

**Outcomes of High Impact Practices for Underserved Students:
A Review of the Literature**

Lynn E. Swaner, Ed.D., LMHC, NCC, ACS

Jayne E. Brownell, Ed.D.

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Abstract

This literature review examines the known outcomes of five high-impact practices – learning communities, service-learning, undergraduate research, first-year seminars, and capstone courses and projects – for underserved student populations, namely underrepresented minorities, low-income students, and first-generation college students. There is evidence that these practices can lead to a range of positive outcomes (academic, personal, and civic) for the general population of college students as well as underserved students (see pages 128-129 for a detailed table providing an overview of these outcomes). The strength of evidence for these outcomes, however, is weakened by the limitations of existing research. In addition, little is known regarding moderating variables for each of these practices and their impact on student outcomes. Future research efforts, by seeking to mitigate these limitations, can provide insight into the potential benefits of high-impact practices for the educational experiences of underserved students.

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Introduction

In AAC&U's 2007 report, *College Learning for the New Global Century*, the National Leadership Council for Liberal Education & America's Promise (LEAP) identified a number of innovative, "high impact" practices that are gaining increased attention in higher education. These practices – which include first-year seminars, common intellectual experiences, learning communities, writing-intensive courses, collaborative projects, undergraduate research, diversity/global learning, service-learning, internships, and capstone courses – are often implemented in an effort to meet the unique needs of a new generation of students:

As higher education has reached out to serve an ever wider and more diverse set of students, there has been widespread experimentation to develop more effective educational practices and to determine "what works" with today's college students. Some of these innovations are so well established that research is already emerging about their effectiveness (5).

In a subsequent AAC&U report, Kuh (2008) describes strong positive effects of participating in a number of high-impact activities as measured by the National Survey of Student Engagement (NSSE). Specifically, first-year students and seniors who participated in learning communities, service-learning, study abroad, student-faculty research, and senior culminating experiences reported greater gains in learning and personal development. These gains included "deep approaches" to learning, which encompass integrating ideas and diverse perspectives, discussing ideas with faculty and peers outside of class, analyzing and synthesizing ideas, applying theories, judging the value of information as well as one's own views, and trying to understand others' perspectives. According to Kuh, "Deep approaches to learning are important because students who use these approaches tend to earn higher grades and retain, integrate, and transfer information at higher rates" (14).

In discussing the evidence for the success of these practices, Gonyea, Kinzie, Kuh, and Laird (2008) recommend that all students in higher education participate in at least two high-impact practices, one in their first year and another in their academic major. Yet, this recommendation is far from the current reality in higher education. A majority of college students do not have the opportunity to participate in high-impact activities, and as Kuh notes, underrepresented students – such as first-generation college students and African American students – are far less likely to participate. This is particularly troubling in light of Kuh’s findings related to the “compensatory effects” of high-impact practices for historically underserved students, or the “boost” (17) participating students receive in terms of higher grades and retention during the first year of college.

In addition to the question of who participates in these practices and what kinds of benefits there may be for various populations, the quality of these experiences is also a factor. Gonyea, Kinzie, Kuh, and Laird (2008) claim that characteristics of high-impact practices have differing effects, which begs the question not only of the variability of impact across practices but also between permutations of the same practice. Kuh (2008) theorizes that high-impact activities are effective because they require considerable commitment of time and effort in purposeful tasks; demand meaningful interaction with faculty and peers; increase students’ exposure to diversity; provide for frequent feedback about students’ performance; and allow for application of learning in different settings. It is feasible that the impact of a given practice may vary based on its effectiveness across these, and potentially other, dimensions.

Kuh’s (2008) findings about the outcomes of high-impact practices provide colleges with strong reasons to continue the development these practices on college campuses. They also raise the question of what else we know about the proven outcomes of these practices. The purpose of

the present review is to examine the literature relative to five high-impact practices: 1) learning communities; 2) service-learning; 3) undergraduate research; 4) first-year experiences; and 5) capstone projects. Each of these practices is addressed in a separate chapter of the review, and an additional chapter examines the outcomes of educational approaches that combine two or more of these practices. Specifically, the review asks what is known regarding the outcomes of these practices for all students, as well as the specific outcomes for populations historically underserved by higher education (for purposes of this project, the term “underserved student” refers to underrepresented minority students, students from low-income families, and first generation college students). In addition, the review seeks to determine if there are any variables within each practice that have an impact on student outcomes (e.g., duration of experience or degree of faculty involvement). First, however, the scope of the review – in terms of populations and practices – will be described.

Underserved Students

Undeniably, access to American higher education has expanded greatly over the past few decades. Yet while a college degree has become an achievable goal for students from all backgrounds and walks of life, there still remain substantial disparities in the educational attainment of students from certain racial and ethnic, socioeconomic, and family educational backgrounds. This review focuses on three such subpopulations of underserved students: underrepresented students of color; low-income students; and first-generation college students.

Underrepresented Students of Color

The percentage of all people of color in the United States has grown over the past few decades, representing 33% of the U.S. population in 2005 as compared to 20% in 1980

(KewalRamani, Gilbertson, and Provasnik 2007). More students of color are now enrolled in higher education than ever before, with nearly one in three college students being a person of color in 2004, compared to just 17% in 1976. However, some racial and ethnic groups are still underrepresented on U.S. college campuses, and are lagging behind in degree attainment, particularly at the bachelor's level and higher (see Table 1) (Chronicle of Higher Education Almanac 2008; KewalRamani et al. 2007).

Table 1: Percentage of degrees conferred in 2004/2005 by racial/ethnic group*

	Native American	Asian-American	African-American/Black	Latino/a	White
General population	.8%	4.3%	12.3%	14.4%	66.9%
Associate	1.2%	4.9%	12.7%	11.5%	69.7%
Bachelor's	.7%	7.0%	9.8%	7.3%	75.3%
Master's	.7%	6.5%	10.9%	6.3%	75.7%
Doctorate	.6%	7.6%	8.0%	4.8%	79%

* removing nonresident alien conferrals, compared to racial/ethnic composition in the U.S. population

In 2004, only about half (46-52.7%) of Latino, African-American, and Native American students enrolled in any postsecondary education immediately after high school, compared to 68.9% of White students and 75.2% of Asian-American students (Provasnik and Planty 2008). It is therefore those three groups, African-American, Latino, and Native American students, who will be considered underrepresented for the purposes of this document. Those groups are also more likely to be low-income and/or first-generation students than their White or Asian-American peers.

Low-Income Students

Different thresholds are used to define which students are low-income. The U.S. Department of Education defines these students “as those whose family income was below 125 percent of the federally established poverty level for their family size” (Choy 2000, 2). Using U.S. Census Bureau statistics, that 125% threshold was \$26,504 for a family of four in 2007 (U.S. Census Bureau 2008). The Pell Institute for the Study of Opportunity in Higher Education looks at the percentage of Pell grant recipients in a school as an indicator of whether they are serving a large proportion of low-income students. More than one-third of undergraduates received a Pell grant in 2004/2005, although most did not receive the maximum grant of \$4,050 per year. The median income of Pell grant recipients in 2004/2005 was \$17,217, with “73 percent of dependent recipients of the maximum grant and 90 percent of independent recipients [reporting] family incomes of \$20,000 or less” (Cook and King 2007, 12). Grants have not increased at the same rate that tuition has grown, making Pell grants less effective at covering the cost of tuition today than in the 1970s and 1980s.

The educational pipeline for low-income students is telling. In 2007 it was reported that 69% of students in the lowest income quartile graduated from high school compared to 93% from the highest quartile. Forty percent of low-income students continued to college and 12% graduated from college, compared to 81% and 73% of those in the highest quartile, respectively (Mortenson as cited in Engle and O’Brien 2007). Compared to their higher-income peers, low-income students are typically less prepared for college, having taken a less rigorous high school curriculum and scoring lower on standardized tests (Engle and O’Brien 2007). They are often older and/or first-generation college students, are more likely to begin college in a community college, and are more likely to juggle the demands of school with work, children, and families. Those demands often mean part-time attendance and interrupted enrollment.

Low-income students have been found to be less aware of services offered on college campuses (Engle and O'Brien 2007). Since many services are now fee-based, even when they are aware, low-income students may have less access to the full range of services offered, many of which could provide the assistance and support these students would need to persist and graduate.

First-Generation College Students

Students whose parents did not attend, or attended but did not graduate from college made up a significant percentage of the growth in higher education over the past few decades. However, it is still very challenging for these students to make the transition into the college environment. While 93% of 1992 high school graduates whose parents earned at least a bachelor's degree had enrolled in college two years after high school, 75% of high school graduates whose parents attended college but did not graduate enrolled in this time, and only 59% of first-generation college students had (Choy 2001). Overall, about 22% of students who entered college between 1992 and 2000 were classified as first-generation by the U.S. Department of Education (Chen 2005).

First-generation students enter a new and unfamiliar culture when they enter higher education. Since their parents did not attend college, parents are less likely to be able to guide these students through the admission and financial aid process, and often do not understand the demands and commitment required to complete college level work. First-generation students may feel isolated from their home communities, while at the same time questioning whether they fit into this new environment.

Once in college, first-generation college students are twice as likely to leave school before their second year than those students whose parents earned a bachelor's degree (Choy

2001). While they are as likely to earn an associate's degree as non-first generation students (Choy 2001), they are significantly less likely to complete a bachelor's, even after controlling for pre-college academic preparation, college performance, number of credits earned, enrollment characteristics, and other demographic variables (Chen 2005). Further, those who persisted to earn a bachelor's degree were less likely to continue their education in graduate school (Choy 2001).

First-generation students have been found to progress toward a degree more slowly, earning fewer credits in the same amount of time, due to greater part-time study and more disruptions in their enrollment (Chen 2005). They also have lower GPAs and are more likely to withdraw from or repeat courses. Since students who earn higher grades in their first term of college, and who less frequently withdraw from or repeat classes are more likely to persist to earn a bachelor's degree, these trends are of a great concern.

Seventy percent of first-generation students work while in college (Choy 2001). It is worth noting that first-generation students who work were found to be "more likely than others to consider themselves to be primarily employees who were enrolled in school (as opposed to being primarily students)" (Kojaku and Nuñez as cited in Choy 2001, 21).

Underserved Student Populations

The three groups looked at here, underrepresented minority students, low-income college students, and first-generation students, overlap with the each other to a large degree. For instance, when looking at the proportion of African-American, Latino, and Native American students in college as a whole and the proportion who qualify for Pell grants, students from these groups are overrepresented among Pell grant recipients, as are first-generation college students (Cook and King 2007). Those findings are consistent with other studies that show that African-

American, Latino, and Native American children are more likely to live in poverty and to have parents with lower educational attainment than White or Asian-American students, and that while in college, African-American students require more financial aid than any other racial/ethnic group (KewalRamani et al. 2007). Comparing first-generation college students to those whose parents held at least a bachelor's degree, first-generation students "were more likely to be black or Hispanic and to be from families in the lowest income quartile.... Thus, policies or programs that increase access for students whose parents did not go to college may also do the same for low-income and minority students" (Choy 2001, 5-6).

Given the challenges faced by underserved students, a critical question is which pedagogical practices are most effective both in terms of student persistence and learning. Certainly attaining a college degree is an important indicator of the success these students may or may not be achieving, and therefore it is not surprising that most of the research on underserved students pertains to graduation rates. However, understanding these students' learning experiences, and particularly which educational practices are most beneficial for that learning, can provide more information about an array of important outcomes for students. Moreover, it can provide a roadmap for institutions seeking to improve the educational experiences of underserved students and to maximize their learning in the college environment.

High-Impact Practices

The five high-impact practices presented in this review are detailed in *College Learning for the New Global Century* (AAC&U 2007, 53-54), as excerpted below:

- *Learning Communities*: The key goals for learning communities are to encourage integration of learning across courses and to involve students with "big questions" that

matter beyond the classroom. Students take two or more linked courses as a group and work closely with one another and with their professors. Many learning communities explore a common topic and/or common readings through the lenses of different disciplines. Some deliberately link “liberal arts” and “professional courses”; others feature service learning.

- *Service-Learning*: In these programs, field-based “experiential learning” with community partners is an instructional strategy—and often a required part of the course. The idea is to give students direct experience with issues they are studying in the curriculum and with ongoing efforts to analyze and solve problems in the community. These programs model the idea that giving something back to the community is an important college outcome, and that working with community partners is good preparation for citizenship, work, and life.
- *Undergraduate Research*: With strong support from the National Science Foundation and the research community, scientists are reshaping their courses to connect key concepts and questions with students’ early and active involvement in systematic investigation and research. The goal is to involve students with actively contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to answer important questions. These reforms are part of a broader movement to provide research experiences for students in all disciplines.
- *First-year Seminars and Experiences*: Many schools now build into the curriculum first-year seminars or other programs that bring small groups of students together with faculty or staff on a regular basis. Typically, first-year experiences place a strong emphasis on critical inquiry, frequent writing, information literacy, collaborative learning, and other skills that develop students’ intellectual and practical competencies. First-year seminars can involve students with cutting-edge questions in scholarship and with faculty members’ own research.
- *Capstone Courses and Projects*: Whether they’re called “senior capstones” or some other name, these culminating experiences require students nearing the end of their college years to create a project of some sort that integrates and applies what they’ve learned. The project might be a research paper, a performance, a portfolio of “best work,” or an exhibit of artwork. Capstones are offered both in departmental programs and, increasingly, in general education as well.

The purpose of this literature review is to determine the evidence, where available, for the use of these practices with underserved populations.

Notes on Selected Research and Terminology

Throughout this review, emphasis has been given to peer-reviewed, published research on outcomes for these high-impact practices. Wherever possible, those studies that involved multi-institutional samples as well as sound research practices (e.g., the use of comparison groups) were included. As is evidenced throughout this review, this was often problematic as much of the literature on these practices involves single institutional or programmatic cases that provide self-report data from students and/or faculty engaged in the practice.

It is also important to note that rather than standardize the various terminologies utilized to describe subgroups of underserved students, the review utilizes the language put forth by the authors of each study or article under review. For example, some of the research reviewed refers to students as African American, while other studies refer to students as Black; in each case, the terminology utilized by that particular study or article was utilized in its description.

Learning Communities

While the earliest learning community initiative is commonly dated to the 1920s, learning communities (LCs) began to thrive in earnest during the past 20 years. Learning communities encompass a range of formats and definitions, but hundreds of colleges and universities now offer some form of this experience and nearly 30% of first-year students who completed the National Survey of Student Engagement (NSSE) at doctoral extensive and master's institutions reported participating in a learning community (Kuh, Kinzie, Buckley, Bridges, and Hayek 2007).

In their most simple form, learning communities are a collection of courses that a small group of students complete together. The classes are connected by a common theme, thereby encouraging students to see how knowledge is integrated across disciplines. Ideally, LCs are “integrated, comprehensive programs in which transformative learning takes place through a community process as students develop professional, civic, and ethical responsibility” (Brower and Dettinger 1998, 21). From the simple to the ideal, the hopes for students in LCs are the same.

From reading the literature, common goals emerge. First, by placing a small group of students together in a common intellectual experience, LCs make large campuses feel more intimate. In other words, LCs provide students with an easily identifiable peer group. Second, by allowing students to get to know their classmates better, there is a hope they will feel more comfortable in the classroom and will take more intellectual risks and participate more fully in their classes. Third, LCs are typically designed to increase student interaction with faculty through small classes, and often with out-of-class experiences. Fourth, LCs often use active and collaborative learning methods to increase student participation and ownership in the classroom.

Fifth, linking courses for students aims to teach them how to look for connections among their classes so they will be able to integrate knowledge more effectively after leaving the LC.

All of these goals tie back to the basic ideas of integration, involvement, and engagement. These three ideas are closely related. Tinto's (1993) model of student departure states that integration into both the social and academic environments is necessary in order for students to persist in college. Astin's theory of involvement (1984) posits that students who are more involved in the college experience, in and out of the classroom, will learn more than those who spend little energy on these activities. Both the quality and quantity of effort that students devote to activities matters. Finally, in *Involving Colleges*, Kuh, Schuh and Whitt (1991) found that since students spend so much of their time in activities beyond attending classes and studying, the quality of student life and learning, or in other words, the educational environment, is improved when colleges engage students in and out of the classroom in educationally purposeful ways. Chickering and Gamson (1987) outlined seven principles for good practice in undergraduate education. The first three of these are encouraging faculty-student contact, developing connections and cooperation among students, and employing active learning techniques that will involve students in the learning process. LCs create learning environments that promote all of these principles, leading many to conclude that LCs are an important institutional action to promote engaged, involved students, not only improving their learning, but also leading to a host of other positive outcomes.

Literature about learning communities abounds. Most of this literature is descriptive or prescriptive in nature. Common topics include: the history of LCs (Gabelnick, MacGregor, Matthews and Smith 1990; Shapiro and Levine 1999; Smith, MacGregor, Matthews, and Gabelnick 2004; Smith and Williams 2007), LCs as a response to public criticism or calls for

reform in higher education (Gabelnick et al. 1990; Lenning and Ebbers 1999; Shapiro and Levine 1999), types and models for LCs (Brower and Dettinger, 1998; Gabelnick et al. 1990; Lenning and Ebbers 1999; Shapiro and Levine 1999), campus conditions needed to begin and sustain LCs (Gabelnick et al. 1990; Geri, Kuehn, and MacGregor 1999; Lenning and Ebbers 1999; Levine and Tompkins 1996; Schroeder 1994; Shapiro and Levine 1999), faculty development needed to teach in LCs (Lenning and Ebbers 1999; Levine and Tompkins 1996), the need for LCs for particular populations (Decker Lardner 2003; Lardner 2005; Thayer 2000), examples of successful LC programs (Barefoot, Gardner, Cutright, Morris, Schroeder, Schwartz, Siegel, and Swing 2005; Decker Lardner 2003; Kuh, Kinzie, Schuh, Whitt and Associates 2005; Inkelas, Zeller, Murphy, and Hummel 2006; Shapiro and Levine 1999), and assessment strategies for LCs (Brower and Inkelas 2007; Shapiro and Levine 1999). Comprehensive works, such as Smith et al.'s (2004) book *Learning Communities: Reforming Undergraduate Education*, or Laufgraben and Shapiro's (2004) *Sustaining and Improving Learning Communities*, cover all of these areas in depth. While it is not the intention of this review to repeat here what is thoroughly covered in other publications, it is worth providing an overview of the types of LCs that exist in order to provide background for the remainder of this section.

Types of LCs

Several typologies have been proposed to categorize LCs on college campuses. One of the most widely cited was proposed by Shapiro and Levine (1999). Their categories are:

- *Paired or clustered courses*: This model links two or more individual courses around a common theme, and participation is limited to the students in the LC. These LCs often pair one course with first-year writing or other similar course that enables students to

build college-level skills. Successful clusters have faculty who work collaboratively to help students integrate material across classes. An accompanying first-year seminar or orientation class could also be tied to the cluster. Out-of-classroom activities or trips are often incorporated into clustered or linked courses.

- *Cohorts in large courses:* Known on many campuses as FIGs (freshman interest groups), this model is more common on campuses that offer large lecture courses. Students enroll in the large lecture classes with other students, then are broken down into a FIG cohort for a small discussion section. FIG students may also be enrolled in another, smaller class together along with the large lecture class(es). They may also have an integrative weekly seminar, often facilitated by an advanced undergraduate or graduate student.
- *Team-taught programs:* Sometimes called coordinated studies programs, these programs are the most complex of the LC models, since they create new, interdisciplinary courses rather than linking existing courses. While they can include as few as two courses, they can often serve as the students' full-time course load for a semester, equivalent to the time spent in four or five separate courses. Faculty collaborate to create an interdisciplinary course on a theme, and then team teach it in a block schedule. The groups can be larger than the 20-25 students that are usually found in a cluster classroom, instead having 20-25 students per faculty member, so as many as 75 students with three instructors.
- *Residence based programs:* Residential LCs, referred to as living-learning communities or LLCs in this document, can include any of the models listed above along with a common on-campus living experience for students. The goal is to help students bridge their academic and living environments, carrying learning outside the classroom. The

amount of faculty involvement in the residence halls can vary from running programs related to their courses in the halls, to having an office on site for office hours.

Lenning and Ebbers (1999) used a slightly different approach in categorizing LCs. While their typology covers all of the possibilities described by Shapiro and Levine (1999), one additional categorization made by Lenning and Ebbers (1999) is “student-type learning communities.” While these LCs might meet general education or interdisciplinary goals, these communities are designed for specific populations of students, such as academically underprepared students, honors students, or students with a specific major. While the vast majority of LCs are designed for and enroll first-year students, more colleges and universities are forming LCs for continuing students as well. Many of those programs are student-type LCs.

In addition to the other types of LCs discussed so far, literature is now emerging on a specific category of student-type LCs: virtual communities for distance education. However, since this concept is still in an early stage of development, it will not be covered in this review. Still, it will be worth watching and exploring for the future.

The typologies provided show the variety of LCs programs in existence. However, when turning to the outcomes literature, many authors do not provide enough information about the programs they studied to break them down into these distinct categories. For that reason, the typology used for this review will vary from former models. The most basic distinction is between programs that are residential or non-residential in design. Within non-residential programs, all programs break down into one of three simple types: 1) programs that link or cluster courses without any additional supportive seminars, 2) programs that link courses along with providing a first-year seminar (e.g., orientation course or skills course designed for new students), and 3) programs that link courses along with providing an integrative seminar based

on the LC theme or curricular content. While residential LLCs might be broken down into these categories as well, too few studies provide enough information about the curricular component of these communities to make this distinction possible at this time.

Student Outcomes

While the descriptive and prescriptive literature is well developed and very useful for anyone wishing to explore, begin, or improve LCs on their campuses, the literature that is of the most interest here is the literature that describes the outcomes of LCs. LCs have been hailed as having many positive outcomes for both students and institutions, but it is relatively recently that researchers have begun trying to test the results of LC participation. Much of what has been written in this area is in the form of internal institutional reports evaluating a single campus' program. An excellent publication that summarizes the findings of those reports is *Learning Community Research and Assessment: What We Know Now*, published by the National Learning Communities Project at the Washington Center for Improving the Quality of Undergraduate Education (Taylor 2003). The authors reviewed 32 research studies and 119 single institution assessment reports, most of which were unpublished, and then highlighted 17 reports in more detail. While a few institutional reports are included here, most of the studies included in this review are published articles or reports sponsored by foundations or covering multi-institution, multi-year studies.

The most simple outcomes to measure are retention or year to year persistence, and grades or grade point averages, often referred to as a measure of academic achievement by researchers. Perhaps for that reason, those are the most common outcome studied. However, while both of these outcomes have an obvious benefit to the student, persistence in a single

institution as well as higher grades (which often lead to persistence) can also be viewed as desirable outcomes for colleges and universities themselves.

Other outcomes studied focus on behavioral and attitudinal outcomes that are more difficult to measure than simply seeing whether LC students are more likely to be enrolled at an institution the following term. Most of these measures relate to Tinto's (1993) ideas of integration or Kuh et al.'s (1991) measures of engagement. While a majority of the outcomes from these studies are desirable in order to create a positive learning environment, they still tell us little about student learning or the development of skills and capacities often associated with liberal learning. However, a range of studies, many of which have been published in the last ten years, have begun to examine outcomes that are more commonly associated with liberal education.

Grades and Persistence

Some studies measured persistence and/or grades alone, while others looked at these measures along with other types of outcomes. Most studies found that LC students had both higher grades and greater persistence than non-LC students. Some findings are quite encouraging. For example, in a multi-campus, multi-year study on campuses that serve diverse, predominantly low-income and first generation students, LC students had significantly higher rates of persistence than those of non-LC students (nearly 10% higher at 4-year schools and more than 5% higher at 2-year schools) (Engstrom and Tinto 2008a). Even after controlling for demographics and engagement levels, differences in persistence were found (Engstrom and Tinto 2008b). Zheng, Saunders, Shelley, and Whalen (2002) studied residential students, 40% of whom participated in an LC and 60% who did not. The authors found higher grades among LC participants as compared to their non-LC peers, even after controlling for demographics, pre-

college performance, and attitudinal and motivation factors. The authors concluded that self-selection did not contribute to the positive outcome. Finally, when reviewing the background characteristics of students who chose to enroll or not enroll in a first-year LC at an urban, mainly commuter institution, the researchers found that the LCs tended to enroll students who would typically perform more poorly academically than did non-LC courses (Hotchkiss, Moore, and Pitts 2006). While the raw GPA and persistence data showed minimal differences between groups, after controlling for pre-college background, LC participation had a greater than expected impact on the LC students. LC participation led to significantly higher retention than expected one year after matriculation for both Black men and women. Looking at GPA, while White women in the LC performed about as would be predicted by the raw data, LC participation led to more than a full letter grade increase for Black men, .93 higher for Black women, and .78 higher for White men. A year later the GPA gap between LC and non-LC students narrowed, but was still significant (Hotchkiss et al. 2006).

In other studies, higher grades and/or persistence were found, but the differences tended to be modest and often decreased over time. For instance, two LCs made up of commuter students, half of whom were also first-generation, had higher GPAs and rates of persistence at the end of one term, one year, and two years as compared to a matched sample of non-LC students, but the difference was small and faded over time (Waldron and Yungbluth 2007).

Other studies found positive results for either persistence or grades, but not both. Students in four linked courses had higher persistence after one term and one year as compared to students who took the same four classes but not as a cohort. However, no GPA differences were found (Belcheir 1997). Similarly, in a study of students in three LCs at a community college, grades between groups and as compared to a non-LC matched sample were similar, but

persistence in the higher education system (although not necessarily at the same institution) was significantly higher for LC students (Tinto and Love 1995).

Two additional large-scale studies found that initial trends changed over time. In a multi-year study conducted at one community college, LC students initially had higher GPAs than non-LC students, but that difference faded over time and disappeared after 3 terms (Scrivener, Bloom, LeBlanc, Paxson, Rouse, and Sommo 2008). For persistence the opposite appears to be true for this group. No difference in persistence was found initially, either for returning to the community college or enrolling at any other college. However, a significant result was found after three terms, with more LC students enrolled in some higher education institution. The authors planned to track these students for at least one additional year to study that trend further.

In the largest review of LC students to date, Zhao and Kuh (2004) reviewed all first-year and senior data from the national administration of the 2002 NSSE survey to compare students who participated in an LC and those who did not. After controlling for students' background and pre-college variables as well as for institutional characteristics, no difference was found in first-year grades, but by senior year the LC students had a higher GPA than non-LC students. This study did not review students' persistence.

Two studies looked at persistence in the sciences rather than in an institution. It was found that participation in an LC could increase retention in a college's chemistry sequence (Barrows and Goodfellow 2005), and increase the retention of a predominantly Latino, first-generation population in science, technology, engineering, and mathematics disciplines (Decker Lardner 2003). The GPA for students in that LC were also higher.

Finally, Lichtenstein (2005) looked at the effect of the quality of the classroom environment on grades and persistence for LC students, rather than looking at program

participation. Students in classrooms that successfully linked content between classes, built a sense of community, and helped students build skills for future academic success had the highest grades and persistence over three terms. Students in negative classrooms, defined as those in which professors in linked courses did not coordinate material and/or were in conflict, who did not create community in or out of the classroom, and who did not focus on skill development had the lowest persistence and grades when comparing them to positive environment students, mixed environment students, and non-LC students.

Behavioral Outcomes

Findings of behavioral outcomes have also been mainly positive. LCs have been found to ease first-year students' transition to college (Blackhurst, Akey, and Bobilya 2003; Inkelas, Daver, Vogt, and Leonard 2007; Inkelas and Weisman 2003; Pascarella, Terenzini, and Bliming 1994; Tinto 1997). For example, Inkelas and Weisman (2003) studied three types of LLCs on one college campus and found that regardless of participation in an honors community, a discipline-based community, or an LLC specifically designed to ease the transition into college, all LLC participants reported an easier transition into college than did non-LLC students. LCs have also been helpful for community college students, who credited the positive peer environment of their LC with the ease of their transition to college (Tinto 1997). That supportive group of peers who were facing similar challenges of balancing life and school helped them manage those conflicts, leading to higher rates of persistence.

Multiple studies have reviewed social and/or academic integration of students in LCs (Blackhurst et al. 2003; Engstrom and Tinto 2008b; Inkelas et al. 2007; Pasque and Murphy 2005; Pike, Schroeder, and Berry 1997; Scrivener et al. 2008; Stassen 2003; Tinto 1997; Walker 2001). Some authors use the term academic engagement in similar ways that others use

academic integration, so those terms will be used interchangeably here.

LC students in a multi-campus, multi-year study were found to be more engaged in their classrooms, as measured by a modified version of the Community College Survey of Student Engagement (CCSSE), as compared to their non-LC peers (Engstrom and Tinto 2008b). Scrivener et al. (2008) found similar results, also with a community college population, with LC students engaging with peers, faculty, and course content in and out of the classroom at a significantly higher rate than non-LC students.

Studying LLCs, Pike et al. (1997) and Blackhurst et al. (2003) both found that these environments eased the social integration of participants. Inkelas et al. (2007) found that for first-generation students, LLCs eased both academic and social integration, although time spent on academic integration had a somewhat negative impact on social integration.

Stassen (2003) studied three LLCs on a single campus, each with linked courses but varying in the methods used to enroll or select participants, the level of faculty involvement, and the level of structure in the program. Despite those variations, LLC students experienced positive effects on academic integration, including interaction with peers about academic topics, group work on projects, hours spent studying, and integrating course material between classes, as compared to their non-LLC peers. No significant differences were found between LLC and non-LLC students for social integration.

Tinto (1997) found that the LC community college students he studied described social integration as a necessary step that allowed them to focus on academic engagement. That finding led Tinto to speculate that persistence may be developmental in nature. First-year students need to focus on establishing social connections first, and once those are established, they are more able to focus on their academic pursuits.

Faculty interaction and peer interaction are two of the most common behavioral outcomes examined, and are usually studied together (Blackhurst et al. 2003; Duran, Colarulli, Barrett, and Stevenson 2005; Engstrom and Tinto 2008a, 2008b; Inkelas et al. 2007; Inkelas, Johnson, Lee, Daver, Longerbeam, Vogt, and Leonard 2006; Inkelas, Vogt, Longerbeam, Owen, and Johnson 2006; Inkelas and Weisman 2003; Pascarella et al. 1994; Pike 1999; Pike et al. 1997; Schussler and Fierros 2008; Stassen 2003; Waldron and Yungbluth 2007; Walker 2001; Wilmer 2007; Zhao and Kuh 2004). Most studies found that LC participation led to increases in faculty-student interaction and peer to peer interaction, in and out of the classroom. For example, in studying thousands of LC and non-LC students who completed the NSSE survey in 2002, Zhao and Kuh (2004) found that LC students had more interaction with faculty and were more involved with active and collaborative learning.

LLC students were more likely to have faculty mentoring experiences than those in traditional residence halls (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006), and were more likely to meet with faculty socially outside of class (Inkelas and Weisman 2003). LC students also experienced more familiarity with and concern for their peers (Duran et al. 2005) and a greater sense of connection to their peers (Waldron and Yungbluth 2007). For LCs populated exclusively or predominantly by commuting students, these structures provided an opportunity for students to have increased contact with both faculty and peers compared to being in traditional classrooms (Engstrom and Tinto 2008b; Waldron and Yungbluth 2007; Wilmer 2007).

However, despite increased faculty contact built into LCs, researchers also found that peer interaction sometimes trumped faculty interaction in significance for students. Studying multiple LLCs on a single campus, some of which were designed to have greater faculty

involvement, Schussler and Fierros (2008) found that no one LLC group reported higher levels of faculty relationships than any others. However, all LLC students reported that the relationships they made with peers in their residence halls had a greater impact on their feeling of belonging than did relationships formed in the classroom. Stassen's (2003) findings of multiple LLCs on her campus were similar. Despite the fact that the three LLCs she studied were designed with varying levels of faculty involvement in the program, no differences in levels of faculty interaction were reported among the three LLC groups or between the LLC students and their non-LLC peers.

Walker (2001) found that among students in a highly selective research university, LC students were more likely than non-LC students to work on projects with their classmates, and therefore spent more time talking to peers about academics and about political topics. LC participation did not affect the amount of time interacting with faculty, but LC students were more likely to feel that faculty challenged them intellectually.

In addition to these positive outcomes, one recent study by Jaffe, Carle, Phillips, and Paltoo (2008) also looked at negative outcomes in LCs, namely the formation of cliques in LCs and the perpetuation of a "high school feeling" through the first year of college. Students who reported those environments also reported a higher sense of community and satisfaction than non-LC students, but the authors did identify a downside to spending too much time together during the first year of college.

Attitudinal Outcomes

While not universal, the majority of studies that looked at attitudinal outcomes were conducted with predominantly underserved populations or at community colleges. One theme that emerges in qualitative studies is the way the LC experience leads to students gaining voice

or growing in identity as a learner (Engstrom and Tinto 2008a, 2008b; James, Bruch, and Jehangir 2006; Jehangir 2008). In interviews and focus groups, students talked about LCs providing them with a safe space where they felt comfortable taking academic risks, participating in class, and finding their voice as learners (Engstrom and Tinto 2008a, 2008b).

Similar outcomes emerged from a multiculturally themed LC designed for TRIO students, reported in two studies (James et al. 2006; Jehangir 2008). The TRIO students were predominantly first-generation, low-income, students of color in their first term at a large university. By reviewing students' reflective journals and course papers, the authors found that the LC helped these students build an identity as learners. The students discussed how the cluster allowed them to see that they had something to contribute in this environment and recognize their academic potential. Related to growing in one's identity as a learner is academic self-confidence, which was also identified as a theme in the literature (Engstrom and Tinto 2008a; Inkelas, Vogt et al. 2006; Tinto and Love 1995).

The way that LCs contribute to a sense of belonging on a college campus was also important (Engstrom and Tinto 2008a; Jehangir 2008; Schussler and Fierros 2008; Scrivener et al. 2008). LC students discussed the importance of seeing students like themselves in their LC, commuting, first-generation and low-income students who were struggling with the same life challenges. Developing relationships with those students made them feel like they belonged at college and gave them confidence to participate and persist (Engstrom and Tinto 2008a). At another community college, students mainly in developmental courses reported a stronger sense of belonging than did non-LC students (Scrivener et al. 2008).

Among first-generation LLC students, the perception of a supportive peer environment eased the transition to college (Inkelas et al. 2007). Similar findings were found by Tinto (1997)

when studying community college students in an LC. The students credited the support they found from peers who were struggling with similar life/school balance issues with helping them learn to manage their challenges and persist in school. Tinto and Love (1995) also found that LC students at a different community college were more positive in their perceptions of their classes, faculty, the campus climate, and their own involvement as compared to a matched non-LC cohort.

Perceptions about support in the college environment was the one attitudinal outcome that was studied across a wider range of settings, and findings were universally positive. (Engstrom and Tinto 2008a, 2008b; Inkelas et al. 2007; Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006; Inkelas and Weisman 2003; Tinto 1997; Wilmer 2007; Zhao and Kuh 2004). Compared to students not in LCs, LC students felt a greater sense of encouragement (Engstrom and Tinto 2008a, 2008b), felt their campus was more supportive both academically and socially (Zhao and Kuh 2004), and more often felt that their faculty were concerned about their success (Wilmer 2007).

LLC students found their residences to be more academically and socially supportive than those in traditional residence halls (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006; Inkelas and Weisman 2003), and noted a more positive campus climate for racial/ethnic diversity (Inkelas, Vogt et al. 2006). When studying three types of LLCs on one campus, Inkelas and Weisman (2003) found that students in an honors LLC and in an LLC designed to ease the transition to college reported their residences to be more academically supportive, while those in a discipline-based LLC found their residence to be more socially supportive.

Liberal Education/Learning Outcomes

Critical thinking is one of the most common outcomes associated with liberal learning,

and was the topic of several studies (Inkelas, Soldner Longerbeam, and Leonard 2008, Inkelas, Vogt et al. 2006; Inkelas and Weisman 2003; Scrivener et al. 2008; Walker 2003; Zhao and Kuh 2004). However, nearly all of these measures are based on student self-reported estimates of gains in critical thinking. For instance, students in LLCs reported higher levels of critical thinking and critical analysis skills than did students in traditional residence halls (Inkelas, Vogt et al. 2006; Inkelas and Weisman 2003). And while both LC and non-LC students at a highly selective research university reported gains in critical thinking and analysis/problem solving skills, significantly more LC students reported gains in these areas (Walker 2003).

Zhao and Kuh (2004) examined a range of outcomes that could be linked to critical thinking when studying the national sample of NSSE first-year and senior respondents from 2002. They found that LC students reported greater gains in critical thinking and problem solving skills, and took a greater number of courses that require higher order thinking skills such as judging the quality of information and arguments, synthesis, and the application of theory. Finally, students in an LC at a community college were found to be more likely to choose a curriculum that increased critical thinking skills (Scrivener 2008)

Intellectual/ cognitive development is different than critical thinking, and more likely to be measured in ways other than through self-reports (Avens and Zelle 1992; James et al. 2006; Jehangir 2008; Pascarella et al. 1994; Tinto 1997). Intellectual and cognitive development is defined and discussed in many different ways by researchers, and in some cases, while the outcomes that authors are measuring are clearly related to intellectual development, they do not use that term. Within cognitive development theories, intellectual development is demonstrated by several measures, including an ability to see multiple points of view as valid, viewing both oneself and one's peers as valid sources of knowledge, seeing the potential for a teacher or

professor to be a co-learner in the classroom, and understanding that knowledge is constructed (see for example, Baxter-Magolda 1992; King and Kitchener 1994; Perry 1970). Knefelkamp and Widick's Measure of Intellectual Development (MID) is one method of measuring this construct in students, and was used by Avens and Zelle (1992) to study a full-year LC linking three courses at a community college. By analyzing student responses to the MID at the start, middle and end of the term, the authors found these LC participants advanced in their intellectual development at one term and again at one year at a rate that was higher than the national average growth reported over the course of a full four years of college. In other words, these students displayed more growth in intellectual development in one year than most students develop in four. In a separate assessment of this program, students were asked to rank possible outcomes of the LC experience. For nine consecutive semesters, students felt two of the three most important features of the LC experience were learning that there are multiple perspectives on each issue, and the opportunity to learn from peers. These results further emphasize the intellectual development that occurred among these students.

Using students' reflective journals and academic papers as the basis for analysis, two reports of a multiculturally themed LC designed for predominantly first-generation, low-income TRIO students found similar outcomes (James et al. 2006; Jehangir 2008). While the authors do not label any student changes as intellectual development, they do discuss how during the course of the semester students came to see themselves and their peers as a source of knowledge, and understood that diverse views led to a stronger learning environment, both of which are key indicators of intellectual development.

A third example related to intellectual development, although again without the use of that term, was Tinto's (1997) study of students in an LC at a community college. Students were

able to see faculty sitting in on each other's classes and learning in concert with the LC students, and that impacted their views about learning and the construction of knowledge. They came to appreciate the diverse views expressed in the classroom, and felt more free to express their own views in these classes, becoming active participants in the learning process.

A series of articles studied cognitive complexity, defined as a combination of factors including critical analysis skills, independent learning, and understanding relationships between ideas (Inkelas, Johnson et al. 2006; Inkelas et al. 2008; Inkelas, Vogt et al. 2006). No differences were found between LLC students and those in traditional residence halls in levels of cognitive complexity in these studies. However, since participants were first-year and sophomore students, the authors noted that no higher levels of development might be expected at that point in time (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006).

LCs by their design are intended to help students make connections between classes, so another outcome that one would hope to find is integrative thinking (Dabney, Green, and Topali 2006; Duran et al. 2005; Engstrom and Tinto 2008a, 2008b; Inkelas, Vogt et al. 2006; Pasque and Murphy 2005; Pike 1999; Stassen 2003; Waldron and Yungbluth 2007). In most studies, the researchers did find that LC students felt more able to integrate information or make connections among classes than did non-LC students (Duran et al. 2005; Inkelas, Vogt et al. 2006). In fact, in interviews, students often mentioned that ability as one advantage of being in an LC (Dabney et al. 2006; Engstrom and Tinto 2008a; Pasque and Murphy 2005; Stassen 2003; Tinto and Love 1995). Waldron and Yungbluth (2007) surveyed students in two LCs along with the faculty who taught them. Both groups agreed that the LC led to more integration of course material across classes than did other, non-LC classes. Pike (1999) pointed out that while LLC students were more likely to integrate course information and include that information in conversations with

peers, it was an indirect effect brought about by higher levels of interaction and engagement with peers, not simply by LLC participation.

Reading and/or writing skills, measured by self-report or analysis of students' work, was another outcome studied (Duran et al. 2005; Scrivener et al. 2008; Walker 2001, 2003; Zhao and Kuh 2004). Walker (2001, 2003) found that LC students at a highly selective research university reported greater gains in reading and writing skills than those not in an LC. Another study compared LC students with a matched sample that took the non-LC versions of the same courses (Duran et al. 2005). They asked students to assess their own skill development and then analyzed student writing from their courses. LC students self-reported greater gains in writing than did non-LC students. The writing analysis showed that LC students did, in fact, have greater improvement in writing quality and clarity, and the improvement demonstrated was even greater than in the self-report measure.

Another study used a different objective measure to examine this outcome. Researchers followed LC students at a community college, most of whom were taking developmental English as part of the LC (Scrivener et al. 2008). Compared to matched peers, the LC students were much more likely to pass the developmental reading and writing tests after one term, allowing them to continue into credit bearing college classes more quickly. Further, the non-LC group had not caught up in completion of the developmental sequence three terms later. For low-income students, the ability to earn credits for tuition paid is crucial and was a major goal for the college studied.

Diversity was another significant area of inquiry in the literature. First, researchers looked at openness to new ideas in general or to diversity in particular, and found that LC participants tended to be more open (Avens and Zelle 1992; Inkelas, Johnson et al. 2006;

Inkelas, Vogt et al. 2006; Inkelas and Weisman 2003; James et al. 2006; Jehangir 2008; Longerbeam and Sedlacek 2006; Pasque and Murphy 2005; Pike 2002; Tinto and Love 1995).

Avens and Zelle (1992), in students' rankings of the importance of various outcomes, as well as in qualitative interviews with current LC students and LC alumni, found that discovering an appreciation for different viewpoints was the most important feature of the students' LC participation. Tinto and Love (1995) found the same in their review of three LCs at a community college with students in interviews discussing how much they learned through the diverse experiences and opinions of their peers.

LLC students reported being more open to new ideas and opposing views than students in traditional residence halls or commuter students (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006; Inkelas and Weisman 2003; Pike 2002).

However, not all changes found in this area were positive. In one quantitative study of civic engagement LLC students, some regression was found in attitudes regarding racial and ethnic diversity (Longerbeam and Sedlacek 2006). The authors note that regression can be a normal part of the developmental process, and a more longitudinal, qualitative study might be necessary to track long term changes for this outcome before drawing definite conclusions.

Another outcome related to diversity was participation in intercultural discussions and diversity activities (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006; Inkelas and Weisman 2003; Zhao and Kuh 2004). LLC students nationwide were more likely to participate in diversity-related activities (Inkelas, Johnson et al. 2006) and to engage in sociocultural conversations with peers than those in traditional residence halls (Inkelas, Vogt et al. 2006; Inkelas and Weisman 2003). From the national sample of first-year and senior respondents of the NSSE survey, LC students, residential or not, were also found to engage in more diversity-

related activities than non-LC students (Zhao and Kuh 2004).

Collaboration with peers is a broad area measuring concepts ranging from the likelihood of working on group projects to building teamwork skills (Stassen 2003; Walker 2001; Zhao and Kuh 2004, Tinto and Love 1995). Both LLC students and LC students in general were found to be more likely to work with peers on group projects than their non-LC peers, often leading to more time talking to peers about academic and political subjects (Stassen 2003; Walker 2001). One group of community college students, who were interviewed after they completed their LC experience and were in traditional classrooms, talked about how much more collaboration happened in LCs, how challenging it was to replicate that collaborative environment in non-LC classes, and how they missed that interaction (Tinto and Love 1995). LC students nationwide also reported greater gains in the ability to work in teams than did non-LC students (Zhao and Kuh 2004).

Only one study measured civic engagement as an outcome. Rowan-Kenyon, Soldner, and Inkelas (2007) used a three-prong definition of civic engagement encompassing civic knowledge, values, and skills. It includes service to others, a belief in personal responsibility, and a sense of responsibility for the common good. The authors examined these measures for students in a general LLC, a civic engagement themed LLC, and students in a traditional residence hall, all of whom completed the National Survey of Living Learning Programs (NSLLP) survey. After controlling for demographic variables and precollege attitudes about the importance of cocurricular involvement, students in the civic engagement LLC had higher rates of civic engagement, followed by those in other LLCs. Higher rates were also displayed by students who were involved in student government or a one-time community service project, as well as by those who discussed sociocultural issues with peers and reported positive diversity

interactions.

Finally, LCs have been shown to contribute to students' self-understanding and their development of values and ethics. Zhao and Kuh (2004) found that compared to non-LC students, LC students reported greater gains in personal and social development including developing an understanding of oneself and of diverse others, and the development of values and ethics.

Outcomes for Underserved Students

Some of the authors above have attempted to determine the outcomes for specific groups of underserved populations. It could be argued that every community college study falls under this category, since it is in two-year institutions that many students of color, first-generation students, and low-income students begin or complete their college careers. Those studies tell us that LCs play an important role for students in these contexts. They play a part in creating a sense of support and community for students who may not feel that they belong in a college environment, either because of their level of high school preparation or because they have too many conflicts among their home, work, and school demands (Engstrom and Tinto 2008a, 2008b; Scrivener et al. 2008; Tinto 1997; Tinto and Love 1995). This support led students to take more academic risks by actively participating in classes and finding opportunities for growth and learning through listening to diverse views and voices in the classroom. Through those experiences their views of knowledge were broadened and they made notable gains in intellectual development (Avens and Zelle 1992; Tinto 1997). These LC community college students were more likely to report that their faculty cared about and believed in their success, and they had greater levels of peer and faculty interaction than matched non-LC peers, when studied (Engstrom and Tinto 2008a, 2008b; Wilmer 2007). Persistence findings varied among

the community college studies.

Similarly, there are studies conducted on four-year campuses that mention useful demographic information about their LCs, but without a more detailed analysis it is difficult to draw conclusions for specific populations. Students in two LCs made up exclusively of commuters, half of whom were first-generation students and one-third students of color, were found to have more communication with each other and their faculty as compared to non-LC students (Waldron and Yungbluth 2007). They also felt more connected to their peers and participated in more campus activities. However, no analysis was conducted for differences within demographic groups on these outcomes.

Other studies focused on campuses that serve a preponderance of a certain population, leading one to believe that their findings would extend to underserved students generally. However, these studies do not provide a specific breakdown of the demographics for the LC students studied. For example, Decker Lardner (2003) describes a STEM LC at the University of Texas-El Paso (UTEP), which is a university that serves a predominantly Latino, first-generation population. By using math scores to place students into an LC that includes math, English, and STEM courses, retention for students in the LC reached 80% compared to 68% for the campus as a whole. LC students also had higher GPAs. However, there is no information provided that would confirm whether the LC students matched the demographics of UTEP's general population.

Two studies of an LC designed for TRIO students included mainly low-income, first-generation students, over 90% of whom were also students of color, but no specific analysis was conducted for any of these demographic categories (James et al. 2006; Jehangir 2008). Their findings were very similar to those found at the community colleges described above. In

journals and papers written throughout the course these students talked about the LC helping them find their place within the university. They also noted that hearing a diverse range of views and opinions led to a stronger, more dynamic learning environment. The faculty in the LC felt the experience helped the students become more open and connected learners (Jehangir 2008).

Another set of studies looked specifically at one of the underserved student populations, or broke down their analysis by demographic group. Inkelas et al. (2007) found that first-generation students in LLCs experienced an easier academic and social transition than first-generation students in traditional residence halls. However, they also found that time spent on academic integration had a somewhat negative effect on social integration, possibly because time spent on academics reduced the time available for cocurricular involvement. Interestingly, while these students' actual interactions with peers seemed to have little impact on their transition to college, perceptions of a positive peer environment were very significant for these students. The authors found no differences among this group's outcomes based on gender, race/ethnicity, generational status in the United States, or income.

Inkelas and Weisman (2003), in their study of three types of LLCs and a non-LLC control group, found that African-American and Latino students in an honors LLC experienced a smoother transition to college than non-LLC students from those ethnic/racial groups. Women and African-American students in the non-LLC group reported less openness to different social or cultural perspectives than these student populations in a transition, honors, or discipline-based LLC. Latino students in the discipline-based LLC were the most open to those new perspectives compared to Latino students in any other population studied.

Another study found that minority students in an LLC were less likely to persist than their LLC majority peers, even after controlling for other background factors (Pike 1997). In

contrast, a study at an urban, mainly commuter campus found that LCs had a positive impact on grades and persistence, particularly for students of color. When controlling for pre-college characteristics, both Black men and women in LCs were retained at higher rates than predicted compared to their non-LC peers. In terms of grades, the authors predicted what students' GPA should be based on pre-college information such as high school GPA, SAT score, age, and college of entry. While White women in the LC performed about as would be predicted by the raw data, LC participation led to better than a full letter grade increase for Black men, .93 higher for Black women, and .78 higher for White men. One year later the GPA gap between participating and non-participating students narrowed, but was still significant (Hotchkiss et al. 2006).

Finally, there is a category of studies that could have been useful but their analysis was not done in a way that would allow for comparison of outcomes of LC and non-LC students from the same demographic group. For example, Inkelas, Vogt et al. (2006) broke down their data by gender and by racial/ethnic group, but they did so separately from LC versus non-LC analyses. Still, they found that African-American students were less likely to interact with professors or to dialogue with peers, and were least likely to report a positive racial climate on campus. However, these students did have positive perceptions of the climate in their residence hall, and were most likely to use resources in the halls. They also reported the strongest gains in openness to different perspectives. In addition, Latinos had high scores on perceived gains in critical thinking and the ability to apply knowledge across contexts. First generation college students were more likely to express an appreciation of diversity but were less likely to be involved with the college environment and had lower scores on measures of learning and development outcomes.

Outcome Analysis by LC Type

One of the challenges in reviewing specific outcomes is that these studies cover all types of LCs and various populations. To get a better sense of what we know about LCs and their outcomes, it is worth examining whether particular types of LCs lead to different outcomes than others. The most basic difference in the LCs studied were whether they were residential or non-residential.

Among non-residential communities, all involved linked or clustered courses, but a few other distinctions are possible. First, courses could link as few as two or up to four courses together, lasting one term or one year, making for very different experiences for students. Of those classes, one could be an integrative seminar, in which a faculty member or peer leader will help students make connections between their classes. Another model is to have a first-year seminar or orientation class as one of the linked courses. Those classes typically aim to help students acclimate to the college environment, build study and time management skills, and learn about campus resources. Some LCs are exclusively for a small group of students, while others have LC students in a large lecture course with non-LC students, and then have them attend a smaller discussion section with their LC cohort.

One challenge is that many of the studies do not specify the exact nature of the LC program, making it difficult to say with certainty how these differences impact outcomes. Or, the author groups several LC formats together. However, where it was possible to make those distinctions, those analyses were made.

Residential LC programs are particularly problematic in that way. Few of the studies specified the details of the curricular component of the LLC program, and since most of the LLC studies are using multi-institutional data those differences are impossible to determine. A

difference from the non-residential LC models is that LLCs do not always link multiple courses to each other, but sometimes link just one course to a residential experience on the same theme.

In the next section some key studies are summarized based on type of LC. Conclusions about differences in outcomes will be reviewed at the end of this section.

Linked courses without a first-year seminar or integrative seminar

All of the studies reviewed that could specify the presence or absence of an accompanying seminar are single institution studies. Three studies focusing on community college populations will be profiled, along with one LC at a four year institution.

In studying a three course cluster LC program at a community college over several years, Avens and Zelle (1992) found increases in intellectual development compared to the national, normed sample for the Measure of Intellectual Development. That finding was reinforced by students' own ranking for LC outcomes, which indicated that learning that there are multiple perspectives on every issue and the ability to learn from peers as two of the three most important outcomes of the experience. Those findings were consistent for nine consecutive terms studied. They also found high persistence rates for these students after one and two terms, but no comparison was made to a non-LC population or to the college average.

Another study of developmental English students enrolled in a reading/writing-themed LC that connects students to a range of support services found higher ratings of peer and faculty interaction, and a higher perception of faculty concern among the LC students compared to students taking the same courses in an unlinked version (Wilmer 2007). The LC students had higher grades in the class but lower persistence to the next term.

A third community college LC study, looking at commuter students in a coordinated studies program that links multiple courses on a common theme, used both qualitative and

quantitative methods to explore student persistence (Tinto 1997). While the author found that LC students persisted into the second term and second year at higher rates than non-LC students, the focus of the study was to determine why that was true. Three themes emerged from the student interviews. First, students indicated that the ability to get to know a small group of people facing similar challenges with managing life and school helped their transition to college, and that peer support helped them to manage those conflicts. Second, the LC helped students connect the social with the academic, serving as a bridge between the two domains. In other words, social networks helped create conditions that led to academic engagement. This finding led Tinto to revisit his earlier ideas of social and academic integration, particularly for this population, and led him to speculate whether persistence might be developmental in nature. In his words: “Might it be that fulfilling one need, the social, is for many students, a developmental precondition for addressing the need for intellectual engagement?” (Tinto 1997, 618). A third common theme in the student interviews related to intellectual development, although as was true in studies by other authors, Tinto does not use that term. Students talked about how they were impacted by observing faculty sitting in on each others’ classes, where faculty participated as learners rather than as co-teachers. Seeing students and faculty learning together in an integrative, multidisciplinary environment, and hearing diverse student views in a supportive environment led these students to expand their views about learning and the construction of knowledge.

Duran et al. (2005) compared students in a freshman LC and students taking non-LC versions of the same courses. The LC students were found to have significantly higher outcomes on every measure studied, including integration of material between courses, perceived cognitive learning, quality of writing, familiarity with and concern about peers, comfort interacting in

class, motivation, and comfort using computers and computer-based communication.

Linked courses with a first-year seminar

A common approach in teaching first-year students is to connect one or more classes with a first-year seminar or orientation course that introduces students to the resources available at the college/university. These seminars can be credit bearing or not for credit.

Two studies conducted by different researchers (Dabney et al. 2006; Hotchkiss et al. 2006) describe freshman learning communities at the same urban, predominantly commuter institution. The freshman LC consisted of five courses: a writing course, an orientation class, and three other courses. The classes utilized field trips, writing across the curriculum, and web-based discussions. The first study found that the LC students had significantly higher retention at the end of years one, two, and three compared to matched non-LC students, but there was little impact on GPA (Dabney et al. 2006). The second study controlled for the background characteristics of those who chose to enroll or not enroll in an LC. The authors found that LCs tended to enroll students who would typically perform more poorly academically than did non-LC courses. Participation had a greater than expected impact on these students. LC participation led to significantly higher retention than expected one year after matriculation for both Black men and women. Compared to the predicted outcomes that were generated using a model at the time of college entry, retention was close to the predicted level for White women, but slightly lower than predicted for White men. Looking at GPA, while White women in the LC performed about as would be predicted by the raw data, LC participation led to significant GPA increases for Black men and women and for White men. A year later the GPA gap between LC and non-LC students narrowed, but was still significant (Hotchkiss et al. 2006). Moving beyond the numbers, in focus groups LC students talked about the importance of the LC on their decision to

return to school. They also reported a strong sense of community and the ability to integrate thinking across courses as key features of the LC (Dabney et al. 2006).

Another learning community at a community college serving primarily students who were taking developmental classes aided the LC students in their feelings of engagement and belonging at the college (Scrivener et al. 2008). The LC linked an English course (usually developmental), another academic course, and a one-credit orientation course. The LC also offered a host of support services as well as a book voucher for these predominantly low-income students. Looking at the program two years from inception, while LC students' GPAs were higher than non-LC students' initially, those gains faded after three terms. However, they were much more successful than matched non-LC students at completing their developmental English sequence after one term, allowing them to move into credit-bearing courses more quickly. After three terms the LC students were still ahead of their peers in their rate of completion of the developmental sequence. While persistence in college was not significantly different for LC and non-LC students initially, the LC students were more likely to be enrolled in a higher education institution after three terms. The authors intended to follow these students for at least one additional year to track any future trends.

Two communications professors studied another LC program that linked two academic courses with an orientation class to examine the impact of student/faculty communication on grades and persistence (Waldron and Yungbluth 2007). They chose a general LC and a science-themed LC, both of which incorporated a librarian, an IT consultant, and an academic advisor in the instructional team. All students were commuters and half were first-generation college students, and were followed over a two-year period. A matched non-LC group was used as a control group. The authors found that students in the LCs had more opportunities to

communicate with each other, their faculty, and the staff from the instructional team. They felt more connected to their peers and both knew about and used more campus resources than non-LC students. Both students and the faculty felt that these courses were more successful in integrating content across classes than typical courses. Finally, LC students had higher GPAs and rates of persistence at the end of one term, one year, and two years but the difference was modest and faded over time.

Linked courses with an integrative seminar

Another approach is to link two or more courses together on a common theme, and then to offer a separate course led by a peer or faculty member whose purpose it is to help students integrate the material from the academic courses. The two studies profiled in this section were both conducted at the same institution, with high achieving students at a research university.

Walker (2001, 2003) conducted two studies of a year-long LC model at a selective research university. During the first two quarters, approximately 120 students enroll in a series of large interdisciplinary, team taught lecture classes with small discussion sections. In the following quarter the students take a small, related seminar that integrates the learning from the other classes. Utilizing Astin's (1993) Input-Experience-Output (I-E-O) model, blocks of data were entered into a stepwise regression to isolate the impact of specific variables. Compared to a matched sample of non-LC students and controlling for background variables, LC students reported greater increases in reading skills and were more likely to feel that faculty challenged them intellectually (Walker 2001). Further, while both LC and non-LC students reported gains in critical thinking, analysis/problem solving skills, and writing skills, significantly more LC students reported increases in these areas than their non-LC peers (Walker 2003). In addition, LC students were more likely to work on projects with other students and therefore spent more

time talking to peers about academics and about political topics (Walker 2001). LC participation did not affect the amount of time interacting with faculty.

Other LC models

One LC study stood out for its unique approach. While most LCs hope to increase student success in college generally, Barrows and Goodfellow (2005) created an LC designed to increase persistence in their university's chemistry sequence, hopefully leading to an increase in chemistry majors. By linking a large general chemistry class with a small seminar that emphasized problem solving and application of chemical principles, they were able to increase both GPA and retention in the sciences in the LC's first term of existence. However, when the seminar was reduced from a 3-credit to a 1-credit seminar, the increases disappeared for future administrations.

Residential Living Learning Communities

Living learning communities are typically designed so that students have both a shared academic experience and a shared living environment, housing all LLC students together on a specific floor or in a common residence hall. Literature about these types of communities is abundant and has flourished recently, with all studies profiled here having been written in the past ten years. However, when reviewing the literature that discusses LLCs, few specify the type of academic component included in the program, and sometimes it is clear that what is being discussed is themed housing rather than a true LLC. For instance, Knight (2003) assesses the outcome of 10 LLCs, LCs and first-year programs at one institution. However, his descriptions do not make it clear whether the programs he mentions meet the LLC definition used here, and results for all communities are reported together, making it difficult to tease out the outcomes for

LLC participants versus other program or residential community participants.

Other articles are clearer in explaining program structure, but are still mixed in the way they use the term LLC. For example, Pike (1999, 2002) used the College Student Experiences Questionnaire to conduct studies at a large university comparing students in five possible environments. Both studies looked at students in a traditional residence hall, an LLC for first-year students in which students lived together and co-enrolled in three courses and a one-credit first-year seminar, and a community termed an LLC (or in Pike's term, a residential learning community [RLC]), but was really academically themed-housing without a common academic experience. His 1999 study also looked at students living in an LLC where residents completed a humanities sequence in the residence hall, and his 2002 study included students living off campus. In both studies, Pike found a range of positive outcomes for all residential students, with the greatest gains in integrative thinking, general education outcomes, and openness to diversity among the freshman LLC participants.

Inkelas and Weisman (1993) compared the outcomes of three LLC types on a single campus comparing them to each other and to a non-LLC control group. The three LLCs were different in design and goals. The first type was designed to assist with the transition to college, the second was for honors students, and the third was made up of discipline-based communities. The researchers controlled for multiple background and pre-college variables and found that all LLC participants were more satisfied with their living environments, reported a smoother transition to college, enjoyed learning new perspectives, and enjoyed challenging academic pursuits more than non-LLC residents. Other outcomes varied by the type of community. In both the first-year transition and honors communities students had higher self-ratings of critical thinking gains, were more likely to meet with faculty socially, and were more likely to discuss

sociocultural topics with peers. While transition students were more likely to discuss academic issues with faculty, honors students were more likely to discuss those issues with their LLC peers. Transition and honors students found their residences to be academically supportive, while the discipline-based LLC students found their residence to be more socially supportive.

Schussler and Fierros (2008) examined multiple LLCs at one institution, which together house 90% of the first-year class. All residents are placed into a required humanities seminar with their building or floormates, but some LLCs require an application for entry and have high levels of faculty involvement, while others house randomly placed students who have no activities beyond the required course. Through a class-required survey and follow up focus groups, the authors found that students felt their residence hall relationships contributed more to their sense of belonging than did classroom relationships. None of the LLCs led to closer bonds with faculty, despite the different levels of faculty involvement in the programs. This suggests that LLCs contribute more to social integration than academic integration.

Jaffe et al. (2008) explored possible negative outcomes in a study of an LC, an LLC, and a traditional classroom. While LC and LLC groups reported a stronger sense of community, satisfaction, and peer support than did students in traditional classrooms, the LLC also had the highest levels of undesirable outcomes, such as the formation of cliques, students reporting socializing during class, and a general feeling of continuing in a high school environment. No questions compared student learning in different environments, nor did Jaffe survey faculty about their observations of the classroom environment. Still, the authors speculate whether spending too much time together delays students from transitioning into the college culture.

Several articles have been written looking at different pieces of a common data set about LLCs. The National Survey of Living Learning Programs (NSLLP) was piloted on four

campuses, followed by a full administration at 34 campuses nationwide. The NSLLP is an internet survey that collects students' background characteristics, involvement in campus activities and environments (e.g., peer interaction, faculty-student interaction, residence hall environment, perceptions of diversity, climate for diversity, involvement/quality of effort in co-curricular activities), and self-reports of multiple outcomes (e.g., perception of intellectual abilities, growth in cognitive development, self-confidence, appreciation of diversity, alcohol consumption, satisfaction with the college environment, and sense of belonging). Both LLC students and a matched sample of students who live in a traditional residence hall completed the survey. (See Inkelas, Vogt et al. 2006 for further information on the NSLLP.)

To date, this data has generated multiple findings. Each study utilized Astin's (1993) Input-Experience-Output (I-E-O) model by controlling for multiple pre-college and demographic characteristics, and entering blocks of experiences into each regression analysis. Compared to students in traditional residence halls, LLC students:

- found their residences to be more academically and socially supportive (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006)
- were more likely to participate in diversity-related activities (Inkelas, Johnson et al. 2006), to discuss sociocultural issues with their peers (Inkelas, Vogt et al. 2006), and to have a positive view of their campus climate for diversity (Inkelas, Vogt et al. 2006)
- felt more academically self-confident, rated their critical thinking and analysis skills more highly, and felt more able to apply knowledge across contexts (Inkelas, Vogt et al. 2006)
- were more likely to have faculty mentoring experiences (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006)

- reported more gains in liberal learning (openness to new ideas and opposing views, appreciation of a broad education, ability to discuss controversial issues, and enjoyment of art, music and cultural diversity) (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006)

No differences were found between LLC students and those in traditional residence halls in reported levels of cognitive complexity (e.g. critical analysis skills, independent learning, and understanding relationships between ideas) (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006). However, since participants were first-years and sophomores, no higher levels of development might be expected at that point in time (Inkelas, Johnson et al. 2006).

Additionally, no differences were found between these two populations in course-related faculty interactions or in interpersonal self-confidence (Inkelas, Vogt et al. 2006).

Rowan-Kenyon et al. (2007) used NSLLP data to look at civic engagement, defined as civic knowledge, values, and skills, among students in general LLCs, civic engagement themed LLCs, and in traditional residence halls. Students in the civic engagement themed LLC reported higher rates of civic engagement, followed by those in other LLCs, even after controlling for background and attitudinal variables.

When examining only first-generation students who completed the NSLLP and after controlling for several inputs, first-generation LLC students reported higher levels of academic and social transition than first-generation students in traditional residence halls (Inkelas et al. 2007). That transition was aided by the use of residence hall resources, such as structured study groups, as well as by the perception of a supportive peer environment. The authors note that past studies have found that first-generation college students often focus more attention on the academic over the social sphere (Terenzini 1996 and Pascarella, Pierson, Wolniak, and Terenzini

1994, as cited in Inkelas et al 2007), and similar findings were found in this study. However, they also found that “a successful academic transition may be at the cost of a successful social transition” (Inkelas et al. 2007, 424). For example, faculty mentoring of this population had a negative impact on students’ social transition. The authors theorize that the time spent on integrating academically may take time from social interactions, which are also important for persistence.

Another study examined the responses of all African-American, Asian-American and Latino students who completed the NSSLP, along with a random sample of White students (Johnson, Soldner, Leonard, Alvarez, Inkelas, Rowan-Kenyon, and Longerbeam 2007). However, the authors chose to moderate the “living-learning effect” for this study, entering LLC participation in one of the early input blocks for the regression analysis. Therefore, the results look at these populations in both LLCs and traditional residence halls together, telling us about the outcomes of a residential experience but not necessarily about the LLC experience. Still, it is interesting that all student groups who felt that their residence hall climate was socially supportive and tolerant of diverse backgrounds also reported a greater sense of belonging and a smoother academic and social transition to college, suggesting that those factors should be intentionally developed in any LLC.

All of the NSLLP studies above look at LLCs regardless of the format. Inkelas et al. (2008) analyzed the 34 LLCs included in the NSLLP data to look for trends. They found three major types of LLCs: small LLCs with limited resources with a primary emphasis on residential life and little involvement from academic departments; medium LLCs with moderate resources and some shared responsibility between academic and student affairs for LLC sponsored activities, such as community building or service learning activities; and finally, large,

comprehensively resourced communities with clear collaboration between student and academic affairs. These last communities are the most likely to have a curricular connection. They can often be considered residential colleges, and they integrate a full range of resources in the residence hall. When studying the outcomes of critical thinking, cognitive complexity, and appreciation for liberal learning, the authors found that the most critical thinking gains were reported by this third group, with the most well organized programs and the strongest curricular link. However, the strongest outcomes for cognitive complexity and liberal learning were found in both the first and third categories of LLCs. That is somewhat unexpected, considering the first category rarely has a curricular component to the program. The second category was the weakest format of the three, perhaps because of the weak collaboration between academic and student affairs, leading to the least sense of ownership and responsibility for the LLC.

Quality Studies

Most of the studies reviewed above looked at outcomes for students simply based on LC participation. A few considered how student inputs (e.g. demographics, pre-college attributes, engagement) might influence those outputs, but for the most part all focused on student effort or participation. However, an interesting study opens up a different set of questions for studying LCs, namely, the way that faculty actions in the LC can impact student outcomes.

Lichtenstein (2005) looked at multiple pairs of linked courses on one campus, each made up of an academic class linked with a writing course, as well as a comparison group of first-years enrolled in a section of the same writing course but not in an LC version. Using focus groups and a web based survey to confirm her focus group conclusions, the author determined the type of classroom environment for all of the LCs, and then looked at institutional data and two questions from NSSE to see if particular outcomes matched to different environments. The

NSSE questions selected were: “How would you evaluate your entire educational experience at this institution?” and “If you could start over again, would you go to the same institution you are now attending?” (Lichtenstein 2005, 347). From the focus groups and web survey, the author found three types of environments among the LCs:

- 1) Positive classroom environments (PCEs) were characterized by students as LCs that had clear linkages between classes, including shared syllabi and linked assignments, and clear, visible communication between faculty. Faculty sometimes attended each other’s classes, but when visiting they participated as co-learners, not co-teachers. PCEs used active and collaborative learning methods, and out of class group experiences such as service learning projects. Faculty created a sense of community in the classroom and an environment of respect for students. They also helped students build skills, such as writing and study skills, that they would need to be successful in their future studies.
- 2) Negative classroom environments (NCEs) were characterized by students as having no subject matter linkages between classes. Faculty either didn’t interact or were in clear conflict with each other, and the syllabi, grading and assignments were not coordinated. While some students still reported good faculty experiences, these faculty did not work to prepare them for the academic skills they would need in the future. They were also unsuccessful at creating a sense of community among students, in and out of the classroom.
- 3) Mixed classroom environments (MCEs) had mostly positive classroom experiences, but weak or no linkage between the content of the two courses or between grading protocols. There was an emphasis on community building above skill building.

Student outcomes were found to vary between classroom environment types. Students in the

PCEs had higher rates of persistence and grades than students in NCEs, MCEs or not in an LC at all. Those effects lasted across the three semesters studied except that by the 3rd term the persistence rate and GPA of the PCE and MCE students were similar. Non-LC students had higher persistence rates than those in NCEs. No differences were found among any of the four groups for the two NSSE questions. This study is important in that it shows that quality of the LC experience could determine whether LCs will be successful in achieving desired outcomes for students.

Summary of Outcomes by LC Type

Overall, the research shows that regardless of the type of LC, positive outcomes appear to result. Whether highly structured programs with a range of support services attached, such as is typically the case when an extended orientation or integrative seminar is attached to the LC, or just two courses connected by a common theme, residentially-based or not, students benefit from LC participation. However, the type and intensity of outcomes are impacted by the quality of the LC. All LCs appear to lead to increased faculty and peer interaction, and the simple fact that material across courses are connected for students by labeling them with a common theme, LC students will be able to integrate their learning more effectively than when taking discrete courses. Just as any on-campus residential experience has been shown to have a positive impact on students (see for example, Pascarella et al. 1994), LLCs have some benefits beyond LCs alone just by the nature of students spending more time together and continuing their classroom conversations in the residence halls. However, as Lichtenstein (2005) demonstrated, a negative learning environment in an LC will lead to the same outcome (or worse) than no LC at all, while intentional, positive environments will benefit students and institutions in many ways. Especially for students who are the first in their families to attend college, who commute and

spend limited time on campus, who are low-income and often need to work significant hours while going to school, and/or who are academically underprepared for college at entry, intentionally arranged LCs that integrate learning while also connecting students to each other and to their institution's resources can make a significant difference in students' persistence, views of themselves, and their learning.

Current Evaluation of the LC Literature

While the literature on LC outcomes has become more sophisticated during the past decade, there are still many gaps and weaknesses to address.

Too many single institution studies do not provide enough information about their LC structure to be able to make good comparisons across programs. It would be helpful to be able to determine with confidence whether a five-course cluster leads to the same or different outcomes than a two-course cluster, or whether the presence of a particular type of connecting seminar is important. Unfortunately, not enough is known to make those determinations.

The LLC literature is particularly problematic in that regard. LLC is a term used very broadly by colleges and universities. It could mean a well-structured LC with a residential component, one common course taken by residents living on a themed floor, or a themed residence only with no formal curricular link. Some single institution studies are clear in their descriptions but most are not. Both the majority of single institution and all multi-institution studies therefore present a problem, as very different models are grouped together. The NSLLP survey that was used in several LLC articles above did produce a thorough report of findings (NSLLP 2004), including a breakdown of outcomes for the 14 primary types of LLCs, but that typology looks at program topics, such as cultural programs, honors programs, and transition programs. They do not specify a curricular component or program structure. A recent article

(Inkelas et al. 2008) goes a long way to help clarify this problem by identifying outcomes associated with three major types of LLCs: small, residentially based programs which have almost no curricular links, medium sized programs with some academic affairs/students affairs collaboration, and large programs with strong academic affairs and student affairs collaboration and significant curricular links. Still, none of those types is pure, so it still cannot be determined with certainty the outcome differences associated with a curricular link. Further, it does not help clarify the full range of outcomes studied in the other LLC literature.

A different gap in the LLC literature concerns comparison groups. While most of these studies are very thorough in matching LLC students to a comparison group in a traditional residence hall, very few (e.g. Pike 2002; Jaffe et al. 2008) compare LLC participants to students who are participating in a non-residential LC, or to commuting students not in an LC. It would be useful to determine the added benefits, if any, of the residential experience above the general LC benefits.

Another weakness of the literature as a whole is the short-term nature of most studies. Many are looking for outcomes while students are still enrolled in the LC, or they may track students to the next term or year. Even those that say they are longitudinal rarely track students beyond two years. While initially few differences may be found in grades and/or persistence, differences may emerge over time, as some researchers have found (e.g., Scrivener et al. 2008; Zhao and Kuh 2004). Especially when tracking liberal learning outcomes such as intellectual development or attitudes toward diversity, the time required for the natural process of development makes it unlikely that significant differences will be found in a term or year, even with the best programmatic and curricular innovations (Inkelas, Johnson et al. 2006; Inkelas, Vogt et al. 2006; Longerbeam and Sedlacek 2006).

Liberal learning outcomes are the most challenging group to measure, especially using quantitative methods. However, while much of the data in this area is encouraging, it is mainly based on student self-reports of estimated gains. While still self-reported, employing a pre-test/post-test design would help improve the level of confidence with these findings.

Qualitative measures are often more effective at assessing change in these areas, such as evaluations of student work (James et al. 2006; Jehangir 2008), or interviews conducted over time (Engstrom and Tinto 2008b). Even better is the triangulation possible by using quantitative self-reports supported by a separate evaluation of students' written work (Duran et al. 2005). However, the qualitative studies reviewed often shared other weaknesses, namely a lack of consistent control or comparison groups and a failure to control for background variables among participants. While quantitative studies quite often faced these same problems, it is much less common for qualitative studies to employ these methods of comparison and control.

Particularly of interest for this review, a consistent weakness of this literature is how rarely studies examine outcomes for specific populations. While quantitative LC studies usually offer some demographic breakdowns, they are often inadequate looking only at a few variables, such as gender and race/ethnicity, but not whether students' parents went to college. Many studies, quantitative and qualitative, give some information, but are not specific. For example, they will note that a college is made up predominantly of commuters, or first-generation students, or low-income students, but fail to tell us about the specific participants in the LC studied. Even when descriptions are robust and specific, those elements are rarely the focus of the analysis. While it is a good research practice to control for all demographic variables, it tells us little about how we can meet the needs of specific populations. There were several studies that did a careful analysis for specific populations, but the comparison group often wasn't useful

in determining the impact of LCs for these groups (e.g. Inkelas, Vogt et al. 2006; Pasque and Murphy 2005; Wilmer 2007). For example, a few studies did a full study comparing LC students to non-LC students on particular variables. They then went on to do an analysis of a specific population who completed the study to see if their outcomes varied. However, instead of comparing Latino LC students to Latino non-LC students, for example, they compared all Latino students to all White students. While it could be useful to know that this population varies from the majority on persistence or another outcome, we have no idea whether the LC experience made any difference. In another example, the authors used NSLLP data to look at the factors that contribute to a sense of belonging for students of color, but rather than comparing LLC and non-LLC students, they controlled for LLC membership to control for the “living-learning effect” (Johnson et al. 2007).

Finally, Lichtenstein’s (2005) study brings up one last weakness of the LC literature, namely that little is known about the quality of the LC experience and the ways that quality impacts outcomes. This is a promising line of research that should be explored further.

Service-Learning

According to Colby et al. (2003), in the past decade service-learning “has emerged as the most widespread and closely studied of the various student-centered, or engaged, pedagogies” (134). Despite its popularity, however, there is a lack of consensus in the literature as to the definition of service-learning, and even dispute as to which terminology best describes the pedagogy, whether academic service-learning, community-based learning, community service, or volunteerism. As Eyler and Giles (1999) explain, “A lot of energy has been devoted to defining service-learning. In 1990 Jane Kendall wrote that there were 147 definitions in the literature, and there has been no falling away of interest in this endeavor since” (3). Crews (2002) asserts that the dramatic growth of service-learning “[makes] the task of becoming acquainted with the field and its constituencies a somewhat daunting task” (v), and in terms of scholarship, Ziegert and McGoldrick (2004) describe a “diverse literature that lacks clarity and cohesion” (31). Given this lay of the land, the purpose of this section of the review is not to provide an exhaustive catalog of all service-learning theory, research, and practice, but rather to provide an organized overview of the service-learning literature and the known outcomes of the pedagogy.

Defining Service-Learning

In theory and in practice, service-learning has many definitions and permutations. Jacoby (2003) asserts that “service-learning is a program, philosophy, and a pedagogy” (4). Furco (1996) explains that “the term ‘service-learning’ has been used to characterize a wide array of experiential education endeavors” and that each institution may define service-learning differently, depending on their formulation of the practice (11). Similarly, Crews (2002) remarks, “Given its flexibility and the many different ways in which it is being experimented with in vastly different contexts and communities, service-learning certainly can be seen as a set of

pedagogies” (viii) as opposed to a singular practice. Despite this variability within the field, Stanton, Giles and Cruz (1999) hold that the essence of service-learning lies in its name, which “joins two complex concepts: community action, the ‘service,’ and efforts to learn from that action and connect what is learned to existing knowledge, the ‘learning’” (2). Similarly, Jacoby (1996) explains: “Service-learning is a form of experiential education in which students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning and development” (5). Regarding the balance of these two activities, Jacoby (1996) and Eyler and Giles (1999) all endorse Sigmon’s (1996) definition of service-learning, in which both words in the term – *service* and *learning* – are given equal weight in students’ experiences.

“Service” in Service-Learning

In most service-learning practices, students are generally involved in service through non-paid work in a community setting. Community can be defined in various ways and might be local, national, or global; service to the campus community itself, however, is generally not accepted as viable for a service-learning experience. Common examples of service-learning settings include early literacy programs, Head Start centers, homeless shelters, immigrant centers, health clinics, legal aide agencies, or community organizations (such as senior citizens’ centers or Boys and Girls Clubs). While students can and do perform a wide range of duties in these settings – ranging from clerical work to direct contact with the constituencies served – Eyler and Giles (1999) assert that the more relevant the service to the student’s coursework the more meaningful the learning experience can become.

In *The Wingspread Principles of Good Practice for Combining Service and Learning*, Porter Honnet and Poulsen (1989) describe the ideal relationship between the community and the

institution in the service-learning partnership. First, service learning is defined as responsible action for the common good. Those with needs (i.e. the communities being served) must be the ones to define those needs, and the services and providers are continually matched with and adapted to those needs. Clear service and learning goals are articulated for students, as are the responsibilities of all parties in the service-learning arrangement. All constituencies involved in the service-learning endeavor (students, faculty, community members, agency personnel, etc.) receive ongoing training, supervision, support, monitoring, and evaluation. Finally, the college or university demonstrates institutional commitment to service-learning through the dedication of funding and other resources, as well as to participation in service-learning by and with diverse populations.

Beyond these general principles for good practice in service-learning, it is important to recognize that – regardless of its particular formulation – a given service-learning program generally reflects a philosophical stance toward those being served (Hoppe 2004). A *philanthropic* perspective views the educational goal of service-learning as instilling in students a spirit of charity, which in turn will inspire students to continue to give to those less fortunate over their lifetimes. This perspective operates from a deficit model, in which the community being served is deficient in some area which is then provided for by student service. The *civic* perspective, however, views service as founded on democratic principles, with students serving as agents of change to help empower community members; a social justice orientation, which challenges existing power structures that lead to disenfranchisement and oppression of the community being served, is generally consonant with this perspective. The *communitarian* perspective holds that through service, students can become responsible members of communities and work toward shared values that lead to self-governance (Codispoti 2004).

Hoppe asserts that any or all of these philosophies may be operating at a given institution and often depends on the orientation of individual faculty or service-learning programs; additionally, different philosophies can be combined to frame students' understanding of their service experiences.

Similar to the three categorizations offered above, Boyle-Baise (2002) identifies three paradigms for service-learning in teacher education – charity, civic education, and community building – and discusses their suitability for providing multicultural education. A charity paradigm, which involves altruistic action to meet the immediate needs of (an often distanced) other, often operates from a deficit view. A civic education paradigm, which promotes civic involvement and strives for equal opportunities for participants, may function as “temporary redress for social problems” (25). The community-building paradigm is comprised of both a communitarian perspective – as described above, but which “is constrained by lack of direct attention to diversity and pluralism” (32) – and a social change perspective, which works to “search for root causes of injustice and to build a sense of collective power” (27). Boyle-Baise suggests that a “social change view of community-building complements multicultural service learning” (32), which she defines as “shorthand for community-based service learning as part of a multicultural education. It refers to community based service learning which is attuned to culture, diversity, and equality” (11).

The model in which a particular service-learning experience is grounded can have an impact on the experience of underrepresented students, who may have similar backgrounds as those receiving service (Myers-Lipton 2002). For example, service-learning operating from a deficit model may alienate and further disempower students from underrepresented groups,

whereas service-learning operating from a civic or communitarian perspective may empower students for learning, identity development, and community action.

“Learning” in Service-Learning

Throughout the literature, service-learning is described as a pedagogy that utilizes active learning and integrates students’ curricular learning with their experiences of service. Zlotkowski (1999) explains that in contrast to “traditional cocurricular volunteerism” (97) in higher education, many institutions have moved to integrate service with the academic structure and curricula: “Currently, almost all service learning programs that seek to have a significant institutional as well as community impact also seek to promote faculty involvement and to establish a reliable curricular base” (98). This type of integrative service-learning has been implemented in a wide range of academic disciplines and professional fields (Madden 2000); an extensive monograph series by the American Association for Higher Education (AAHE) covers formulations of service-learning in fields and disciplines such as biology, composition, engineering, history, management, philosophy, political science, psychology, sociology, women’s studies, and others. Zlotkowski (1999) highlights the importance of the faculty’s role, regardless of academic discipline, in articulating the rationale, purpose, and learning goals of service activities, as well as ensuring that the specific tasks of service are relevant to these goals.

In terms of specific course activities, much of the service-learning literature points to structured opportunities for reflection, such as journal writing and group discussion, as the hallmarks of the pedagogy. Eyler and Giles (1999) explain that, “At its simplest, reflection is being able to step back and be thoughtful about experience – to monitor one’s own reactions and thinking processes” (171). On a more complex level, reflection enables students to not only make connections between their classroom learning and their service experiences, but also consider the

meaning of their learning and how it may be applied. The authors note from their research that structured reflection in service-learning is a predictor of positive academic outcomes.

In addition to reflective opportunities, the importance of providing academic credit for service-learning is discussed in the literature. Although service-learning courses vary in their formulation – such as entire courses based on service, service-oriented discussion sections attached to larger content courses, or small facilitated groups of students engaged in service that meet independently from the class – many authors point to making service-learning a credit-bearing activity as a way to fully legitimize and value students' involvement in service-learning.

While the academic nature of service-learning is emphasized in the field, the need for the establishment of partnerships between faculty, student affairs, community organizations, and others is also discussed widely (Jacoby and Associates 2003). Additionally, the parties responsible for handling the administrative aspects of service-learning – such as how placements are made, sites are selected, and so forth – can vary greatly, from individual faculty to service-learning centers with dedicated coordinators. The staff responsible for service-learning at an institution can be drawn from academic affairs or student affairs, though Engstrom (2003) concludes “the literature suggests that most effective programs are based on partnerships between faculty and student affairs professionals” (65). Service-learning experiences can also differ in terms of duration; depending on the degree to which service-learning is integrated in the curriculum, students' involvement can span a few days or weeks, a summer break, a semester, an academic year, or their entire college career (McCarthy 1996). Finally, from a field-level perspective, it would be difficult to overstate the role of service-learning organizations in the promotion of practice and research in higher education. Organizations such as Campus Compact, Campus Outreach Opportunity League (COOL), the National Society for Experiential Education

(NSEE), and others continue not only to provide valuable resources to interested institutions and faculty, but also to shape the national dialogue on service-learning.

Outcomes of Service-Learning

The literature on student outcomes related to involvement in service-learning is extensive, and points to multidimensional change in students as a result of participation. Roldan, Stage, and David (2004) provide a helpful categorization of these types of outcomes into three broad categories: academic achievement; civic engagement; and personal growth. The present review will first summarize broad outcomes within these three categories, as well as moderating variables that affect outcomes. Then, the review will discuss known outcomes relevant to underserved populations, and finally address issues in service-learning research. [It should be noted that this review provides an overview of service-learning research, with particular attention to methodologically robust studies, as opposed to an exhaustive listing].

Academic Achievement

There is reasonably strong evidence in the literature that service-learning has a positive effect on many aspects of students' learning. In their meta-analysis of higher education research, Pascarella and Terenzini (2005) found that students involved in community service had a measurable learning advantage over those not involved in service. Furthermore, such students were "significantly more likely than control students to say that they learned to apply principles from the course to new situations" (129).

In *Where's the Learning in Service-Learning?*, Eyler and Giles (1999) report similar findings from two comprehensive studies of service-learning outcomes, one of which involved

extensive surveys of 1500 students and the other intensive student interviews of a smaller sample. Eyler and Giles discuss possible reasons for the academic gains due to service-learning:

Students suggest that this greater learning results because they are more engaged and curious about issues they experience in the community. Students find that they remember and can use material that they learn from the rich and complex community context. Students report that service-learning is powerful because it is rooted in personal relationships and in doing work that makes a difference in people's lives, which helps them connect their learning to personal experience (98).

Specifically, in the area of understanding and applying knowledge, students reported that they were more motivated to work harder in service-learning classes, experienced deeper understanding of subject matter and social issues, and were better able to apply classroom learning to real problems. With regard to critical thinking skills, Eyler and Giles report that students "in service-learning classes where service and learning are well integrated through classroom focus and reflection are more likely to show an increase in their level of critical thinking demonstrated in problem analysis" (127).

The impact of service-learning appears to apply to a range of academic outcomes. Astin et al. (1999) surveyed 42 institutions involved in Learn and Serve America's programs and found that participation in service was associated with higher GPAs, greater retention, a higher likelihood of degree completion, and more interaction with faculty, alongside gains in academic knowledge. In a local study, Markus, Howard, and King (1993) – in a study of two sections of an eight-section American politics course randomly selected to conduct service – found that service-learning students were significantly more likely to report they had learned to apply course principles and also had better course grades. Additional studies point to the benefit of service-learning for students' writing; Shastri (1999) found that of 64 students in an educational psychology course, with one section randomly assigned to service-learning and to keeping a

reflection journal, students who participated in service-learning had higher grades on written assignments (the same students also had better attendance in the course). Finally, Strange (2000) similarly found that in an introductory child development course, the 166 out of 477 students who were involved with service-learning demonstrated higher grades on essay portions of exams.

Civic Engagement

Many – if not the majority – of studies conducted on service-learning attempt to assess outcomes related to students' civic engagement and development. It is important to note that this dimension of student learning includes cognitive, attitudinal, and behavioral aspects. Examples of these aspects are recognizing the needs in one's community (cognitive), believing one has the capacity to effect change in the community (attitudinal), and participating in a community clean-up effort (behavioral). Cognitive change and attitudinal change have been the primary focus of much of service-learning research (e.g., through univariate surveys), though a few studies have attempted to measure change across all three areas.

Before discussing service-learning, it is important to note that gains across the dimensions of civic engagement and development have been demonstrated for participation in service alone, without a course-based learning experience. Astin and Sax (1998) found that participating in volunteer service had a positive correlation with 12 civic responsibility outcomes, including developing commitments to helping others, serving one's community, volunteering, and promoting racial understanding. Astin, Sax and Avalos (1999), in a longitudinal study of over 12,000 students, found that those who volunteered six or more hours per week during their last year of college were more likely to volunteer after college, attend graduate school, socialize with diverse people more frequently, help others in difficulty, develop

a meaningful philosophy of life, promote racial understanding, participate in community action and environmental clean-up, and develop self-efficacy.

When adding service to a course or curriculum – in other words, service-learning – gains in civic engagement were also evident. Eyler and Giles (1999) found that a third of service-learning participants reported gaining a new perspective on social issues, and that service-learning had an impact on students' perceptions of the locus of social problems, valuing of social justice, and desire to personally effect political change. Eyler and Giles claim that these and other identified outcomes of service-learning contribute to “active and effective citizenship,” which they describe as comprised of the elements of values, knowledge, skills, efficacy, and commitment (163). Similarly, Myers-Lipton (1998), in a study of 225 students, found that those engaged in course-based service-learning (as opposed to non-course linked community service or no service) experienced significant gains in their locus of control, civic behavior, and concern for civic responsibility, while other groups stayed the same or even declined. Boss (1994) found that volunteering had an impact on students' moral development as measured by the Defining Issues Test (DIT), which assesses students along Kohlberg's model of moral reasoning. In the study, one of two sections of an ethics course was randomly selected to participate in 20 hours of community service; students in the service-learning section scored significantly higher on the DIT, with three times the number of students using principled moral reasoning than those in the non-service section.

Personal Growth

Finally, in the realm of personal and interpersonal development, Eyler and Giles (1999) found that participation in service-learning led to reduced stereotyping and greater tolerance, as well as student reports of positive impact on their ability to work well with others. Service-

learning was a predictor of increased leadership skills and, in affective terms, students reported “greater self knowledge, spiritual growth, and finding reward in helping others” (55) as a result of service-learning participation. The authors also point to service-learning as a “predictor of an increased sense of personal efficacy” and “desire to include service to others in one’s career plans” (55). Additionally, service-learning was a predictor of students’ feeling connected to the community, as well as a means of creating opportunity for close relationships among students and between faculty and students, which are themselves predictors of positive educational outcomes.

Astin et al. (2000), in a study of more than 20,000 students utilizing CIRP data, identified three dimensions of personal growth, along with academic achievement, that contributed to the success of service-learning as a pedagogy. The authors explain that “service learning is effective in part because it facilitates four types of outcomes: an increased sense of personal efficacy, an increased awareness of the world, an increased awareness of one’s personal values, and increased engagement in the classroom experience” (iv). In a local study, Osborne, Hammerich, and Hensley (1998) measured aspects of personal growth (such as self-worth, competence, and social behavior) among 95 students in four sections of a pharmacy communication class who were randomly assigned to service-learning or no service-learning. The authors found that those students engaged in service-learning demonstrated positive gains in social competency, perceived ability to work with diverse others, and social self-worth, in addition to gains in cognitive complexity.

Finally, there is some evidence that participation in service-learning is correlated with better health-related behaviors. Specifically, Wechsler et al. (1995), Jessor et al. (1995), and Fenzel (2005) all describe a correlation between participation in pro-social activities like

community service and lower drinking rates. As it is unclear in this research whether students who were predisposed to drink less self-selected into service-learning experiences (self-selection bias), Fenzel asserts, “cause and effect cannot be inferred” (136) from these studies.

Moderating Variables

The performance of community service by college students takes many forms throughout higher education. Thus, the question of specific outcomes related to this service must take into consideration moderating variables in the formulation of service experiences which, in turn, have an impact on outcomes. First and foremost in this discussion is whether service-learning itself – as opposed to non-curricular volunteerism – has added benefit for students. In their meta-analysis of higher education research, Pascarella and Terenzini (2005), when considering the different formulations of service-oriented activities in higher education, found support for the hypothesis that “greater learning will occur in courses or curricula where the service component is an integral part of the course content and activities and where there is a regular reflective component linking the two (that is, service learning) than in courses that simply contain a service component...” (129-30).

Vogelgesang and Astin (2000), in their study of over 20,000 students using Cooperative Institutional Research Program (CIRP) data, found that those students in course-based service demonstrated significant gains over those in generic community service in the areas of development of cognitive skills, choosing a service-related career, commitment to activism, and promoting racial understanding. Astin et al. (2000), utilizing CIRP data again, found that performing service as part of a course (as opposed to by itself) “adds significantly to the benefits associated with community service” (ii, underscore in original), namely in the development of academic skills, choice of a service career, and plans to participate in service after college. The

authors note that benefits were strongest for academic outcomes, particularly writing skills. They assert that their “results suggest that providing students with an opportunity to ‘process’ the service experience with each other is a powerful component of both community service and service learning. Compared to community service, taking a service-learning course is much more likely to generate such student-to-student discussions” (iii).

Given the diversity of service-learning practices across institutions of higher education, the question of quality of these practices is particularly important when considering outcomes. As Eyler and Giles (1999) explain, “Service-learning makes a difference, and within the group who experience these programs, higher-quality service-learning makes a bigger difference” (xvii). Roldan, Strage, and David (2004), in their review of related service-learning research, concluded that a higher number of service hours, direct contact with clients, careful planning and preparation, successful partnerships with community sites, orientation and supervision of students, and reflection activities all seem to enhance student outcomes in service-learning. From their analysis of CIRP data, Astin et al. (2000) report that moderating variables include student interest in the subject (thus supporting the use of service-learning in the major), professors’ encouragement of class discussion and “connect[ing] the service experience to the course subject matter” (iii-iv), and use of reflection “as a means of connecting the service experience to the academic course material” (iv) whether through course journals and papers or discussions with students and professors. Mabry (1998) similarly concluded that service-learning is more effective when it involves at least fifteen to twenty hours of service, frequent contact with community members receiving service, weekly reflection in class, formative and summative written reflection, and student discussion of their experiences with instructors and site supervisors. Finally, Batchelder and Root (1994) found that on-site supervision and quality of instruction

were important mediating variables for the outcomes they identified (moral cognition and reasoning, and development of occupational identity).

Outcomes for Underserved Students

Very little research has been conducted on the impact of service-learning on students from underserved groups. As Myers-Lipton (2002) explains, “The limitation of service-learning, both in research and in practice, is that the focus has been primarily on European American students” (202), and often these students are from middle-class or affluent socioeconomic backgrounds. Despite this reality, the few studies that have been conducted point to the benefits of service-learning for students from underrepresented groups.

Effects of Volunteerism

Although addressing volunteerism as opposed to service-learning, the longitudinal study of AmeriCorps alumni (Corporation for National and Community Service 2008) shows substantial gains for participants of color and for those participants who were financially “disadvantaged.” The study involved over 2,000 alumni, most of whom were aged 17-24 during participation and who were more highly educated than the general population (most were college-educated), and compared outcomes for those alumni to applicants for AmeriCorps during the same period who either declined to enroll or were not accepted due to space limitation (thus raising some issues of self-selection bias). The study found significant positive impacts over eight years post-service on participants’: connection to community (attitude); self-assessed understanding of problems in the community; confidence in ability to work with local government; ability to lead a successful community-based movement; active participation in community affairs; public service employment; and life satisfaction.

Of particular interest to this review is that some of these effects were amplified for participants from underrepresented populations: “The effects of program participation are particularly pronounced for some subgroups of members” (17). For Blacks/African Americans, these heightened effects were seen in the areas of: understanding how to meet the needs of their communities; ability to make a difference in their communities; and likelihood to be engaged in the political process. Members from disadvantaged circumstances experienced a heightened feeling of being connected to their communities, and were significantly more likely to have contacted a government official to express opinion on a local or national issue. For Hispanics/Latinos, the effects heightened included understanding problems associated with the lack of civic engagement in their communities, understanding local public health problems facing the community, placing importance on neighborhood participation, and ranking neighborhood safety a very important obligation. For non-Whites in general, confidence in working with local government was double that of the comparison group, and they were significantly more likely to have a career in public service and report the importance of having a service-oriented career. Although no impact on voting behavior was evident, “AmeriCorps service continues to have long-term impacts on the civic engagement and employment of State and National members from disadvantaged circumstances. For these members, AmeriCorps influences their commitment to volunteer service, their service to others in the community, and their feelings of connection to their community” (42).

Outcomes for Students of Color

One of the most frequently cited studies is that of Roose et al. (1997), who conducted a retention study of 170 African American students at Oberlin College who attended from 1987-1991. Involvement in community service was the factor most strongly correlated with

graduation, out of a total of 15 variables (such as community service involvement, changing majors, and summer employment).

Beyond the issue of retention, some studies have demonstrated academic gains for students of color engaged in service-learning. Although at the middle and high school level, the National Evaluation of Learn and Serve America (Center for Human Resources, Brandeis University 1999) found with a sample of approximately 1000 students:

For non-white and educationally disadvantaged participants, participation in service-learning appeared to provide significantly more positive impacts on measures of academic performance (i.e., grades and course failures) than for the complementary subgroup (that is, white students and non-educationally disadvantaged students). For the educationally disadvantaged students, at least, these findings suggest that service-learning may be a particularly effective strategy for students who are not otherwise likely to do well in school. More generally, they indicate that, while the academic impacts of service-learning may be limited for the population as a whole, some groups of students are likely to gain a more substantial academic boost from involvement in service-learning than others (18).

It is largely unknown whether this impact can also be seen at the college level, due to a lack of studies investigating this outcome with this population. Only a few studies provide this type of evidence. For example, in a study of 84 sociology students at Rust College, an HBCU, Balazadeh (1996) found that students who choose to enroll in a sociology course involving service-learning had better grade performance compared with those who did not (thus self-selection bias was an issue). Tartter (1996) also found that the GPAs of 57 undergraduate inner-city students at City College who mentored second graders in a Harlem public school improved on average by .14. These studies are limited to impact on grades, thereby leaving open the question of other potential academic impacts on participating students of color.

In regard to civic engagement, studies of students of color engaged in service-learning are also limited and sometimes contradictory in their findings. In regard to actual outcomes, Mabry

(1998), in a study of 144 students participating in service-learning in 23 different courses, found that men, non-White participants and those students with the least service experience showed significant positive changes in their civic attitudes as a result of participation in service-learning. Eklund-Leen (1994) surveyed 177 community college students about their level of co-curricular activity, involvement in student leadership roles, and community service participation; results indicated significant differences between African American and White students, as Whites scored higher on attitudes about and estimates of future community involvement. Smedick (1996), however, surveyed 231 alumni and found that African Americans and women who participated in service during college were more service-oriented than Euro-Americans or Asian-Americans who participated as well. Boyle-Baise and Langford (2004), in a study of an alternative spring break service-learning class, found that activist views were more common for students of color than for White students. Taken cumulatively, these findings suggest that more research is needed to understand the civic outcomes for students of color who participate in service-learning.

Although indirectly related to outcomes, there have been some studies of the perceptions and experiences of students of color engaged in service-learning. Pickron-Davis (1999) conducted an ethnographic case-study of 13 Black students enrolled in three service-learning courses who worked with lower-class, Black middle school students. Students reported the absence of critical dialogue on race and cultural differences in their classes, that they self-silenced when issues of race were raised in class, and that they experienced dual identities as college students and as role models and service providers in the middle schools. In addition, students reported developing new cultural competencies to bridge the differences they encountered in the service setting. Similarly, Einfeld and Collins (2008), in a qualitative study of

nine students in AmeriCorps program (7 White and 2 African American) found that:

“participants who had previously experienced inequality generally had a better understanding of how inequality impacts individuals on a day-to-day basis than those who had not. These participants included two people of color and a White woman who had experienced being treated unfairly as a minority when volunteering abroad” (103). In addition to this understanding of service recipients’ experiences, these students also may have had differential outcomes in terms of their orientation toward social justice or toward charity in the service setting: “Each participant acknowledged and witnessed inequality, however, some participants developed a social justice paradigm and others adopted a charity paradigm. It is possible that these differences in paradigms were the result of varied backgrounds and personal differences” (104).

There is also evidence that the experiences of students of color in service-learning are very different from that of White students. For example, Myers-Lipton (2002) conducted a study of a course in sociology entitled “Social Problems,” in which 17 out of 28 students were students of color. Fifteen of those students participated in the study and completed integration papers and a questionnaire. From analyzing these data sources, Myers-Lipton concluded that “students of color experience service-learning in ways that are different from and similar to (but with different results) European American students,” particularly in their insights and responses to those being served (216). Students related differently to clients because “they see part of themselves in the people with whom they are working. This insight about “sameness” may also lead students of color to explore their own ethnic identity as well as develop a strong commitment to racial and social justice” (216). This is not always a positive experience however, as “students of color may discuss how the course material is relevant to their lives but at the same time is disempowering, as it connects to their negative life experiences” (216).

It is helpful for comparative purposes to discuss the research on White and/or middle- or upper-class students' experiences in service-learning at this point. From their study of students in service-learning programs, Rockquemore and Schaffer (2003) developed a three-stage "theory of engagement" that answers the question of "*how* do students learn while they are engaged in service learning" (43). In the first stage of *shock*, students – who mostly came from middle and upper-middle class families in the study – experience "shock and disbelief at the social and economic circumstances they were expected to work within" (43). According to the authors, this stage provides "a sharp emotional and psychological jolt to students' perceptions of reality [since] college students, like most humans, tend to generalize their own individual experience to the rest of society" (44). In the second stage, *normalization*, students gain a level of comfort both in their surroundings and role in the community service setting. As personal relationships with people in the setting develop, "the 'other-ness' gives way to personal description" (45), and students no longer "marginalize" and "stereotype" the people with whom they work. In the final stage, *engagement*, "Students began seeking answers to their causal questions...It was in the final stage that students were forced to reconcile the content of the coursework" (46)

Comparing the paradigm offered by Rockquemore and Schaffer with the experiences of students of color described earlier, it is evident that students from different backgrounds – and particularly those from underrepresented groups, which are often the very population "served" in service-learning – may experience service-learning differently. As Myers-Lipton asserts:

For students of color, service-learning connects the ideas discussed in the classroom, their personal lives, and the communities from which the students come. While this is a different experience from the one that European American students have, it is a mistake to define it as somehow less powerful. Further research will allow for greater understanding of how service-learning affects students of color (216).

Low-Income and First-Generation College Students

The only research found pertinent to students from low-income and first-generation backgrounds actually addressed the issue that such students do not often participate in service-learning. Horn et al. (1995), in their study of 66,000 students for the 1992-1993 National Postsecondary Student Aid Study, report that high income and high parental education levels were correlated with likelihood of students performing service. In a two-year study of eleven sociology courses, in which students were offered the opportunity to perform service or choose another project, Ender et al. (2000) found that off-campus students who worked were less likely than any other group to choose the service option. And Zawacki (1997) found that in a group of 110 students divided into three subgroups (service-learning related to a course, no service, and prior service not related to a course), students whose mothers had a college degree or higher were more likely to volunteer.

This may be due in part to the optional nature of service-learning at most institutions; students can self-select into the majority of service-learning experiences, as opposed to it being a requirement for graduation or for the major. As a result, service-learning is often selected by those students who have the additional time to involve themselves in service – which often means residential students who do not work, or who work part-time on campus. Those students who commute, work off-campus, and/or have family responsibilities may have less time and inclination to participate in a service experience that is not required for academic credit.

There are some studies of students in community college settings – where many students tend to be from low-income or first-generation status – demonstrate that service-learning is an effective pedagogy. For example, Berson and Younkin (1998) conducted a study of 286 students in six community college courses, who were divided into groups of students performing service

and those not (students had no knowledge if there was a service-learning component when selecting their courses, therefore self-selection bias was not a prominent issue). Students engaged in service-learning obtained significantly higher mean final course grades when compared to the control group, and they also reported higher levels of satisfaction with their learning experience. While this and related studies did not examine underrepresented populations explicitly, service-learning might be beneficial for students from low-income or first generation backgrounds – *if* such students are able to engage in service-learning opportunities in the first place.

Issues in Service-Learning Research

A number of issues can be identified regarding the quality of service-learning research, which future efforts should attempt to address. These issues can be categorized into general methodological issues, and issues related to the study of underrepresented student populations.

Methodological Issues

Perhaps the single most important issue facing service-learning research is that of self-selection bias. The majority of service-learning opportunities in higher education are elective; that is, students can choose whether to participate or not, as they are not required for graduation or the major. As a result, those students who are actively interested in service tend to self-select into these experiences in higher education settings. This is problematic as there is evidence that these students are fundamentally different than those who do not opt for service. For example, Eyler, Giles, and Braxton (1997), in a study of 1500 students across 20 colleges and universities, found that students who choose service-learning differ from those who do not in several areas including pre-service attitudes, skills, values, and understanding of social issues. To address this issue, the authors recommend making service-learning part of the core curriculum as opposed to

a co-curricular option. The issue of self-selection bias persists even in many studies that utilize comparison or control groups, as these groups are often comprised of students who expressed interest in service but for one reason or another (generally space limitations in service opportunities) did not engage in the experience.

In addition to self-selection bias, the lack of longitudinal research (even following students' development a semester or year after participation) is another issue facing service-learning research. Warchal and Ruiz (2004) explain, "In the past 15 years, there has been a proliferation of service-learning experiences... Surprisingly, there has been little empirical research on the long-term effects of these programs... studies have usually been conducted immediately following the service-learning experience" (88). Even the authors' study, which demonstrated that alumni of service-learning experiences were more likely to accept service-related jobs and were likely to do increasingly more volunteering as they got older, is only "one small sample of participants in service-learning experiences from a small college with a strong mission to service, [but it does] provide an impetus for further research into this area" (104).

Issues Related to Underserved Populations

The most significant issue related to research on underserved populations in service-learning is the paucity of such studies. In regard to students of color, Myers-Lipton (2002) offers several possible explanations for the "lack of attention" to these students:

European American students are the dominant group on most college campuses; thus, they have been the most involved in service learning... students of color have less time available because of job and family responsibilities, they may see service-learning as a "white charitable program," and they already have other avenues for community service through church and other ethnic networks (202).

Myers-Lipton describes this situation as problematic for the field, as "because of the lack of research on students of color, we do not know the effect of service-learning on this group" (202).

Although a few studies do exist, Myers-Lipton explains that “most of what we know about students of color and service-learning comes from faculty observations rather than research” (202). In addition, it is an error to assume that existing research that does not address the experiences of underrepresented students can be extrapolated to explain these students’ experiences as well: “If service-learning is conceptualized as a universal experience affecting all participants in the same way, it will not accurately describe social reality, nor will it promote the success of students of color...” (216). Clearly, then, increasing both the number of students of color engaged in service learning – and then conducting research on the experiences of these students – is a priority for service-learning research. As per Myers-Lipton’s description, it may also be advisable to study the outcomes of alternative avenues to service in which students of color already engage (e.g., church involvement and ethnic networks), as well as consider ways to integrate these pathways into service-learning programs at colleges and universities.

The lack of research and related understanding also holds true for students from other underrepresented groups, such as low-income or first-generation college students. Henry (2005) describes and problematizes the current server/served dichotomy in service-learning with these questions:

What does it mean to the “privileged student server” to share characteristics with the “underprivileged served” service-learning community? How do students, who occupy both privileged and underprivileged status, understand themselves and their multiple identity categories through working in a service-learning situation that puts them in the position to “serve” communities that represent their backgrounds prior to college? (45).

According to Henry, this dichotomy precludes answering these kinds of questions through research, because it fails to take into consideration those students who – by virtue of their identity as low-income or first-generation college students - may simultaneously share characteristics with both parties in the dichotomy: “If we envision and reify college students as

‘privileged’ servers and those they work with as ‘underprivileged served’ we fail to see students in their totality, especially how their class status changes and is influenced by the relationships they make during their service-learning assignment” (64).

Thus, future research on service-learning outcomes should take into consideration the experiences of underrepresented students, but also recognize that many of these students may not be participating in service-learning in the first place. Such a research agenda necessarily involves a programmatic element, in that researchers may need to create the conditions – e.g., service-learning opportunities that are attractive to and inclusive of underrepresented students – in order to study their effects.

Undergraduate Research

Undergraduate research can be characterized as “a growing movement [that] transcends institutional boundaries and types to produce programmatic undergraduate research initiatives” (Kinkead 2005, 7). This movement largely has its origin in the “scientific community [which], appalled by the number of reports proclaiming the scientific illiteracy of American students, embarked on a national campaign to ground instruction in science and mathematics” (7) in the 1980s and 1990s. Reports and a strategic plan provided by the National Science Foundation, along with the Boyer Commission’s (1998) report entitled *Reinventing Undergraduate Education: A Blueprint for America’s Research Universities*, provided the catalyst for the establishment of undergraduate research programs at institutions throughout the country (for a detailed history of the undergraduate research movement, see Merkel 2001). Although undergraduate research had its inception in the sciences, such opportunities now frequently extend to the humanities and social sciences (for examples of undergraduate research across multiple disciplines see Kaufman and Stocks 2004, Lee 2004, and Karukstis and Elgren 2007).

Out of the several high-impact practices discussed in this review, undergraduate research is of particular interest due to its intentional usage with underrepresented students in higher education. Many institutions have utilized forms of undergraduate research – such as undergraduate research opportunity programs (UROPs) or summer research opportunity programs (SROPs) – to engage students of color as well as academically disadvantaged students in the academic enterprise. Thus, a review of the definition and forms of undergraduate research, as well as known outcomes of the pedagogy both broad and specific to underrepresented students, may provide particular insight into the use and efficacy of high impact practices with these students.

Defining Undergraduate Research

Kinkead (2005) asserts that “*undergraduate research* is defined broadly to include scientific inquiry, creative activity, and scholarship” (6), and many hold that the student’s work should be original and make a contribution to the student’s discipline (Hu et al. 2008).

Undergraduate research opportunities are generally structured in nature and, programmatically, are often sponsored or administrated by the student’s major department. Some institutions have undergraduate research centers or may house related programs within broader teaching and learning centers. Two national organizations – the Council on Undergraduate Research (CUR) and the National Conferences on Undergraduate Research – also support students, faculty, and institutions engaged in undergraduate research.

As a pedagogy, undergraduate research is fundamentally different from traditional forms of learning in the academy. This is underscored by the Boyer Commission’s (1998) report, which asserts that “learning is based on discovery guided by mentoring rather than on the transmission of information” (15). In the model proposed by the Boyer Commission, undergraduates would engage in collaborative research efforts with faculty and graduate students, thereby constituting in a “profound change in the way undergraduate teaching is structured” currently (16). In such a model, undergraduates would be responsible for co-creating knowledge through the process of inquiry, as opposed to receiving, memorizing, and re-presenting knowledge from faculty experts. The Commission asserts that “every course in an undergraduate curriculum should provide an opportunity for a student to succeed through discovery-based methods” (17).

Undergraduate research opportunities have frequently been extended to students of color as well as academically disadvantaged students. Kinkead (2005) states that, in addition to honors programs:

A second prospective candidate for undergraduate research is the student defined at risk or underrepresented in a field of study. At what some might see as the opposite end of the continuum from honor students, at-risk students benefit from the same advantages offered by undergraduate research. They engage in a meaningful project with a faculty mentor committed to intellectual discovery. In essence, they gain an understanding early about the heart of the academic enterprise (11).

Often, these opportunities take the form of undergraduate research opportunity programs (UROPs), which frequently are “highly structured, with successful upper-class students serving as peer mentors in addition to graduate student and faculty mentors” (10). Other program features may include cognitive and skill development, including writing and presentation skills. Examples of such programs include those at the University of Michigan and the University of California, Los Angeles. In addition, the federally-funded Ronald E. McNair Postbaccalaureate Achievement Program sponsors undergraduate research opportunities for students from disadvantaged backgrounds across many institutions. The National Science Foundation’s Louis Stokes Alliances for Minority Participation (LSAMP) Program provides multi-institutional awards designed to encourage enrollment and degree attainment in the fields of science, technology, engineering, and mathematics (STEM).

Elgren and Hensel (2006) explain the primary benefit of such opportunities to be mentorship with faculty members: “These connections with faculty, across all academic disciplines and at a wide range of institutions, can be particularly meaningful to students deemed “at risk,” including first-generation college students and minorities” (4).

One of the major benefits of participating in undergraduate research – beyond retention and graduate school enrollment – is that these opportunities may connect underrepresented students to the academic community. Penrose (2002), in a study of academic literacy perceptions and performance of first-generation college students, found that these students’ self-perceptions were critical to their performance and persistence, and emphasizes helping students develop their

identities as members of the academic community. Undergraduate research may provide a vehicle for this development.

Outcomes of Undergraduate Research

Unlike some of the other high-impact practices examined in this review, the literature on undergraduate research is not as extensive. This holds true for research on student outcomes, particularly beyond questions of retention and graduate school enrollment. In their meta-analysis of higher education research, Pascarella and Terenzini (2005) found that undergraduate research has a “positive influence” on “persistence and degree completion” (406), as well as “elevates degree aspirations... and the likelihood of enrolling in graduate school” (407). However other outcomes – such as those related to student learning – were not as well established. Lopatto (2006) asks, “But what precisely are the benefits of the undergraduate research experience? The literature on undergraduate research is filled with anecdotes, endorsements, and assertions that the benefits are self-evident,” but there is a “lack of solid information about these benefits” (22). The majority of studies in this field address a single program at one institution, do not have comparison or control groups, and, as mentioned, focus solely on retention statistics or percentages enrolling in graduate school.

Hu et al. (2008) summarize the known outcomes of undergraduate research, which include: improvement in writing and communication skills; increased frequency and quality of interaction with faculty and peers; gains in problem-solving and critical thinking; higher levels of satisfaction with the educational experience; and greater chance of enrollment in graduate school. Key studies to this effect include that of Bauer and Bennett (2003), who surveyed nearly 1000 graduates – 418 who had participated in institutional research programs, 213 who worked

on their own with faculty members, and 355 who had no research experience – and found that alumni in the first two groups (who were engaged in undergraduate research) were more likely to enroll in graduate school and report a higher level of satisfaction with their undergraduate experience. They also reported gains in their intellectual curiosity as well as research, communication, and time management skills. Similarly, Russell, Hancock, and McCullough (2007) describe the results of a nationwide assessment of 4500 students who were funded by the NSF, and found that students reported the research experience increased their interest in a science, technology, or engineering career, as well as in obtaining a PhD.

In a qualitative study, Seymour et al. (2004) found that among 76 students at four liberal arts colleges, those involved in undergraduate research self-reported gains in: the personal and professional realm (comprised 28% of all reported gains), which included increased confidence as a researcher and collegial relationships with mentors and peers); “thinking and working like a scientist” (28%), which included critical thinking and problem-solving); skill development (19%), which included skills in communication, writing, lab/field techniques, work organization, computer usage, reading comprehension, working collaboratively, and information retrieval; clarification and confirmation of career and graduate school plans (12%); enhanced preparation for career or graduate school (9%); and shifts in attitudes toward learning and working as a researcher (4%), which included learning to work independently, taking responsibility for learning, and a greater interest in/motivation for learning.

Lopatto (2006) reports the results of two studies that show gains in multiple areas for students as a result of participation in undergraduate research. First, in a mixed qualitative and quantitative study of students in summer research programs at four liberal arts colleges, students self-reported gains on a variety of skills related to research, ranging from research and

hypothesis design to data collection and interpretation. In addition to research skills, students reported professional development in terms of “professional advancement and professional development,” such as publication and presentation opportunities, resume building, and mentorship opportunities, as well as “understanding professional behavior, appreciating the demands of a career, and understanding how professionals work on problems” (23). Lopatto explains that these types of gains are often not noticed by faculty or tracked through programmatic assessment:

Faculty mentors, especially those in science, often keep their focus on the payoff of undergraduate research for graduate school careers. But our research found evidence for a kind of development seen only out of the corner of the eye, so to speak. *Personal development*, including the growth of self-confidence, independence, tolerance for obstacles, interest in the discipline, and sense of accomplishment, centers on the increasing understanding of one’s self and one’s capabilities. Undergraduate researchers reported gains on these dimensions and, when asked to indicate which benefits of undergraduate research were most important, included personal gains among those benefits (23, emphasis added).

Lopatto reports that these gains were reported regardless of the student’s major – that “the benefits reported by science, social science, and humanities students were comparable” (24). In terms of mediating variables, Lopatto cites two conditions of faculty behavior as being important to the quality of students’ experiences: “Two traits, “responsive to your questions” and “treats you like a colleague,” were directly correlated with the students’ satisfaction with the research experience” (24).

Lopatto describes a second study, in which over 1,130 students at 41 institutions participated in an online survey to evaluate their research experiences in the sciences. Results indicated that undergraduate research has a positive effect on students’ educational experiences. In addition, these opportunities both attract and support students who are interested in a science

career. And finally, the “benefits of the research experience are gained across gender and ethnic groups” (24).

Outcomes for Underserved Students

Issues of retention and graduate degree attainment are at the focus of the majority of research conducted on the effects of undergraduate research participation for underserved populations. Pascarella and Terenzini (2005), in their meta-analysis of higher education research, report that undergraduate research has a positive effect on minority students specifically in terms of “increased rates of persistence through to graduation,” for which the “effects were strongest for African Americans and for sophomores” (406-7). Additionally, “Among minority students who pursued postbaccalaureate study, [undergraduate research] program participants were more likely to enter schools of medicine and law than were similar students who participated in less structured forms of undergraduate research” (407). Hu et al. (2008) also indicate that the majority of studies of undergraduate research and underrepresented students address issues of retention and graduate school enrollment, but that the effects in these areas are positive: “Student retention and clarified goals for career options and graduate school attendance, especially among those who are first-generation students or from underrepresented groups, is promoted by undergraduate research experiences” (35).

In terms of retention, Nagda et al. (1998) conducted a landmark study of 1280 students, those who participated in an undergraduate research opportunity program (UROP) and those who had applied but had not been accepted. The strongest effect was seen for African American students, with 90% retention of UROP students as opposed to 82% of the comparison group. There was a slight effect on retention rates for low-achieving students (88%, as opposed to 86%

of the comparison group). Hathaway, Nagda, and Gregerman (2002) followed up with students by conducting a focus group and alumni survey, which revealed that UROP students were more proactive by initiating activities, anticipating problems, and seeking out help; these students were also more likely to see faculty, staff, others as having a positive influence on their experiences, and were more likely to pursue postgraduate education. The nature of the comparison group for this study – comprised of students who were not accepted to the UROP – may problematize these findings.

Foertsch, Alexander, and Penberthy (2000) conducted a longitudinal study of 15 institutions with summer research opportunity programs (SROPs) for minority students, which involved over 5400 students over 10 years. Over half of the students attended graduate school, with more than one-third completing their graduate degree. Students reported the SROP experience was essential for them to get into graduate school and emphasized the importance of the mentor's role, but also noted the drawbacks of the eight-week program and claimed this was not enough time to fully develop their skills.

Ishiyama (2001) found that undergraduate research had similar benefits for the retention and graduate school acceptance for first-generation, low-income college students. In a study of the Ronald E. McNair Program at Truman State University, Ishiyama conducted a comparison of first-generation, low-income McNair program students with a comparable control group (of high ability, high ambition, students of first-generation, low-income backgrounds, as identified by CIRP data). The study found that that retention rates for first-generation, low-income McNair program students were higher than that for the comparison group at both the two-year and five-year mark (92.9% to 64.7%, and 93.6% to 44.1%, respectively). McNair students also entered graduate school within five years after their first entrance to the university at a higher rate

(55.3% compared to 19.5% of the comparison group). McNair scholar graduates indicated on questionnaires that their participation in the research internship was important to extremely important in their admission to graduate school (71.4%), and that faculty mentoring was important to extremely important in preparing them for graduate school (95.2%).

There has been some research on the impact of undergraduate research for underrepresented groups beyond the concerns of retention and graduate school attendance. Jonides et al. (1992) conducted a study of the first year of the undergraduate research opportunities program (UROP) at the University of Michigan, which involved 120 underrepresented minority students in the program, a primary control group of 60 African American UROP applicants, and a secondary control group of 146 White residential students.

The authors found that:

Students in UROP show higher levels of personal and collective self-esteem, they report more confidence in their research abilities and a greater likelihood of seeking an advanced degree, and they state that they are more likely to seek help from faculty and teaching assistants than students in either control group (11).

In further analysis, the impact of self-esteem was deemed to be “indirect... primarily through its influence on the coping strategies and confidence it provides” (12). In a subsequent study on the same program, Jonides (1995) found not only higher retention rates for program students than underrepresented students university-wide, but also higher GPAs (on average 6%) and positive effects on self-esteem, coping strategies, learning behaviors, and expectations about academic performance.

In a small study of seven Lakota students involved in a three-year aging research project in American Indian communities, Anagnopoulos (2006) found the retention rate was 86% for these students – better than the non-American Indian student retention rate. Due to the study’s

small sample, this finding is not as valuable as the qualitative data garnered from the project. The author explains: “For the Lakota students involved in this project, the mentorship opportunity gave them occasions to develop their confidence and skill in asking questions, offer opinions and ideas, improve their comprehension of methodology within the field, and discover answers together” (523). Given the high attrition rates for American Indian students, the author recommends “engaging these students in faculty-mentored research” to increase student retention (524).

For certain populations of underrepresented groups, there may be mediating variables that impact the quality of the undergraduate research experience. Ishiyama (2007) utilized Lopatto’s (2004) methodology to examine 33 students in the McNair Program at Truman State University. These students were from three groups: white/Caucasian students from first-generation, low-income backgrounds; African American students from first-generation, low-income backgrounds; and African American students from “continuing generation” backgrounds (those who were not first-generation but had a parent or parents who completed college). The study specifically looked at students’ characterizations of the mentoring relationship with faculty. Findings indicated that at least initially, African American students from both groups were more likely than White students to highlight: the personal consideration role of mentors (listening to students’ personal concerns, being a good listener, and being a friend); the psychological benefits of undergraduate research; and being personally supportive as descriptive of a good mentor (being personally concerned with the student’s welfare). Ishiyama found that over time the first two emphases diminished but the third persisted. Thus, the quality of the mentoring relationship may have an impact on the effectiveness of the undergraduate research experience, though from

this study it is not entirely clear which elements of the relationship are likely to produce long-term effects.

Regardless of the benefits of undergraduate research for students – which at this point have not been fully explored, at least not beyond considerations of retention and graduate school attendance – issues persist in terms of student participation in these opportunities. Though there have been a number of programs (e.g., UROPs and SROPs) aimed specifically at underrepresented groups, these programs are not widely accessible to underrepresented students in higher education, and often accept the most promising among these students at research institutions.

Along these lines, in a recent study, Hurtado et al. (2008) examined predictors of first-year minority student participation in health science research (in the study, underrepresented minorities, or “URMs,” included Black, Latina/o, and American Indian students). Data was obtained from the 2004 CIRP and 2005 Your First College Year Survey for 3,095 students across 129 institutions. The study found that students who intended to live on campus had significantly greater odds of participating in health science research, as well as those who enrolled in a first-year experience course, joined a pre-professional or academic department club, sought advice from upper-division peers, or spent more time engaging with faculty members. Compared to all other groups, Black students had significantly reduced odds of participating in health science research programs, and Black students who “indicated having more serious financial concerns about paying for college were significantly less likely” to participate (145). Black students had greater odds of participating if they had a greater sense of social confidence upon college entrance, received advice from a junior or senior, participated in a learning community, or attended an institution offering structured health science research programs available to first-year

students. In addition, a key factor for “increasing Black students’ likelihood of participation in research... [was] positive cross-racial interactions... indicating the significance of the racial dimension of social capital for these students” (147). From an institutional standpoint, health science research opportunities were more likely to be offered at universities (versus colleges), selective institutions, larger institutions, and those that generated more revenue per full-time equivalent student. Not surprisingly, students were more likely to participate in these programs if their institutions enrolled higher numbers of undergraduate and graduate students and provided structured health science research programs available to first-year students.

Issues in Research Related to Undergraduate Research Programs

The most significant concern regarding outcomes of undergraduate research is the lack of empirical studies. As Seymour et al. (2004) explain, there is a “preponderance of program descriptions, explication of models, and evaluation efforts rather than research studies” (496) in the literature. And for the few studies that do exist, the issue of selection bias is pervasive: “the problems of small sample size and samples that are self-selected, faculty-recruited, or predisposed by selection criteria to display expected gains are common” (497). Thus, while studies may show greater retention rates for participating students, these students may very well be more successful to begin with (thus the reason why they are recruited or selected for undergraduate research programs). As long as undergraduate research opportunities remain a scarcity in higher education, it will be difficult to assess their impact without the issue of selection bias.

Along these lines, it is difficult to ascertain what the opportunity cost is for students who *do not* participate in undergraduate research. Seymour et al. (2004) explain that, “Alongside questions about what students gain from undergraduate research experiences, and how these

gains are made, lie the parallel issues of what is “lost” (if anything) by students who do not participate, and with what consequences... As most studies lack comparison or control groups, this has been little discussed” (499). And as mentioned earlier, many comparison groups are comprised of students who applied for undergraduate research opportunities but who were not accepted – thus raising the issue of selection bias again.

Given the lack of empirical evidence regarding the outcomes of undergraduate research, it is not surprising that little is known about the mediating variables affecting those outcomes. Lopatto (2006) explains, “What is missing is a strong test of causes of a good experience” (24). While the quality of the mentoring relationship between faculty and students appears to be significant, it is not clear what dimensions of that relationship or behaviors of either party make for an effective experience. It is also unclear whether there is a minimum “threshold” of intensity and involvement in the experience necessary for student success, however it might be defined. Along these lines, Nnandozie, Ishiyama, and Chon (2001) found a weak relationship between characteristics of research internships and success in placing students in graduate programs, and posited that this might be because preparation, presentation, and publication of research are components that are missing from many programs.

Finally, there is a significant lack of research on outcomes of undergraduate research programs beyond retention and graduate school enrollment. This is true both for general populations and for underrepresented students. Thus, little is known about the impact such opportunities may have on students’ learning and personal development.

First-Year Seminars

Of the five educational practices reviewed in this monograph, first-year seminars have existed for the longest period of time, and are the most common of the initiatives on college campuses. Seminars for new students first appeared on college campuses around 1910 and were a common staple for several decades (Gordon 1989). Those early courses were similar in content to most first-year seminars today. They focused on acclimating students to living and learning in a university environment, taught study skills and time management, introduced students to campus resources, and taught students about their institution's policies, history, and traditions. While nine out of ten students were required to take an orientation class in 1938 (Mueller as cited in Gordon 1989), faculty at that time began to question the academic value of these courses and they nearly disappeared from campuses by the mid-1960s.

The resurgence in new student seminars began in the early 1970s, and by the 1980s had become a common initiative once again. While the exact number of campuses that offer first-year seminars is impossible to determine with certainty, it has been reported that between 85% and 95% of two-year and four-year campuses offer some type of a first-year seminar (Goodman & Pascarella 2006; National Resource Center on The First-Year Experience and Students in Transition 2006; Policy Center on the First Year of College 2002).

Barefoot (1992) developed a typology to classify these seminars, and that typology has been adopted by the National Resource Center for the First-Year Experience and Students in Transition. It identifies five main types of seminars:

1. *Extended orientation seminars*: These courses are often called orientation classes, student success or survival courses, or "University 101" courses. The content of these seminars is very similar to those of the classes introduced in the

first-half of the 20th century. They provide information to help students transition to a new environment, including learning about the purposes of higher education and the history of a particular campus, introducing students to campus resources, teaching them study skills and time management techniques, discussing academic and career planning, and addressing student health and wellness issues. These courses may be taught by faculty, staff or administrators from student affairs, and/or student peer mentors.

2. *Academic seminar with uniform content across sections:* These courses address the intellectual transition to college more than the personal transition. They may still address academic skill building topics, particularly writing or critical thinking, but within the context of an interdisciplinary or theme-oriented academic course designed for first-year students. They often fulfill a general education requirement. These courses are more likely to be taught by faculty, although they may be team taught with a member of student affairs or a student peer mentor.
3. *Academic seminar with variable content:* These courses are very similar to #2 above except that they are more likely to be based in a single discipline rather than being interdisciplinary, so content areas will vary section to section.
4. *Pre-professional or discipline-linked seminar:* While seminars with variable content are disciplinary in nature, they might be taken by any student regardless of major as a general education class. In contrast, the courses in this category are designed specifically for students intending to enter a particular discipline or field, and are meant to introduce them to and prepare them for the demands of that

discipline or profession. They are typically offered by professional schools or specific disciplines rather than a university as a whole.

5. *Basic study skills seminar*: Usually targeted for underprepared students, these courses focus mainly on college-level skill development such as grammar, note taking, or reading texts. They are the least common first-year seminar type found on campuses.

Of the five types of seminars, extended orientation seminars are by far the most common type found. In the three volumes of its *Exploring the Evidence* series, the National Resource Center on The First-Year Experience and Students in Transition presents profiles of research on first-year seminars from more than 120 colleges and universities (Barefoot 1993; Barefoot, Warnock, Dickinson, Richardson, & Roberts 1998; Tobolowsky, Cox, & Wagner 2005). Of those summaries, more than 60% describe extended orientation seminars. In a survey conducted by the Policy Center on the First Year of College that included 62 four-year institutions, 73% offered the extended orientation type (Swing 2002). While academic seminars or hybrids of multiple first-year seminar types are becoming more common, with extended orientation seminars accounting for only 23% of entries in the latest *Exploring the Evidence* volume, “University 101” is still the norm.

Despite the longstanding history of the first-year seminar, research about their effectiveness was very limited until the late 1980s. At that time, multiple national reports and individual college campuses started paying more attention to the first year of college. National centers began to be established, such as the National Resource Center on The First-Year Experience and Students in Transition (founded in 1986 and most recently renamed in 1998), as well as the Policy Center on the First Year of College. Since most student attrition in higher

education occurs between the first and second years, there were many calls to “front load” services to help student acclimate to college, making it more likely that they would persist. Academic and social integration was seen as crucial, and the small class size, increased faculty interaction, and the establishment of peer groups inherent in the first-year seminar made it an obvious initiative to study. Goodman and Pascarella (2006) note that when writing the 1991 version of *How College Affects Students* (Pascarella and Terenzini 1991), very little research existed to review. However, by the 2005 version there were more than 40 studies available for review. Still, for the current review, it was found that much of the research available is still from the 1990s, with the pace of published research slowing down after 2000. Since a good amount of that research examines students who entered college in the 1980s or early 1990s, and college students today are different in many ways from students at that time, current research is crucial. Still, the research that does exist shows patterns that are worth noting.

First, looking at the patterns of the research itself, nearly all studies identified are single-institution studies. Only three studies used national data to look at the impact of first-year seminars across multiple institutions (Keup & Barefoot 2005; Porter 2002; Porter & Swing 2006). While single-institution studies are useful in establishing patterns, they make it difficult to generalize results to other schools. Second, it is interesting that the majority of studies appear in one journal, the *Journal of The First-Year Experience and Students in Transition*, or in monographs produced by the affiliated National Center. Since that journal and related publications are not as widely available as other journals, it limits the audience for this information. These issues will be discussed further in the recommendations section of this chapter.

Notes on the Research Included in this Review

Before looking at the outcomes mentioned in the literature, it is worth noting the treatment of two significant collections of first-year seminar outcome studies for the purposes of this review.

The *Exploring the Evidence* series of monographs, published by the National Resource Center on The First-Year Experience and Students in Transition, include research summaries about first-year seminars offered at more than 120 colleges and universities (Barefoot 1993; Barefoot et al. 1998; Tobolowsky et al. 2005). Researchers at these institutions have studied a range of outcomes for students, institutions, and faculty. Most studied multiple outcomes for their seminars, and the most common outcomes examined were persistence/retention (65% of studies) and academic achievement/GPA (53% of studies). The next most common outcomes were student satisfaction (23% of studies) and the broad category of student self-assessments (23% of studies). That category included student self-reports about numerous attitudinal, behavioral, and skill areas, such as increased awareness about college and faculty expectations, skill development, gaining confidence in asking for help, respect for diversity, and sense of belonging or community. While all of this information is very useful for institutions that are looking to create, improve, or assess their own seminars, it should be viewed with some caution for a review like this one. The information for the volumes was gathered by putting out an invitation for institutions to submit brief summaries about outcomes research they conducted on their campuses. While the editors included a range of institutional and first-year seminar types in the monographs, the quality of the research varies and it should not be taken as being representative of the practices in all first-year seminars. It seems safe to say that few institutions would have submitted information about unsuccessful programs, so these monographs represent

“best practices” for these seminars. For those reasons, specific institutional studies are not included in this outcomes summary unless the research also appeared as a published article or the profiles included specific information about outcomes for underserved students.

Using a very different approach, in Pascarella and Terenzini’s 2005 edition of *How College Affects Students*, the authors provide a thorough and concise analysis of the outcomes research related to first-year seminars. This current review does not intend to duplicate that work, but will highlight some of the key studies and findings, and look at research published since that time, as well as paying special attention to what is known about the impact of first-year seminars on underserved student populations.

Outcomes of First-Year Seminars

Since much emphasis was placed on retention to the sophomore year when first-year seminars began to be studied in earnest in the 1980s, that outcome is the most commonly studied in the research. Closely related, academic performance, usually defined as grade point average (GPA), and graduation rates are common outcomes studied. Other outcomes are related to specific goals in the design of a particular seminar, such as student adjustment and involvement, self-understanding, use of campus resources, and student satisfaction.

Persistence

The overwhelming consensus in the literature is that first-year seminars have a positive impact on student persistence. Most of the research is short-term, looking simply at first-year to sophomore retention. Students who complete a first-year seminar are more likely to return for their sophomore year than those who do not (House & Kuchynka 1997; Miller, Janz & Chen

2007; Sidle & McReynolds 1999; Sommers 1997; Starke, Harth & Sirianni 2001; Williford, Cross Chapman, & Kahrig 2000-2001; Yale 1999).

Fidler has produced a great deal of research over the years, examining University 101 at the University of South Carolina from 1973 forward (e.g. Fidler 1991; Fidler & Goodwin 1994; Fidler & Moore 1996). In one of the most frequently cited articles in the first-year seminar literature, Fidler studied every entering cohort from 1973 to 1988 and compared the sophomore retention rates of seminar participants and non-participants (Fidler 1991). While the study controlled for motivation and multiple background demographic and academic characteristics, the two groups were not intentionally matched in any way. In all years studied, first-year seminar participants persisted at higher rates than non-participants, reaching significance in 11 of the 16 years. There was greater than a 7% difference in retention rates found in multiple years. Further, in most years, participants had lower predicted GPAs than their peers, but still had higher persistence rates.

In another study, Fidler and Godwin (1994) found that African-American students were more likely to enroll in University 101 than their White peers, and their participation had a positive impact on retention. African-American participants had greater first-year to sophomore retention over a twenty year period than did White participants. In addition, African-American students who completed the first-year seminar were generally more likely to persist than African-American students who did not take the seminar.

Few studies look at students' persistence beyond the sophomore year. Lang (2007) found that first-year seminar students had higher persistence rates across four terms as compared to a matched control group not in a seminar. Bourdreau & Kromrey (1994) looked at the persistence of students who took a first-year seminar at one university over a four-year period. They

examined all records for one semester as a snapshot in time, thereby examining one group's retention to their sophomore year, one to junior year, one to senior year, and one to a four-year graduation. Compared to a matched peer group, they found significant differences for the two youngest groups only, with seminar students more likely to return for their sophomore and junior years than those not in a first-year seminar. However, since the authors did not look at all four cohorts' persistence year-by-year, but rather persistence only at one point-in-time, it is impossible to know whether the impact of the seminar on persistence fades over time, or whether those older cohorts never displayed a significant difference between participants and non-participants.

One of the few multi-institution studies of first-year seminars approached the question of persistence from a different angle (Porter & Swing 2006). The goal of this study was to determine what elements of these seminars led to increased likelihood of student persistence. The study looked at students at 45 four-year colleges and universities, measuring students' intention to persist rather than persistence itself. The authors reviewed literature showing that students' expressed intent to persist is an accurate measure of students' true behavior, and they further showed that the intended rate of persistence matched the typical persistence rates for the 45 schools in the review. Extended orientation seminars were the only type included in the study in order to make the content, structure and goals of the courses studied as similar as possible. In addition to controlling for student background characteristics, they also controlled for institutional characteristics, such as selectivity, resources, and institutional type (e.g., public, private, doctoral-granting, etc.). The authors found that the two elements most related to students' intention to persist were effectiveness in the teaching of study skills, and educating about health and wellness topics. They note that these are the two areas that faculty often feel

the least equipped to address, but they are the most significant to students. They theorize that for health education, it may not be the material covered that is most important to students, but the fact that in doing so, faculty “are de facto expressing caring about students... [acknowledging] that students are more than ‘cognitive beings’” (Porter & Swing 2006, 106).

Graduation Rates

Few studies followed students through college to examine the impact of first-year seminars on graduation rates. However, those that did find higher graduation rates for seminar participants at the end of four, five, and/or six years from entry (Lang 2007; Schnell, Louis, & Doetkott 2003; Starke et al. 2001; Williford et al. 2000-2001). For example, one study demonstrated a greater impact on the five-year graduation rates of students from small high schools than from larger high schools (Schnell et al. 2003).

Academic Achievement/GPA

Findings about student grades are not as clear cut as the results regarding persistence. While many found that first-year seminar participation has a positive impact on first-term and/or first-year grades (House & Kuchynka 1997; Maisto & Tammi 1991; Yale 1999), others did not find any significant GPA differences between seminar participants and non-participants (Fidler 1991). Others found significant differences for seminar participants in the short term, but found the advantages faded after the first year (Lang 2007).

Friedman and Alexander (2007) compared seminar participants who took a first-year seminar as a stand-alone class, those in a first-year seminar connected to a learning community (LC), and those in no seminar. All seminar participants received higher grades than non-participants, with those also in the LC having the highest grades of the three groups. The LC

anchor class also had the most intentional and supportive course design, helping students integrate material between classes, bringing instructors and academic advisors together as an instructional support team, and using out-of-class activities to build community.

Fidler and Hunter (1989) demonstrated that first-year seminars can have a compensatory effect for underprepared students, both in terms of grades and persistence. These classes often draw the least academically prepared students, but they are then able to perform at the same level as their better prepared peers. The authors note that the effect is indirect; the benefits come from students building relationships with faculty, peer networks, and awareness and use of campus resources, rather than simply from participating in a seminar.

Other Outcomes

Barefoot (2000) has called for campuses to think beyond retention outcomes to focus on student learning. Upcraft, Garder, and Barefoot (2005) also challenge schools to broaden their definition of student success to include a wide range of outcomes, including developing intellectual and academic competence, building interpersonal relationships, exploring identity, developing career goals, maintaining health and wellness, clarifying their values and beliefs, developing multicultural awareness, and developing a sense of civic responsibility. A few recent studies have taken on those challenges. Engberg and Mayhew (2007) examined democratic outcomes, such as commitment to social justice, multicultural awareness, and a propensity toward active and causal thinking, as outcomes of the first-year seminar experience. The authors compared first-year students in an extended orientation seminar with an emphasis on diversity to matched peers taking a first-year communication class or a first-year engineering class. Despite no pre-test differences on these measures between any of the groups, the students in the first-year seminar reported significantly more growth in commitment to social justice and multicultural

awareness than the other two groups. Both these students and the engineering group showed significant growth in active and causal thinking.

Another study looked at cognitive development according to the Perry (1970) scale. Stallings (2005) compared students in a stand alone first-year seminar, those in a seminar attached to an LC, and those in no seminar. When students completed the Learning Environment Preferences survey at the start of the term and in the last week of the regular term, the author found a decline in scores for all three groups. However, the only significant decline was found for those students not in a seminar, leading Stallings to posit that the first-year seminar might have helped minimize the level of developmental retreat for those students. However, the short time span of this study makes it difficult to assess changes in intellectual development, which often requires a longer time to demonstrate growth.

Keup and Barefoot (2005) in one of the few multi-institution first-year seminar reviews looked at all students who completed both the Cooperative Institutional Research Program (CIRP) survey and the Your First College Year survey in 2001 to compare trends between seminar participants and non-participants. Utilizing Astin's (1991) Input-Environment-Output framework in their regression analysis, they found that first-year seminar students reported more faculty interaction, speaking more often in class, and being less likely to skip class or arrive late. Participants also reported being more likely to develop a network of friends, discussing course content with peers outside of class, studying with other students, using campus resources, attending campus events, and participating in volunteer activities. While the analysis showed that large campuses mitigate some development of strong peer relationships, no other campus differences were found to be significant.

Other findings in the literature determined that compared to non-participants, students in first-year seminars demonstrate:

- More positive relationships with (Fidler 1991; Starke et al. 2001) and more informal interactions with faculty (Maisto & Tammi 1991; Yale 1999);
- Greater perception of faculty support and care (Sommers 1997);
- More peer interaction (Yale 1999);
- Greater knowledge of (Schwitzer, McGovern & Robbins 1991) and use of campus resources (Fidler 1991; Wilkie & Kuckuck 1989; Yale 1999);
- More involvement in campus activities (Starke et al. 2001); and
- More ability to manage their time (Sommers 1997).

Outcomes by First-Year Seminar Type and Structure

Swing (2002) reported the results of the First-Year Initiative study conducted by the Policy Center on the First Year of College. The benchmarking survey was intended to determine the types of first-year seminars that exist across the U.S. as well as the range of student outcomes associated with these seminars, so the researchers surveyed both seminar coordinators/directors and more than 30,000 first-year seminar students. No non-participant comparison group was surveyed. Ten learning outcomes were studied, including study strategies, academic/cognitive skills, connections with faculty and peers, knowledge of campus services, and knowledge of wellness issues. The researchers also looked at course delivery and effectiveness, and students' overall satisfaction with their institutions. As noted earlier, they found that at the 62 four-year institutions that participated in the survey, the most common seminar type was the transition (extended orientation) seminar (73%). The researchers also found that this seminar type led to

the greatest number and range of student outcomes studied. Students rated the seminars as highly effective at improving study strategies, out-of-class engagement, knowledge of academic services, knowledge of wellness issues, connections with faculty, connections with peers, and managing time/priorities. Discipline-based seminars were rated as the least effective type by students, and these seminars were also rated the lowest by students at containing engaging pedagogy. It may be those factors together that determine the success or failure of this type of first-year seminar.

Swing (2002) also looked at seminar structure and found that colleges and universities are highly varied in the number of contact hours offered for these courses. Six percent offer them as non-credit classes, 40% for one credit, 24% for two credits, 24% for three credits, and 6% for more than three. Different levels of results were found for each of these categories. One credit/contact hour courses were as effective as courses with greater contact at introducing students to institutional policies and practices. However,

“[i]f the course goals also include increased knowledge of campus services, improvement in time management and other study skills, increasing student/student and student/faculty connections, and increased out-of-class engagement, then at least 2 contact hours per week are more effective in producing these learning outcomes. If the course goals also include gains in academic skills and critical thinking, then a 3-contact hour course is more likely to produce the desired learning outcomes” (Swing 2002).

Most of the outcome studies that are included in this review are related to extended orientation seminars. Despite academic seminars becoming more common on college campuses, fewer studies are available on the outcomes of this approach. For those that do exist, results regarding grades and persistence have been mixed. While a positive impact has been found (Sommers 1997), others have found no significant results, positive or negative (e.g., Cavote & Kopera-Frey 2004). However, as pointed out by the authors of these studies and by the results

reported by Swing (2002), those results may be related to the approach taken in the first-year seminar rather than a reflection of the usefulness of a discipline-based seminar. In the study without significant results, the classes were designed department by department with no common expectation about traditional first-year seminar content such as academic skills development, and they offered no faculty development regarding engaging pedagogy. So aside from being smaller in size, the classes studied did not have many of the components associated with successful first-year seminars.

As described earlier, academic seminars often have different goals than extended orientation seminars, so the types of outcomes studied for this seminar type will be related to their unique goals. Brent (2006) examined a seminar intended to help students at a research university understand the nature of research and develop skills in that area. In particular, the goals of the class were to help students develop library skills, judgment in evaluating sources, and critical thinking, as well as to learn to write for college-level research papers. Through interviews with students from the class, it was determined that the seminar met its goals.

Outcomes for Specific Student Populations

A significant gap in the first-year seminar literature is the lack of attention to the outcomes of seminars for specific student populations. While several discuss the impact of seminars based on level of academic preparation, very few focus on the underserved populations of interest here, and rarely is that investigation the main purpose of the study. Only one article identified focused on low-income students (Anselmo 1997). Baruch College is a four-year college in which half of their students earn \$20,000 per year or less, and the first-year seminar studied was designed for their SEEK program which is made up of the most academically and economically disadvantaged students on campus. The seminar is designed so that students get

together for a reunion in each of the three terms following the course. The hope was that the reunions would help renew and extend the academic and social connections made during the first-year seminar. Compared to the SEEK group that took the seminar without reunions, the first-year seminar reunion participants had significantly higher GPAs, earned more credits, and were more likely to persist over the following three years. However, no comparisons were made to non-SEEK students.

Race/ethnicity factors are usually controlled for early in the analysis of most studies, making it impossible to determine differential impacts for these groups. Other times it is simply noted that the results found did not vary based on race/ethnicity. For example, Starke et al. (2001) found that African-American and Latino students demonstrated as many benefits from first-year seminars as their peers, including higher graduation and persistence rates, comfort with faculty, and greater involvement with campus activities. An exception is Fidler and Godwin (1994), which examined the impact of the University 101 first-year seminar program on African-American students at the University of South Carolina. While not targeted specifically to this population of students, University 101 attracts a higher proportion of African-American students than White students, and it is structured in a way to meet three essential needs that have been identified for these students. Fidler and Godwin cite Pounds (1989) who recommends that predominantly White institutions should intentionally create ways “to involve African-American students in campus life, ...help them form positive attachments to adults, and ... provide security from threatening situations” (35). While they cannot prove a direct correlation between these efforts and retention, it is clear that this class has made a difference for African-American students at this institution. In contrast to national trends, they have achieved higher first-year to sophomore retention rates than their White peers for 19 straight years. Further, African-

American students who participated in the seminar persisted at a greater rate than African-American students who did not participate in 9 of 13 years.

Wilkie and Kuckuck (1989) is the only published article found to specifically note an impact of first-year seminars on first-generation students. Most of the students in their study were first-generation and academically at-risk, with all students predicted to earn a 1.5 GPA or lower. Students were randomly placed into either a participant or non-participant group, and only those that successfully completed the seminar, and therefore the experimental treatment, were included in the analysis. The two groups earned comparable GPAs their first term, but by the third year the first-year seminar group's GPA was significantly higher than the control. Similarly, persistence for the participant group surpassed their peers' over time, and by the third year the difference approached significance. The seminar group was also more likely to use campus resources than their peers.

One profile in the *Exploring the Evidence* series also mentioned first-generation students (Barefoot et al. 1998). Kutztown University in Pennsylvania has a student body that is over 60% first-generation, and 88% of students in the Student Support Services Program (SSSP) program are first-generation students. About a quarter of the students in the program were students of color, and over half were conditionally admitted to the university. The seminar for this program is a non-credit course intended to develop writing, reading, critical thinking, and study skills, as well as helping students learn about university resources and how to be a successful student in a university environment. Not everyone in the SSSP program decided to participate in the seminar, but non-participants did not vary from the participants on multiple demographic or motivation variables. However, 97% of students who attended the seminar regularly (more than half the sessions) persisted to the second year, compared to 58% who attended irregularly or not

at all. Differences in retention rates remained statistically significant after both the second and third years of college, with students who attended more often persisting at a significantly higher rate than those that did not. Those students also had significantly higher grades throughout this time as compared to those with low or no attendance.

Current Evaluation of the First-Year Seminar Literature

While it has been said that “the first-year seminar is the most researched innovation in higher education” (Tobolowsky et al. 2005, 5), the quality of this research is often problematic. While the many single-institution studies that have been conducted in the past 30 years offer a preponderance of evidence that first-year seminars lead to increased persistence as well as other positive outcomes, it is difficult to use individual studies to draw any conclusions about why that is true. With only three multi-institutional studies identified, more work needs to be done on trends across institutions, outcomes for different types of first-year seminars, and determining the factors that lead to those outcomes. Further, more current research needs to be done, and to be distributed more widely. While *The Journal on The First-Year Experience and Students in Transition* is an excellent resource for this information, it is not as widely available or known as other higher education journals, and it is where most first-year seminar research is published. Also, the research that has been published is dated, with much of it studying students who were in college in the 1980s and early 1990s, a very different population than today’s students.

Other problems with this body of literature are similar to those identified for learning communities, but are more pronounced. First, most studies are very short in duration, mainly studying student changes or academic performance during the first year, or persistence to the sophomore year, but not beyond. More research needs to extend this timeline to study outcomes over a longer period of time. Second, not enough attention is paid to control groups. While

many compare seminar participants to non-participants, more studies need to control for differences in groups or do careful matching of the control group. Third, most of the research is quantitative. While these studies provide valuable information, they should be accompanied by qualitative studies to learn more about the factors leading to those quantifiable results. Fourth, a wider range of outcomes should be studied. As pointed out by Barefoot (2000) and Upcraft, Garder, and Barefoot (2005), the field needs to move beyond persistence and achievement studies to review student learning in first-year seminars. While a few studies do this, those studies represent a fraction of the outcomes literature.

Finally, a significant gap exists in the first-year seminar outcomes literature regarding underserved students. While seminars are touted as a way to help students persist in college, little attention is being paid to the impact of these initiatives for at-risk students. By introducing students to the demands and resources of a college campus, they seem an especially ideal tool for first-generation college students. However, that topic has received almost no attention.

While there is a great deal of evidence and promise regarding the positive outcomes of the first-year seminar in higher education, there is still much that could be done to move the research in this area to the next level, which would benefit both students and institutions.

Capstone Courses and Projects

According to Gardner and Van der Veer (1998a), capstone experiences are “summative curricular approaches such as courses synthesizing all of the content to date within a particular major (and often attempting to connect that concept back to the institution’s basic theme of general education and the liberal arts)” (15). Such opportunities – which often include theses, final projects, internships, or artistic shows or recitals – were popularized in higher education literature and practice during the 1990s. During the present decade, however, discussion of capstone experiences appears to have declined; one possible explanation might be that these experiences have been subsumed into the larger and now more visible category of “undergraduate research.” As Lopatto (2006) explains regarding undergraduate research: “it can be situated as a capstone senior experience or a first-year experience” (22).

During the 1990s, capstone experiences were highlighted in the Boyer Commission’s (1998) report, entitled *Reinventing Undergraduate Education: A Blueprint for America’s Research Universities*, which urged that students’ “final semester(s) should focus on a major project and utilize to the fullest the research and communication skills learned in the previous semesters” (27). The report emphasized the variability of that project based on students’ majors, as well as the importance of collaboration and the role of a “seasoned scholar-teacher” (28) to mentor students in their projects.

In addition to the Boyer Commission report, the late 1990s also saw a focus on “the senior year experience” or “SYE,” as initiated by the University of South Carolina (National Resource Center for the First Year Experience and Students in Transition). The publication of a book by that title (Gardner, Van der Veer, and Associates 1998) brought attention to the use of capstone experiences as a way to provide opportunities for integration, application, and closure

to the senior year. As Cuseo (1998) explains in a chapter of that book, “The major vehicle used by SYE programs to bring coherence and closure to the general education experience is the senior year capstone course, designed to forge interdisciplinary connections among the liberal arts and sciences” (23). Additionally, “SYE programming has attempted to realize this goal of synthesis by requiring a capstone course in the major that is designed to promote intradisciplinary connections” (24). Gardner and Van der Veer (1998b) recommend that all institutions “consider a mandatory academic capstone experience” for all students (292), and to this end provide a “primer” and sample syllabus for a senior capstone transition course.

Both during the 1990s and since, the majority of the literature on capstone experiences, however, is descriptive in nature and generally involves a single faculty member, major, or program discussing a particular formulation of a capstone. Little to no evaluation is provided in terms of student learning, and discussion of outcomes is generally anecdotal in nature. With the exception of one large-scale, descriptive study of the usage of capstone experiences in higher education (Henscheid 2000), no empirical examination of these experiences beyond a single course or major was found.

Defining Capstone Courses and Projects

Heinemann (1997) identifies a major difficulty in defining capstone experiences in higher education: “There are undoubtedly more variations of content for the senior capstone course than for any other common course taught by colleges and universities” (2). This is seen even in the contradictory definitions offered in the literature; while some authors describe the focus of capstones as integrating learning already obtained (e.g., in the major and in general education), others frame capstones as opportunities to apply and expand learning to real-world situations of

practice. Heinemann identifies the source of this tension in “a basic philosophical issue involved with purpose. The issue involves two opposites: closure, represented by the dome; and further exploration, represented by the spire” (2). Furthermore, the question of *what learning* is at the focus of the capstone – learning in the major, or learning in general education, or an integration of both, leads Heinemann to ask, “Should there be two capstones – one for the major only, and one for the total college experience?” (16). Henscheid (2000) seems to suggest that higher education aims to attain a number of goals through the capstone experience, such as “to cement the student’s disciplinary affiliation, to provide a rite of passage into the world of work or graduate school as a member of a distinct scholarly community, and to integrate the skills and knowledge acquired in the discipline” (4).

Regardless of its purpose or focus, capstone experiences may take multiple formulations. Levine (1998) classifies these formulations into three types: senior seminars, which vary widely by topic and quality; comprehensive examinations, which are less common; and senior theses or projects, which involve independent study and prepare students for world of work or graduate school. In addition, at some institutions students develop comprehensive portfolios that reflect their work either from their total college experience, their work in the major, and/or internship experiences.

University of California, Berkley provides perhaps the most integrative view of capstone experiences, by envisioning capstones as the culmination of a three-stage process in the undergraduate career (The Regents of the University of California at Berkeley 2008). In stage one, *Exposure*, “students learn to recognize a good research question and are exposed to methods of approaching the problem... students begin to gain an understanding of the process by which knowledge is created...” (4). In stage two, *Experience*, students “have typically committed to a

major and are gaining discipline-appropriate tools and knowledge through coursework and co-curricular apprenticeships” (4). In this stage, students practice formulating research questions, developing plans for research, and acquire research skills. In the final stage, *Capstone*, students “marshal the skills needed to develop their own research or creative questions and to initiate investigations and explorations the outcome of which is largely unknown” (4). While the level of independence (collaboration with a team versus working alone) varies by discipline, students in the capstone “organize and synthesize knowledge and skills acquired in a wide array of settings and situations in the course of their undergraduate career under the guidance of a mentor” (4). The capstone itself provides the opportunity for students to present their work, though the audience may vary (e.g., scholarly publication, professional conference, student conference/journal).

As mentioned earlier, Henscheid (2000) conducted a large-scale study of 707 institutions and their use of capstone experiences. The results of this National Survey on Senior Seminars and Capstone Courses were published in a monograph (now out-of-print) by the University of South Carolina (National Resource Center for the First Year Experience and Students in Transition, Henscheid 2000). The survey, which gathered data for 864 capstone courses across the 707 institutions, found that 70.3% of these courses were discipline or department-based, 16.3% were interdisciplinary, 5.8% were transition courses (preparing for work, graduate school, or life after college), 4.6% were classified as “other,” and 3.0% were career planning courses. The number-one goal of senior seminars and capstone courses was to foster integration and synthesis within the academic major, which was cited four times more than connecting the academic major to the work world (the second most frequently cited goal). The goal ranked third was improving seniors’ career preparation and pre-professional development, and ranked fourth

was promoting integration and connections between general education and the academic major. Two goals were both ranked fifth: promoting the coherence and relevance of general education; and the development of skills, competences, and perspectives developed through the curriculum (e.g., leadership skills).

While the length of capstone experiences varied – from one to eight weeks to two semesters – the overwhelming majority (81.9%) were one semester. Components of capstone experiences included oral presentations (75.1%), major projects (71.9%), group projects (45.1%), final exams (39.7%), portfolio development (37%), theses (27.1%), internships (15.2%), and service-learning/community service (10.8%). Nearly 70% of respondents reported that senior seminars and capstone courses were required for students. Capstones were distributed throughout the humanities (22.1%), social sciences, (17.8%) business/management (15.7%), engineering (12.2%), and biological sciences (11.2%). Interdisciplinary courses were most often found in smaller institutions and/or institutions of medium selectivity.

In discussing the survey findings, Henscheid asserts that “the major finding of this survey is that senior seminars and capstone courses across all types of American colleges and universities are generally designed to leave students with an understanding of and appreciation for single academic disciplines” (4). While some capstone experiences do involve the integration of learning from general education, this is not generally the focus across higher education:

According to these results, individual academic faculty members in these small courses tie up the loose ends of learning in the major and presage the world of work in the field or fields represented by that major. This survey indicates that the culminating academic experience at America’s colleges and universities most frequently caps not the whole of college, but a specialized piece of that experience (4).

Henscheid also found that capstone experiences are generally not experiential in nature, relying rather on students' classroom-based learning both from the past and present: "The least likely instructional components to be found in senior seminars and capstone courses are those that take students out of the classroom, either into the work place, into the community, or as part of an educational travel experience" (4). The implication of this is that students who are engaged in capstone often do not have the opportunity to "practice the ideas and/ skills they have learned out in the workplace or community" (140-141). Finally, in regard to the evaluation of capstone experiences, Henscheid found, "Most senior seminars and capstone courses are not part of a comprehensive assessment process. When they are evaluated, it is by the students and faculty members who participate in these courses" (4). This leaves open the question of student learning outcomes resulting from participation in capstone experiences.

Outcomes of Capstone Courses and Projects

Very few studies regarding the outcomes of participation in capstone courses were identified, and those that were typically involved a single major or capstone course. Stephen, Parente and Brown (2002), in a study of 502 students in business strategy capstone courses, studied the effects of large-scale simulation with teams of students functioning as "corporations" that developed functional and integrative projects. The authors report the effectiveness of the approach in integrating students' functional knowledge and developing an integrative perspective.

Andreasen and Trede (1998), in a study of a capstone course in a college of agriculture at Iowa State University, utilized a random sample of 214 students (150 agricultural studies majors, 38 agricultural education majors, and 26 other majors). Students responded to a questionnaire

after taking a departmental class required of all graduating agricultural studies majors. In terms of demographics, 85% of respondents were male and 94.1% had a farm background, and 84.4% enrolled in the capstone course one time. Students in capstone versus those in other junior and senior level agricultural courses reported that the capstone provided more hands-on activities, student-to-student interactions, and student-directed learning. Students also ranked applying knowledge gained from other courses, preparing and presenting reports, and developing respect for different ideas as the top three perceived benefits of the capstone course in their first professional position.

In addition to actual capstone experiences themselves, research on components of these experiences – for example, theses or portfolios – is also scarce. In the case of electronic portfolios or “e-portfolios,” Reardon and Hartley (2007) assert that evidence of the impact of e-portfolios is limited and in need of further study. Much of the published data on these components involves, again, anecdotal feedback from students and faculty on their usefulness.

Finally, outcomes of capstone experiences specific to underrepresented populations were not found in the literature.

Issues in Research on Capstone Courses and Projects

Among the high-impact practices discussed in this review, data on outcomes appear to be the weakest – and are virtually non-existent – for capstone experiences. Henscheid (2000) identifies a number of areas for further research related to capstone experiences, such as examining activities outside of the classroom that “allow seniors to reflect on their learning and other experiences in college” (141) as well as places within the curriculum that capstone-like experiences – such as integration of learning from general education and the major – may take place. In addition, little is known about pedagogical considerations – such as course structure,

activities, and role of faculty – that might have a positive impact on student outcomes. Finally, a systematic examination of the benefit of capstone courses for students from underrepresented populations has yet to be conducted.

For all of these open questions, Henscheid recommends using both quantitative and qualitative research: “Because the senior year, and all college years, are more than a sum of courses, it is appropriate to use qualitative and quantitative approaches to understanding the rich tapestry of the entire senior experience” (141). Cuseo (1998) highlights the benefit of conducting outcomes assessment within the context of the capstone experience itself, “because there is a captive audience available for student assessment, thus circumventing the potential hassle and sampling bias associated with soliciting volunteers to come at their own time and expense” (34). Cuseo also emphasizes that “as part of the capstone course, a senior thesis, senior project, senior portfolio, or senior self-assessment could be required and used as a source of outcomes assessment” (35). The drawback of this approach, of course, is that comparative data for those students *not* engaged in capstone experiences would be omitted.

Integrated Approaches

In terms of the educational activities reviewed here, each leads to a range of positive outcomes for students, faculty and institutions. There is also some evidence that combining these activities may lead to even stronger outcomes.

Learning Communities and First-Year Seminars

Of the 968 institutions that participated in the 2006 survey conducted by the National Resource Center on The First-Year Experience and Students in Transition, 85% reported offering a seminar on their campus. Thirty-five percent of those link a first-year seminar to one or more other courses as a learning community. Henscheid (2004) points out that first-year seminars can serve two important purposes for an LC. First, they help students integrate learning across LC classes. Seminars intentionally help students build a broader range of academic skills than traditional stand-alone courses, and often help students integrate information across classes that they would otherwise need to do on their own, if at all. She notes that “...the intellectual integration that can occur in the first-year seminar is fundamental to the kind of learning that will transcend the time and space of individual tests, assignments, courses, and academic terms” (3). Second, since the seminar is usually the smallest course of the LC, it can easily be used to build community. These courses are more likely to include out of class trips and activities, increasing both informal peer to peer and student-faculty interaction.

Looking at the studies that compare LCs with or without a linked first-year seminar, it is clear that adding an seminar not only adds different course material, but typically brings with it a range of support services. Instructional teams made up of some combination of faculty, academic advisors, student affairs professionals, librarians, and information technology staff are common, as are peer mentors.

The research done comparing stand-alone first-year seminars and those linked to a LC support the contention that these connections lead to better outcomes for students. For example, Swing (2004) summarizes findings from the 2002 First-Year Initiative Benchmarking Survey conducted by the Policy Center on the First Year of College. Fourteen campuses that completed the survey offered both stand alone and linked seminars, allowing for a natural comparison group. Students in linked seminars were found to have significantly greater gains than those in stand alone seminars on all ten of the learning outcomes studied. The most significant gains were in peer-to-peer connections, out-of-class engagement, knowledge of wellness issues, study skills, and time/priority management. Significant results were also found for knowledge of campus policies and academic services, critical thinking and cognitive/academic skills, and connections with faculty. Further, these students reported more experience with engaging pedagogies in the classroom, and were more satisfied with college than their peers in stand-alone seminars.

Single institution studies also found positive results. Among those is Tinto and Goodsell's (1993) examination of students who were enrolled in two learning communities at a large four year university. The LCs consisted of two large lecture classes and a writing course. The LCs varied in that one LC included a writing seminar that integrated information from the other linked courses and the other included a composition class that did not integrate that information. The LC students were compared to students who were enrolled in non-LC versions of the same classes. The authors found that while both LC groups had more positive outcomes than non-LC students, those with the integrative writing seminar were more actively involved in their classes, had more interaction with their faculty, were more involved on campus, and were more positive about their college experiences than either of the other two groups.

Hensheid's (2004) monograph *Integrating the First-Year Experience: The Role of First-Year Seminars in Learning Communities* profiles 14 two-year and four-year institutions that are intentionally connecting first-year seminars and LCs. While the type of seminars vary school to school and the quality of the program assessment varies, these institutions report positive results for participants including increased retention and GPAs, feelings of a positive campus climate and satisfaction with the college environment, a sense of connection to peers and faculty, students' ability to work as a member of a team, the ability to integrate and apply learning, increased participation in service-learning activities, intellectual growth, and increased use of resources. However, despite these positive outcomes, few studies included a comparison group not enrolled in these communities, limiting our information about the unique impact of these initiatives. Even on campuses that had both stand alone and linked first-year seminars, comparisons were generally made to students who were in neither group rather than comparing all three groups to each other. Only one of the fourteen profiles mentions outcomes for specific populations. That school found that: "students of color in the cluster program were retained at a significantly higher rate than non-participating students of color" (Yale, Brinjiak, and Longwell, 2004, 105), with differences of 7% to 24% across three year's cohorts.

The earlier LC chapter noted that nearly half of the single institution studies profiled included some type of first-year seminar experience in at least some of the LCs on their campuses. While it is difficult to determine how much value is added above the LC alone, it is clear that these partnerships lead to many positive outcomes for students.

First-year Seminars, Learning Communities, and Service Learning

The 2006 survey conducted by the National Resource Center on The First-Year Experience and Students in Transition asked institutions if their first-year seminars included a

service-learning component. Forty percent of the institutions that offer a seminar reported including a service-learning component. Some of the campuses profiled by Henscheid (2004) combine LCs, first-year seminars, and service-learning together. While few studies sought to determine the impact of adding a service-learning component to these activities, it is clear that service learning has the potential be used as an effective integrating tool, helping students see how the academic content of the LC courses relates to a real-life context, bringing the LC's theme to life. Service learning can also serve as a culminating experience for the LC, helping students apply their learning from throughout the LC experience. Eaton, MacGregor, and Schoem (2003) outline the ways that these initiatives can enhance each other. LCs can provide sustained time and space both to conduct the service-learning work and to reflect on that work, and can provide "multiple lenses to examine issues" raised in service-learning (4). The researchers note: "Thinking about problems from multiple perspectives can help students develop a more complex understanding" (5). At the same time, service-learning brings experiential learning to the LC experience, it focuses students on real life, unscripted problems and issues, and it broadens students' thinking about what it means to be a part of a community, expanding that concept beyond the campus. These activities together can help prepare students for life in a diverse democracy.

In the campus profiles studied in MacGregor's (2003) monograph about service-learning initiatives that are linked to LCs and first-year seminars, institutions did some assessment of the outcomes related to these linked activities. In students' writing, faculty could see that students made connections "between their lives and the literature, research, and needs of the community" (Hesse and Mason, 2003, 13). They also "develop[ed] as writers, community members, critical thinkers, and social activists" (13).

Another program that was profiled focused on the theme of law and diversity and involved a diverse group of pre-professional students that was kept together as a cohort for two years. These students took a full term's worth of classes together each semester along with participating in hands-on work in the community exploring "justice-seeking for those often not well-represented in the legal system" (Eaton, 2003, 61). These students were followed as graduates when they continued on into law school. The faculty and administration in the law schools observed that these particular graduates "contributed productively to discussions of diversity in the law, and assumed leadership positions in their schools" (63). They were found to be more open-minded than their peers, and could build coalitions across racial groups. They were also committed to pursuing careers in law that would work for social justice. The authors point out that these students came into the experience with interest in this area so they may have led a life of service with or without the LC experience, but over time the students continued to talk about the skills that they gained through the LC that enhanced their work in and commitment to the larger community.

Integrating High-Impact Practices

While each of the high-impact practices studied in this literature review show positive outcomes for students, combining multiple approaches may offer even greater potential for student growth and learning. By being intentional about these linkages, colleges and universities can provide more opportunities for students to apply their learning to new contexts and develop strong communities in and out of the classroom.

Discussion

The purpose of this literature review was to examine the known outcomes of five high-impact practices: learning communities, service-learning, undergraduate research, first-year experiences, and capstone projects. This examination specifically focused on three underserved populations: underrepresented minority students, students from low-income families, and first generation college students. In addition, the review sought to determine if there are any variables within each practice that have an impact on student outcomes.

General Findings

Although each practice has been identified as “high impact” in nature (AAC&U 2007), from the literature it appears that each practice is not only distinct in its formulation, but also has a unique set of impacts on student experience. This is consistent with the claim made by Gonyea, Kinzie, Kuh, and Laird (2008), that the characteristics of high-impact practices have differing effects. Across these five practices, however, the most common outcomes described for the general college student population include higher grades, higher persistence rates, intellectual gains, greater civic engagement, increased tolerance for diversity, and increased interaction with faculty and peers. While the number of studies examining the experiences of underserved populations was far more limited, the types of outcomes described for these students tended to include higher grades, higher persistence rates, and higher rates of graduate school enrollment.

As would be expected, however, the varying effects on student experience are best viewed by each individual practice. Table 2 describes these known outcomes for both the general population and for underserved students, and also includes two other areas explored in this review: moderating variables (those factors unique to each practice which impact outcomes); and

research issues (complicating factors which impact the interpretation of findings, or persistent concerns that limit current research and the ability to draw conclusions about student outcomes).

Table 2. High Impact Practices: Outcomes, Variables, and Research Issues

HIGH IMPACT PRACTICE	General Outcomes	Outcomes for Underserved Students	Moderating Variables	Research Issues
Learning Communities	<ul style="list-style-type: none"> • Higher grades • Higher persistence rates • Ease college transition • Higher levels of academic engagement • Greater interaction with faculty and peers • Perception of campus as more supportive • Self-report of critical thinking gains • Gains for intellectual development • Higher levels of integrative thinking • Gains in writing and reading • Greater appreciation for diversity/different viewpoints • Higher rate of civic engagement 	<ul style="list-style-type: none"> • Higher grades • Higher persistence rates • Ease college transition • Greater interaction with faculty and peers • Helps build identity as learner/recognize academic potential • Sense of belonging • Gains for intellectual development 	<ul style="list-style-type: none"> • Variability of LC formulation/type (residential, non-residential, linked courses, etc.) • Degree of student and faculty interaction • Classroom environment (positive, negative, mixed) 	<ul style="list-style-type: none"> • Predominance of single-institution studies • Variability of LC formulation/type • Lack of comparison group data across LC type • Short-term nature of most research • Reliance on self-report data • Examination of outcomes for specific populations rare
Service-Learning	<ul style="list-style-type: none"> • Higher grades • Higher persistence rates • Academic gains (including applying course learning) • Higher levels of academic engagement • Increases in critical thinking and writing skills • Greater interaction with faculty • Greater levels of civic behavior, social responsibility, social justice, and sense of self-efficacy • Gains in moral reasoning • Greater tolerance and reduced stereotyping • Greater commitment to service-oriented career 	<ul style="list-style-type: none"> • Increased retention rates • Better academic performance (grades) • Positive changes in civic attitudes • Negative experiences/isolation due to orientation of service experience 	<ul style="list-style-type: none"> • Characteristics of service experience (type, hours, contact, supervision) • Characteristics of learning experience (reflection, faculty connection of material with service experience) 	<ul style="list-style-type: none"> • Self-selection bias • Short-term nature of most research • Lack of involvement in service-learning experiences by underserved students • Lack of research on experiences of underserved students

HIGH IMPACT PRACTICE	General Outcomes	Outcomes for Underserved Students	Moderating Variables	Research Issues
Undergraduate Research	<ul style="list-style-type: none"> • Higher rate of persistence • Higher rate of graduate school enrollment • Improvement in research skills • Increased interaction with faculty and peers • Gains in problem-solving and critical thinking • Greater satisfaction with educational experience 	<ul style="list-style-type: none"> • Higher rate of persistence • Higher rate of graduate school enrollment • Findings mostly limited to studies of UROP/SROP students 	<ul style="list-style-type: none"> • Role of faculty mentor • Quality of mentoring relationship 	<ul style="list-style-type: none"> • Lack of empirical studies (vs. program descriptions) • Selection bias (promising students often selected for UR opportunities) • Impact of mediating variables unknown • Lack of research on outcomes beyond retention and graduate school enrollment
First-Year Seminars	<ul style="list-style-type: none"> • Higher rate of persistence • Higher graduation rate • Short-term positive effect on grade point average • Gains in commitment to social justice/multicultural awareness • Greater academic and campus engagement • Greater faculty and peer interaction 	<ul style="list-style-type: none"> • Some evidence for short-term increase in grades and persistence rates 	<ul style="list-style-type: none"> • FYS type • Course content • Contact hours 	<ul style="list-style-type: none"> • Predominance of single-institution studies • Variability of FYS formulation/type • Lack of comparison group data • Short-term nature of most research • Outcomes limited to persistence and grades • Examination of outcomes for specific populations rare
Capstone Courses & Projects	<ul style="list-style-type: none"> • Limited evidence for applying and integrating knowledge 	<ul style="list-style-type: none"> • Not found 	<ul style="list-style-type: none"> • Not found 	<ul style="list-style-type: none"> • Lack of empirical studies on outcomes (for any population) • Impact of mediating variables unknown

Moderating Variables

It is important to note that, with each of the five high-impact practices described in this review, there is tremendous variability in the practice's formulation and implementation across higher education. Even within a single campus, the same degree of variability may exist across programs or courses (e.g., a service-learning or capstone course in one major may be formulated very differently from that in another major). While heterogeneity is part of higher education's fabric and contributes to its diversity and strength, it also creates difficulty when attempting to assess the benefits of a particular educational practice.

The focus, then, should become understanding what and why elements of certain practices have greater benefits for students. In this review, the following types of elements were identified as potentially having an impact on student outcomes: classroom environment and activities; degree and quality of faculty and student interaction; and number of hours (or "time on task"). More research is needed, however, to better understand how these factors impact student outcomes, particularly for underserved students. In addition, as described in the previous section of this review, it is important to consider the potential benefits of integrating two or more of these practices into a single effort.

Research Issues and Recommendations

While most of the high-impact practices described in this review are increasingly found on college campuses, it is only within the last ten to twenty years that they have attained this popularity and, as such, have become the subject of systematic evaluation. For this reason, it is not surprising that there are substantial limitations to current research on these practices. These limitations are significant in that the evidence for the outcomes described in this review is

moderate at best, and very often is weak. While the specific issues for each practice are detailed in Table 2, the following seven concerns were noted across these practices:

1. There is a dearth of research on the experiences of underserved students, whether due to a failure of current research to examine these experiences, or a lack of involvement in these practices by underserved students.
2. Outcomes at the focus of much of the research – particularly related to underserved populations – are limited to grades and persistence, thereby leaving questions about student learning largely unanswered.
3. The majority of studies are descriptive in nature, and often focus on a single institution or program.
4. Selection bias (e.g., self-selection, or selection by admission) is a persistent issue, which raises questions about the validity of findings.
5. Similarly, much of the research fails to use adequate comparison groups, particularly for underserved populations.
6. Most studies are short-term in nature, and thus do not gauge the longitudinal impact of these practices on students.
7. Much of the research on these practices involves self-report measures as opposed to direct measures of outcomes.

Many of these challenges are not unique to this particular line of inquiry, and often are common in educational research regardless of the specific focus. However, it is important that future research attempt to address these seven issues in systematic ways.

To this end, the following corresponding recommendations are made for future research on the outcomes of these practices:

1. Intentionally design studies to examine the experiences of underserved students. In some cases, this may involve creating study conditions (e.g., implementing a course or program) that involve students from these populations.
2. Expand the focus of such research beyond grades and persistence to issues of student learning (which may also provide information on moderating variables – e.g., faculty roles and actions, course activities, etc.).
3. Design multi-course, multi-program, and/or multi-institutional studies that examine the use of a practice beyond a single setting. This will require more complex research designs and will likely involve both quantitative and qualitative methods to both capture outcomes data and gauge environmental conditions.
4. Strive to eliminate selection bias in future research, possibly through the expansion of existing practices to larger samples (e.g., rather than offering a single service-learning course into which students can select themselves, consider piloting service-learning requirement for all students within a given community or major).
5. Utilize comparison groups in future research, with careful attention to their adequacy (e.g., eliminate the usage of comparison groups comprised of students not accepted into a program or course) as well as inclusion of underserved populations.
6. Conduct research on a longitudinal basis by expanding data collection beyond the immediate impact of a course or program.
7. Utilize or design measures that provide direct quantitative and qualitative assessment of student learning, rather than relying solely on self-report data from students and/or faculty.

Although it is unlikely that a single study will be able to incorporate all of these recommendations, the field should encourage the development of research designs which acknowledge and attempt to address as many areas as possible. This can be accomplished through funding of these types of initiatives, as well as structured opportunities for networking among researchers (whether through conferences, online communities, etc.). The development of a “clearinghouse” for research may also be helpful in advancing this line of inquiry.

Conclusion

There is evidence in the literature that the five high-impact practices described in this review – learning communities, service-learning, undergraduate research, first-year seminars, and capstone courses and projects – can lead to a range of positive outcomes for students. This is also the case for underserved students, namely underrepresented minority students, low-income students, and first-generation college students. The strength of evidence for these outcomes, however, is weakened by the limitations of existing research. In addition, little is known regarding moderating variables for each of these practices and their impact on student outcomes. Future research efforts, by seeking to mitigate these limitations, can provide insight into the potential benefits of high-impact practices for the educational experiences of underserved students.

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