly different. Almost two-thirds of the respondents indicated that if they make an offer to convert to full-time, the salary offer is between 1.5 and 50 percent higher than for a candidate with no prior work experience. The average was 7.8 percent.
Rainsbury, Hodges, Sutherford, and Barrow (1998)	Convenience sample of 19 business students in a cooperative education course, 16 supervisors, and 3 academic coordinators. Limitation of using a convenience sample was implied.	The study describes a collaborative assessment method used by a cooperative education program. Results of t-tests indicate that the academics tend to grade the internship lower than do students or their employers. One potential reason is that the academics have prior knowledge of standards set by other students and of the student's own likely level of performance. Given the small sample size, additional research is needed to more fully understand these issues.

Randall and Good (1991)	Convenience sample of 71 department heads from marketing departments at 4-year universities and colleges throughout the United States. Limitation of convenience samples not acknowledged.	The study was intended to describe marketing internship programs. Approximately 65 percent of the schools surveyed offer some type of internship program. The results also indicate that the most common number of credit hours for an internship in marketing is 3 and that almost half of the internships provide no compensation. Less than 25 percent of the schools had a minimum criterion of 3.0 or higher while approximately 25 percent accepted students with GPAs of less than 2.5. Interviews and application forms were the most common methods used to screen applicants.
Sublett and Mattingly (1995)	Random sample of 100 of 274 geography programs in the United States.	The study used school catalogs to gather data for use in describing undergraduate geography programs. The survey revealed that 69 percent of the sample offered at least one internship-type course. Departments that offer internships tend to larger in number of majors, in the number of full-time faculty, and in total enrollment. Single-term internship course outnumbered co-op type courses. Only 5 percent of the geography programs required an internship for graduation. Aside from these reports, the paper commented primarily on internships at one university located in the Midwest.
Wesley and Bickle (2005)	Convenience sample of 64 student interns majoring in retailing at a public university. No control group. Lack of control group and limitation of convenience sample not acknowledged.	The study examines components of retail management and fashion merchandising internships offered at a large southern university and assesses how the internship program compares with attributes sought by full-time employment in the industry. The results revealed that 89 percent of the interns were perceived as "above average" or "excellent" on each of the 18 components. No control group was used so it is unclear whether these results differ from other employees.
Bailey, Hughes and, Barr (2000)	Quota sample of 468 organizations, of which 113 provided opportunities for internships.	Examined the issue of employer involvement in the school-to-work strategy. The authors present numerous tables that purport to make comparisons across a variety of variables such as perceptions of the quality of interns versus entry-level workers. However, no statistical tests were conducted meaning that the interpretation of the empirical data is subjective. Several regression models were also presented but the variance explained was very low (i.e., .03-.12) suggesting that the results should be viewed tentatively.

APPENDIX H
PERCEPTIONS OF EXPERIENCES

Chin, Munby, Hutchinson, Steiner-Bell (2000)	Convenience sample of 782 community college and university students in education and nursing. Limitation of using a convenience sample was implied.	A survey was conducted to describe why students participated in a cooperative education program during high school. That major reason cited was to try out an already chosen career (48%) and the average participation rate in co-op education of all students was 38 percent (with a range from 33 to 69 percent within the specific programs that were surveyed). Overall, the number one reason for not participating was time constraints (25 percent).
Cook, Parker, and Pettijohn (2004)	Convenience sample consisted of 351 student interns representing 12 different colleges and universities. Limitation of using a convenience sample was not noted.	The study examined student attitudes toward internship programs. The questionnaire included 8 Likert questions. The responses were reported for 9 time periods, 1992-2001. The authors report that the perceptions of internships programs appear to have remained relatively stable over the time period investigated but the results have to be tempered by the fact that a statistical test of change or trend in the data was not conducted. As such, the reported results should be viewed tentatively.
Hall, Stiles, Kuzma, and Elliott (1995)	Convenience sample of 173 business students who were competing an internship interns and 146 employers. Limitation of convenience samples acknowledged.	The study compared student intern and employer expectations of business internships. Based on the responses to 54 Likert items, the results indicate that students are more likely to believe that employers get their money's worth out of interns and that better students are more anxious to do an internship than are poorer students. Students are more likely to expect that a successful internship should result in a job offer and that interns should be paid for an internship. Employers are more likely to believe that internships should be granted on a competitive basis and that a minimum GPA should apply. Means were provided without their respective standard deviations.
Hilt and Lipschultz (1996)	Convenience sample of 66 undergraduate communications students were surveyed during the last week of their internships. The results were compared with those from a sample of 151 broadcast general managers and news directors. Limitation of using a convenience sample acknowledged.	Examined broadcaster's and intern's views of hiring criteria and career preparation, With regard to hiring criteria, broadcasters were more likely than interns to place greater emphasis on "news judgment". Interns placed greater emphasis on college degree and major. However, both college degree and major were rated relatively low, overall, compared to other variables. Communication skills rated highest for both groups, followed closely by self-motivation. With regard to career preparation, interns were more likely than broadcasters to perceive that colleges should teach students hands-on skills (and that students learn adequate hands-on skills in college). Interns also believe more strongly that colleges adequately prepare student for careers. Interns were also more likely to believe that a college degree is essential for a career. Broadcasters were more likely to believe that a broad liberal arts education is valuable.

Karns (2005)	Convenience sample of 227 marketing students from eight different colleges and universities. The limitation of a convenience sample not acknowledged.	The study examined student preferences for a variety of learning activities as well as their perceived effectiveness. The study did not identify the extent to which students in the sample had participated in an internship experiences. Although the results indicate that internships rank very high in terms of both preference and effectiveness, a statistical test for differences was not conducted and standard deviations were not provided. As such, the results should be viewed tentatively.
Kaupins (2002)	Random sample of 211 corporate trainers working for U.S. companies.	Examined trainer perception of the effectiveness of 20 corporate training methods. Question ordering was counter-balanced in the survey instrument to control for potential response bias. Live cases and internships rated highest among the 20 methods on outcome measures such as: (1) knowledge acquisition, (2) problem solving and (3) interpersonal skills. No statistics, other than the mean scores, were presented and no statistical tests for differences in rank were conducted. For example, internships scored a mean of 4.4 on knowledge acquisition while one-on-one instruction scored a mean of 4.3. Since the standard deviations were not reported, it is unknown what the statistical significance of internships is relative to other training methods.
Knemeyer and Murphy (2002)	Convenience sample of 137 students enrolled in a logistics course. Approximately 20 percent were either currently involved with, or had completed, a logistics internship. Key informants of sponsoring organizations were also used (n=64). Limitation of convenience samples was implied.	The study examined employer and student perspectives on logistics internships. Mean differences were found for 10 of 18 measured issues. Data was disaggregated by class level, type of university (private versus public), intern versus non-intern, and degree program and GPA and gender. Separate tests were conducted for each comparison. Overall, students tended to have higher expectations of internships. Students, for example, believed more strongly that the internships should allow students to earn money and provide a source of part-time employment to companies. The authors note that the gap between expectations could result in tension during the internship and resulting changes in satisfaction.
Knemeyer, Murphy, Poist (1999)	Convenience sample of 145 students from three different universities. Approximately 40 percent reported having held a logistics internship *or* job. Limitation of the convenience sample not acknowledged.	This study examined the perceptions of prospective logisticians with respect to five gender-related issues in logistics: employment opportunities, job responsibilities, starting salaries, internship opportunities, and comparative advantage of logistics compared to other majors. As such, the title is somewhat misleading since the study focuses on more than just opportunities. To the extent that the results are valid, they suggest that males and females differ in perception for all of the issues except for comparative advantage. However, given the limitations of the study, the results should be viewed cautiously. First, the authors often reported results in terms of frequencies within response categories. Means, standard deviations, and tests for statistical differences were not adequately conducted. The 5-point Likert scales were collapsed to 3-point scales in order to facilitate the cross-tabulation analysis which would have been unnecessary if the authors had conducted a more

		approach test using a multivariate analysis of variance. The question items were gender directed (i.e., male) which may have affected responses. P-values were also accepted at the .10 level when .05 is the accepted standard. Also, since the study did not directly measure issues related to internships or cooperative education, any contribution is tangential and related to the characteristics of the sample.
Raymond and McNabb (1993)	Convenience sample of 196 business students and 87 manufacturers. No information was provided on the number of students who had an internship experience. Limitation of using a convenience sample was not acknowledged.	Examined the role of business education in preparing students for the workforce. This study is not directly related to experiential learning, but has some implications. Specifically, student and manufacturer ranking of effective teaching methods showed that business internships ranked first for both groups in terms of observed scores. However, since a rank- order test was not conducted, the results cannot be validated.
Rothman (2003)	Convenience sample of 143 undergraduate students from a public university who completed an internship experience. The limitation of using a convenience sample was not acknowledged.	The survey asked students what they liked most and least about their internship. In this sense, it was a descriptive study. The two least-liked aspects were low quality of work and the low quality of the supervision. The most liked aspects were skill and task variety and exposure to a corporate environment. No statistical tests were conducted on the data.
Ruiz (2004)	Convenience sample of 150 student interns who completed airline flight operations internships representing 6 different airlines. Limitation of using a convenience sample was not acknowledged.	The study described the results of a survey of student perceptions of their internships. The author reported mean responses and standard deviations for the 16 question instrument. The author notes that the means are relatively high indicating satisfaction with the internship, but a ranked test for differences in perceptions among the items was not conducted. The results of a Kruskal-Wallis test, however, did indicate that intern's perceptions do not differ across the different airlines. No further statistical analysis was conducted for the individual items. Factor analysis along with an analysis of variance might have been an appropriate way to examine the data.
Spinks and Wells (1994)	Sample of 107 of 145 deans from AACSB accredited business schools.	The study examines business school dean's perceptions of student internships. The results indicate that internship programs are viewed favorably on 22 of 24 items measured. In general, respondents expressed strong support for internship programs. The statistical method did not account for rank ordering of the items and the test was based on data that was unnecessarily collapsed from 5 to 3 categories. Standard deviations were not provided. The use of factor analysis with an analysis of variance may have been more appropriate.

Coll, Pinyonatthagarn, and Pramoolsook, (2003)	Convenience sample of 8 students who participated in a cooperative education program. The limitation of the convenience sample was acknowledged.	The study examined perceptions of 5 Thai students participating in international work placements and 3 overseas students completing work placements in Thailand. Using an interpretivist approach, they found that both groups encountered difficulties with immigration, language, and communication. Advantages reported included improved self-confidence and career enhancement. Results also show the effect of cultural differences on international exchange arrangements between non-Western and Western countries. Given the qualitative nature of the study along with the convenience sample, the results should be considered exploratory.

APPENDIX I
SUMMARY OF MISCELLANEOUS RESEARCH

AUTHOR	SAMPLE	COMMENTS
Cunningham and Sagas (2004)	Convenience sample of 54 students majoring in sports management and participating in an internship. Use of a control group was appropriate but not used. Limitations associated with not using a control groups and using a convenience sample were acknowledged.	Examined occupational commitment among student interns in the field of sports management. The results indicate that intent to enter the field decreased during the course of the internship. However, since expectations were not measured prior to the internship, it is unknown whether the experience itself or unrealistic expectations influence the decrease in commitment. Furthermore, there was no control group suggesting that the results should be viewed tentatively.
Cunningham, Sagas, Dixon, Kent, and Turner (2005)	Convenience sample of 71 undergraduate students who were completing an internship in sports management. A second sample of 67 non-interns was used as a control group. Limitation of using a convenience sample was noted.	The theory-driven study examined outcomes of a sports management internship. Based on the results of t-tests, it was reported that interns' level of anticipated career satisfaction, occupational commitment and intent to enter the field decreased significantly between period 1 and 2 (the start and end of the internship) when compared to non-interns. A closer analysis reveals that the drop is not significant *within* the groups. That is, neither the intern group nor the non-intern groups showed any significant change from time 1 to time 2. The findings appear to be an artifact of the mean values for the intern group declining in time 2 and the mean values for the non-intern group increasing during that same time (or only decreasing slightly). That intern means would decline while non-intern means would increase is not explained. The authors, however, note that the internship experiences were relatively heterogeneous and so the quality of the internship might have varied depending of the context. If so, this might help explain the findings.
Dixon, Cunningham, Sagas, Turner, and Kent (2005)	Convenience sample of 71 undergraduate students from four universities across the United States. The students were completing internships primarily in the sports and recreation industry. Limitation of convenience group acknowledged.	The study examined affective organizational commitment among undergraduate interns using regression analysis. The results show that "job challenge" was the only variable in the model significantly related to commitment. No control group was used so it is unclear if the results are specific to interns.

Savoie-Zajc and Dolbec (2003)	Convenience sample of 175 cooperative education students working at pulp and paper mills. Limitation of using a convenience sample was not acknowledged.	Using the concept of "community of practice" and a typology of work experience, the students completed three questionnaires (one for each practicum experience). Group interviews with the students were conducted after the third practicum. Details of the questionnaires and the interview process were not described. Statistical data was not reported other than in very cursory form. As such, the validity of the results of difficult to confirm.

APPENDIX J
MISCELLANEOUS

AUTHOR	SAMPLE	COMMENTS
Morton, Dawson, and Laing (1993)	Convenience sample of 22 high school students enrolled in a cooperative education class and 32 students who were not (representing the control group). Limitations of convenience groups were implied.	The study used a survey instrument to measure personal skill development. The survey was completed at the beginning and the end of the co-op experience (i.e., pre and post experience). Details of the scale items, including internal consistency, were not reported. The authors used an analysis of variance model, but the explanation of procedures was vague. The results were minimally presented although means and standard deviations for each item were provided. Differences were shown between groups with regard to increased "assertion" (males in the co-op group) and "interpersonal comfort" (males in the co-op group). The authors also report that "physical wellness" increase for males and females in both groups, but the mean changes were only significant for females in the co-op group and males in the non-co-op group.
Buller and Stull (1990)	This study examined the nature of strategic planning practices and their performance effects in 285 cooperative education programs in U.S. institutions of higher education.	Theory-based research using a survey method. The authors report that the results of the means analysis and correlations are consistent with those of previous research in for-profit firms. Involvement in strategic planning was associated with positive performance outcomes on some criteria but not others. Additionally, an examination of performance effects using Porter's (1980) typology indicated that different strategies were associated with different program outcomes.
Scholz, Steiner, Hansmann (2004)	Convenience sample of 478 student interns participating in an environmental sciences internship and 293 of their supervisors. Limitation of using a convenience sample was not acknowledged.	Examined the benefits of a compulsory internship with respect to the three institutional goals of university education: (a) training for research, (b) professional education, and (c) general natural science education. A survey instrument assessed 14 qualifications of students. Student and supervisor responses were combined into one data base. Pre- and post-internship questionnaires were used. The analysis was over-complex. First, a principle component analysis was conducted based on 8 assessments and 14 qualifications. It revealed 2 factors. A subsequent cluster analysis was then performed on the 14 qualification to determine which were judged similarly by the respondents. I was hypothesized that 3 clusters would emerge. The results suggest 5. Using this information, the authors examined differences between pre-test and overall means and concluded that internship experience enhance learning. Given the lack of a control group and the lack of adequate rationale for the overly complex method of analysis, the results should be considered tentative.
Singer, King, Green, and Barr (2002)	Convenience sample of 21 students in a community action certificate program (internship) and 21 students in an	The study compared outcomes for the two types of internships. The results of the qualitative and quantitative analysis indicate that both groups reported equivalent personal growth from the experience. Results of a MANOVA indicated no differences on measures of optimism, self-esteem or "generativity". However, the community action students linked their personal growth experiences to future community service. A regression

	international studies/liberal arts certificate program (internship). Limitation of using a convenience sample was implied but not explicitly stated as a limitation.	analysis also revealed that the best predictor of their stress-related growth was their level of generative concern (i.e., making a contribution that extends beyond the self). No comparable links emerged for the comparison group. The scale response categories appear skewed. Means tests were not conducted although comparative inferences were made based on mean levels. Authors did caution against making inferences based on correlation analysis; correlation does not imply causation.
Harris, Tanner, Knouse (1996)	Convenience sample of 398 business graduates from a regional southern university. Limitation of using a convenience sample was acknowledged.	A survey method was used to examine differences in the process of job search based on age, gender, and minority status. Results of the t-tests showed that African Americans were less likely to have had internships than Whites.
Morton, Unger, and Laing (1997)	Convenience sample of 55 high school cooperative education students and 55 control subjects. Limitation of using a convenience sample was not noted.	The study examined factors associated with absenteeism from school. Cooperative education students showed a more significant increase in absenteeism during their co-op year. Analysis of transformed scores suggested that the effect is due more to the type of student who participates in a cooperative education program. The multiple regression analysis revealed that the strongest predictor of absenteeism in the co-op year was absenteeism in the previous year, but it was also found that current grade average was also linked to increased absenteeism. Although absenteeism was higher for co-op students it was not driven by lower grades, paid-time employment, or academic level, as it was for regular students.