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Abstract

Alumni self-ratings of their personal growth were linked to their intellectual development during college four to seven years earlier. Graduates that were satisfied with their personal growth in the arts, creative thinking, making logical inferences, learning independently, exercising initiative, and tolerating other points of view had higher intellectual scores in Commitment and Empathy as undergraduates years earlier. These findings support a relationship between college student intellectual development and alumni perceptions of their personal growth. The implications of this study support continuing the custom of querying graduates about their earlier education, a practice in wide use already; and add to the validity of the Scale of Intellectual Development as a measure of college impact upon personal dispositions.

Intellectual College Development Related to Alumni Perceptions of Personal Growth

The role of intellectual development is considered a central component of undergraduate education and receives much attention regarding its nature and importance (Evans, Forney, Guido, Patton, & Renn, 2010; Pascarella & Terenzini, 2005). Many institutions track some elements of intellectual and cognitive development during college, but what effects remain after college is also of fundamental interest. Separate arenas of research activity exist with current students and with alumni, but no longitudinal studies link collegiate intellectual development to personal growth as perceived by alumni. Studying possible connections of collegiate student development with personal growth has implications for programming at the undergraduate level as well as our understanding of the lasting impact of development after college graduation.

Intellectual Development

Intellectual development occupies a key foundation in college impact studies (Collins, 2006; Dawson, 2004; Pascarella, 1985; Torres, 2003; Wang & Rodgers, 2006), and both academic and student affairs programs claim to nurture student's progress in intellectual and cognitive development. A variety of conceptual approaches to cognitive development exist in the literature such as critical thinking, postformal reasoning, and dispositional critical thinking (Evans et al., 2010; Pascarella & Terenzini, 2005). Although critical thinking development is most often defined with cognitive skills such as "identify central issues and assumptions in an argument" (Jones et al., 1995, p. 133), the disposition to think critically has also been noted as part of intellectual development. Some examples of dispositional critical thinking include, "tolerance for new ideas" and "willingness to see complexity in problems" (Facione, Sanchez, Facione, & Gainen, 1995; Taube, 1997).

Recently, the importance of intellectual development has come forth in the Lumina Foundation's project called the Degree Qualifications Profile, which "defines

expected learning outcomes that graduates need for work, citizenship, global participation and life” (Adelman, Ewell, Gaston, & Schneider, 2011, p. 1). Partly motivated by Europe’s Bologna Process (2012), this Profile has outlined “broad, integrative knowledge” and “applied learning” skill sets in general education. One illustrative example of intellectual development states, “articulates and defends the significance and implications of his or her specialized work in terms of challenges, trends and developments in a social or global context” (p. 18). This expectation of intended learning outcomes has a developmental aspect that includes the importance of considering impact on other people and society in general.

Some of our external constituents such as the business community propose affective components are as important in employment and citizenship settings as the cognitive components (Jones et al., 1995). This inclination to be open to evidence, to welcome new ideas, and to embrace complexity is as necessary or at least an equal partner to the pure cognitive component of reasoning skills (Facione et al., 1995). In some aspects of intellectual development, the cognitive and affective perspectives are inseparable. For example, tolerance has both cognitive and affective components: a rigidity of thinking and feeling (Erwin, 2000). It may be an artificial separation, but researchers (Facione et al., 1995) have separated the dispositional perspective, and more positive dispositions are expected due to the undergraduate experiences. Pascarella and Terenzini (2005) report the need for further research in intellectual development in studying college impact, particularly using longitudinal designs. To address this need, in part, this study focuses on the dispositional aspects of intellectual development.

Alumni Perceptions

Many institutions track some elements of intellectual and cognitive development during college, but what effects remain after college is also of fundamental interest.

Colleges and universities have surveyed their alumni since the 1930’s (Pace, 1979), and the practice has grown in scope and consequence ever since. Information from alumni surveys is used to inform fundraising, college marketing, employment preparation, return on public investment, and institutional accountability such as accreditation, program review, and performance funding (Allen, Ramaekers, & van der Velden, 2005; Borden, 2005; Ewell, 2005; Volkwein, 2010). Over a dozen states conduct common comprehensive alumni surveys (Ewell, 2005), and several countries have incorporated the practice as well (Weerts & Vidal, 2005).

In spite of the ubiquitous nature of alumni surveys, questions are still posed about the credibility of self-report data (Bowman & Seifert, 2011; Pike, 2011). Nevertheless, as the foci of surveys have expanded from employment history to college outcomes, it is wise to keep in mind some possible limitations of survey methodologies as well as continue research into their validity. Some of the issues raised about survey methodology include the potential limits of generalizability due to low response rates, the possibility of other life events being confused with college impact, and the role of “indirect” measures versus “direct” measures of student development. In spite of these concerns, alumni perceptual data maintains a prominent place in institutional assessment portfolios.

Given the place of alumni information in institutions, it follows that information obtained during the undergraduate years be studied for its value in optimizing alumni perceptions. Before embarking on research studies with alumni, Volkwein (2010) recommends that researchers adopt an intended perspective. This study utilized the perspective of a developmental outcome model. That is, an intellectual developmental model based on dispositions was considered as the underlying expectation or educational objective for undergraduate impact. Stated another way, higher intellectual development should occur because of college. Generally, this study determines if average differences in college intellectual development occur between alumni satisfied or dissatisfied in nine areas of personal growth. These areas of personal growth are: the arts, creative thinking, making logical inferences based on assumptions, independent learning, setting personal goals, self-reliance, exercising initiative, persistence, and tolerating other points of view. It was hypothesized that satisfied alumni in their personal growth had higher intellectual development during college.

Method

Data Source and Participants

Samples of late sophomores (45-70 semester hours completed) enrolled during 1995-2000 at a moderately selective mid-sized institution in the mid-Atlantic area were selected as participants for this study. Students were chosen if the last digit of their identification number ended in seven. This sample was considered as quasi-random because no selection bias was associated with the last digit. Students in this sample were given a developmental test in a proctored setting. Although no comparison was made with other student groups (i.e. students whose identification did not end in seven) who completed other assessment instruments, no motivation bias was believed to be present with administration of this particular instrument to students with an id digit of seven.

Additional datasets were also obtained from institutional alumni surveys administered between 2002 and 2008. As part of the institution's ongoing assessment process, alumni surveys are administered every year to alumni who had graduated from a given group of major programs. Major programs participate in alumni surveys every six years, and graduates from all major programs at the institution are surveyed within five years. Institutionally, all graduates are contacted within one to five years after program completion. Approximately 40-50% of the graduates contacted responded to the survey, resulting in a sample matched with the Scale of Intellectual Development of complete data for this study of n=624 (See Table 1).

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Table 1

Frequencies in Longitudinal Design of Late Sophomores Completing the Scale of Intellectual Development by Year of Alumni Survey Administration

Alumni Survey	Scale of Intellectual Development						Subtotals
	1995	1996	1997	1998	1999	2000	
2002	47	0	0	0	0	0	47
2003	63	81	4	0	0	0	148
2004	38	86	22	0	0	0	146
2005	29	28	22	18	36	0	133
2006	0	0	1	0	6	5	12
2007	0	0	21	12	26	22	81
2008	0	0	0	3	26	28	57
Totals	177	195	70	33	94	55	624

Instruments

The Scale of Intellectual Development (SID) (Erwin, 1983) was administered to a sample of sophomores who had completed 45-70 semester hours. Originally based on Perry's (1968) scheme of intellectual development, the SID has four subscales: Dualism, Relativism, Commitment, and Empathy. For the Dualism subscale, individuals scoring high on this factor tend to see issues in clear-cut, categorical terms, and look to authorities for the answers. For the Relativism subscale, individuals scoring high on this factor recognize alternative perspectives exist and can handle diversity within themselves and in relation to other people; but they still believe outside forces determine their future. For the Commitment subscale, individuals scoring high on this factor have begun to make major decisions in their lives and accept the responsibilities and consequences of these decisions. There is a tolerance of other viewpoints; however, these persons know where they stand in relation to other people. For the Empathy subscale, individuals scoring high on this factor not only have made major life decisions but also are aware of their impact on other people. High scorers have developed sensitivity about other people and feel responsible for improving society in general. Validity evidence for the SID as a measure of intellectual development may be found in Buczynski (1994), DeMars and Erwin (2003), Erwin (1993), and Erwin (2000).

Only Commitment and Empathy SID sub-scales were used in this study because these developmental dimensions are at the higher end of intellectual development and expected of college graduates. In addition, Commitment and Empathy were hypothesized to be related to the areas of personal growth collected from graduates. For the current sample, the sub-scales of Commitment and Empathy had Cronbach's alpha internal consistency coefficients of .80 and .86, respectively.

On the alumni survey, graduates were asked to indicate their employment and continuing education history; overall satisfaction with the institution, major program, and various student services; satisfaction with several academic areas such as writing, mathematics, speaking, and technology; and satisfaction with the institution's contribution to their personal growth in nine areas: the arts, creative thinking, making logical inferences based on assumptions, independent learning, selection of personal goals, self-reliance, exercising initiative, persistence, and tolerating other points of view. Alumni responded on a 4-point Likert scale ranging from *very dissatisfied* to *very satisfied* for each growth area. Responses were categorized in this study into either *satisfied* or *dissatisfied* for easier interpretability.

Procedure

The longitudinal sample in this study consisted of students who had completed the SID and later an alumni survey. The time between late sophomore developmental scores and post-graduate perceptions ranged from four to six years. The reason for this span was due to years spent until graduation and the target years the alumni survey was administered. Table 1 lists the frequencies related to year of cognitive development testing with year of completing alumni survey.

Multivariate analysis of variance (MANOVA) statistics were calculated using each of the nine alumni personal growth areas as independent variables and two subscales from the SID scale, Commitment and Empathy, as the dependent variables. MANOVA was used to study average differences in intellectual development assessed during college for satisfied or dissatisfied alumni in several areas of personal growth. The Commitment and Empathy subscales correlated 0.65; therefore, Roy's Maximum Root Criterion was chosen as the MANOVA statistic because it is most powerful when the dependent variables are concentrated in a single variate (Hair, Black, Babin, & Anderson, 2010). Cohen's *d* (Hartung, Knapp, & Sinha, 2008) was the effect size calculated in this study; *d* essentially reports the magnitude between groups in standard deviation units. Typically effect sizes of .2 or lower are considered small, .5 moderate, and .8 large differences. Cohen has noted that effect sizes in personal and social areas are likely to be smaller than in achievement tests.

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Results

Table 2 reports the sophomore Commitment and Empathy means, Cohen's *d* statistics, and F statistics between the satisfied and dissatisfied alumni. MANOVA statistics are reported for each independent variable below.

Table 2
Means, Cohen's *d*, and Follow-Up ANOVA Statistics

SID Subscale	<i>F</i>	Satisfied (<i>n</i>)	Dissatisfied (<i>n</i>)	Cohen's <i>d</i>	<i>F</i>	Satisfied (<i>n</i>)	Dissatisfied (<i>n</i>)	Cohen's <i>d</i>
Appreciation of Arts	7.47**	62.6 (482)	54.80 (74)	0.33	17.57***	57.25 (482)	49.81 (74)	0.51
Creative Thinking	5.61**	62.43 (481)	55.58 (75)	0.29	7.13**	56.50 (481)	52.13 (75)	0.33
Logical Inferences	5.61**	62.39 (492)	55.00 (63)	0.31	9.78***	56.89 (492)	50.95 (63)	0.42
Learning Independently	8.17**	62.62 (486)	54.01 (68)	0.37	9.26**	56.92 (486)	51.33 (68)	0.39
Personal Goals	3.02	62.11 (506)	56.04 (49)	0.26	5.42*	56.72 (506)	51.77 (40)	0.35
Initiative	5.54**	62.28 (507)	54.00 (48)	0.30	11.06**	56.85 (507)	49.75 (48)	0.50
Other Points of View	7.28**	62.58 (446)	55.81 (105)	0.29	9.09***	56.91 (446)	52.30 (105)	0.33

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

In general, graduates “satisfied” with their education in the arts, creative thinking, logical inferences, learning independently, exercising initiative, and tolerating other points of view had higher Commitment and Empathy scores as sophomores than “dissatisfied” graduates in these areas of personal growth. Graduates satisfied with their ability to set personal goals had higher average Empathy scores than dissatisfied graduates. No differences were found in either sophomore Commitment or Empathy scores for the personal growth areas of self-reliance or persistence.

Also reported in Table 2 are Cohen’s *d* statistics across the various personal growth areas. These were small, ranging from a low of 0.29 for Commitment in creative thinking to a high of 0.51 for Empathy in the arts.

Appreciation of Arts

The MANOVA overall statistic of Roy’s Maximum Root Criterion was 0.03, $F(2, 555)=9.22, p=.0001$ for the alumni survey question about developing appreciation in the arts. Analysis of variance follow-up results for Commitment was $F(1, 556)=7.47, p=.006$; and for Empathy was $F(1, 556)=17.57, p=.0001$. “Satisfied” Arts Commitment mean of 62.78 ($n = 484$) was greater than the “dissatisfied” Commitment mean of 54.81 ($n=74$). The “satisfied” Arts Empathy mean of 57.25 ($n = 484$) was greater than the “dissatisfied” Empathy mean of 49.81 ($n = 74$).

Creative Thinking

Roy’s Maximum Root Criterion was 0.01, $F(2, 555) = 3.79, p = .02$ for the alumni question pertaining to creative thinking. Analysis of variance follow-up results for Commitment was $F(1, 556) = 5.85, p = .01$; and Empathy was $F(1, 556) = 7.42, p = .006$. Graduates “satisfied” with creative thinking had a Commitment mean 62.61 ($n = 483$), which was greater than “dissatisfied” Commitment mean of 55.58. Graduates “satisfied” with their creative thinking had a higher Empathy average of 56.96 ($n = 483$) than the “dissatisfied” average of 52.13 ($n = 75$).

Logical Inference

Roy’s Maximum Root Criterion was 0.01, $F(2, 554) = 5.03, p = .006$ for the alumni survey question about making logical inferences. ANOVA follow-up for Commitment was $F(1, 555) = 5.83, p = .01$; and Empathy was $F(1, 555) = 10.06, p = .001$. Graduates “satisfied” with their education in developing logical inference had Commitment means of 62.56 ($n = 494$), which was greater than “dissatisfied” alumni having a mean of 55.00 ($n = 63$).

Learning Independently

Roy’s Maximum Root Criterion was 0.01, $F(2, 553) = 5.04, p = .006$ for the alumni survey question about Learning Independently. ANOVA follow-up for Commitment was $F(1, 554) = 8.43, p = .003$; and Empathy was $F(1, 554) = 9.56, p = .002$. Commitment mean for graduates “satisfied” with their education about Learning Independently was 62.79 ($n = 488$), which was greater than the mean of “dissatisfied” alumni of 54.01 ($n = 68$). Empathy mean for “satisfied” alumni was 57.0 ($n = 488$), which was higher than the “dissatisfied” mean of 51.33 ($n = 68$).

Personal Goals

Roy’s Maximum Root Criterion was 0.01, $F(2, 554) = 4.96, p = .05$. ANOVA follow-up for Commitment was $F(1, 555) = 3.16, p = .07$; and Empathy was $F(1, 555) = 5.61, p = 0.01$. No statistical difference was found on Commitment between graduates “satisfied” with their education about their Personal Goal development and “dissatisfied” alumni. The Empathy mean for “satisfied” alumni was 56.80 ($n = 508$), which was higher than the “dissatisfied” mean of 51.78 ($n = 49$).

Self-Reliance

Roy's Maximum Root Criterion was 0.009, $F(2, 555) = 2.55$, $p = .07$ for the alumni question pertaining to Developing Self-Reliance. No follow-up ANOVA were reviewed because this overall MANOVA p value of .07 was greater than the preset alpha level of .01. Therefore, no differences were found on Commitment or Empathy between alumni "satisfied" versus "dissatisfied" with their prior collegiate experience in Developing Self-reliance.

Initiative

Roy's Maximum Root Criterion was 0.02, $F(2, 554) = 5.74$, $p = .003$. ANOVA follow-up for Commitment was $F(1, 555) = 5.72$, $p = .01$; and Empathy was $F(1, 555) = 11.29$, $p = .0008$. Commitment mean for graduates "satisfied" with their education developing their capacity for Exercising Initiative was 62.45 ($n = 509$), which was greater than the mean of "dissatisfied" alumni of 54.00 ($n = 48$). Empathy mean for "satisfied" alumni was 56.96 ($n = 509$), which was higher than the "dissatisfied" mean of 49.75 ($n = 48$).

Persistence

Roy's Maximum Root Criterion was 0.004, $F(2, 555) = 1.25$, $p = .28$. This p value of .28 was greater than the preset alpha of .01, and no follow-up ANOVA were reviewed. No differences were found between alumni "satisfied" versus "dissatisfied" in their prior collegiate experience of Developing Persistence on either Commitment or Empathy.

Tolerating Other Points of View

Roy's Maximum Root Criterion was 0.01, $F(2, 550) = 4.89$, $p = .007$. ANOVA follow-up for Commitment was $F(1, 551) = 7.62$, $p = .006$; and Empathy was $F(1, 551) = 9.50$, $p = .002$. Commitment mean for graduates "satisfied" with their education for Tolerating Other Points of View was 62.76 ($n = 448$), which was greater than the mean of "dissatisfied" alumni of 55.82 ($n = 105$). Empathy mean for "satisfied" alumni was 57.05 ($n = 448$), which was higher than the "dissatisfied" mean of 52.03 ($n = 448$).

Discussion

Graduates who responded to an alumni survey about their satisfaction with several areas of personal growth were linked with their sophomore intellectual development scores, as measured by the SID, four to six years prior. Unlike most previous studies that focus either on current students or alumni, this study examines student development over time. "Satisfied" graduates in their abilities with the arts, creative thinking, logical inferences, learning independently, exercising of initiative, and tolerating other points of view had higher Commitment and Empathy scores on the average than "dissatisfied" graduates in these areas of personal growth. Graduates satisfied with their education in personal goals had higher Empathy average scores than dissatisfied graduates. No differences in intellectual development were found between "satisfied" and "dissatisfied" graduates in self-reliance or developing persistence. Personal goals had mixed results; no differences were found for Commitment, but satisfied graduates had higher Empathy scores. While it is not known why differences in intellectual development were not found in these areas, greater intellectual development in college may not be expected to be related to all these areas of personal growth. Self-reliance and persistence may be related to other areas of college student development but not intellectual development.

These results are limited to graduates who responded to the institutional alumni survey and who had completed the SID, which was administered to quasi-random samples of late sophomores four to six years earlier. Approximately half of the graduates who had taken the intellectual development test responded to the alumni survey. It is not known if the non-responding group of alumni would change these results had they responded. "Satisfaction" was defined and reported by the graduates themselves that might vary by self-referencing differences on the personal growth dimensions, and by a greater proportion

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of graduates who might acquiesce or be “satisfied” with institution. Despite the average differences found and reported in several personal growth areas, the effect sizes using Cohen’s d were moderate. Some of the differences may be due to larger sample sizes, and future studies should continue to monitor effect size. On the other hand, the effect sizes in this study are similar to freshmen to senior differences reported in the low .30’s for the major proprietary general education tests of Collegiate Learning Assessment, the Collegiate Assessment of Academic Proficiency, and the Proficiency Profile (Klein et al., 2009).

Despite these possible limitations, this study offers the strength of a longitudinal study and the collection of a “direct” measure of intellectual development. Although this study did not seek to identify what variables were associated with higher or lower intellectual development scores during college, prior research (e.g. Pascarella & Terenzini, 2005) has shown that offering academic and student services varying in perspective and opinions helps students reach commitments. In addition, students’ empathy can be enhanced by having them consider the effects of their and others’ decisions on society and humankind in general. Both Commitment and Empathy are currently supported in concept in the Degree Qualifications Profile. Whatever the reasons for students being higher in Commitment and Empathy as undergraduates, graduates satisfied with several personal growth dimensions are associated with higher commitment and empathy scores from their earlier college years.

This study also supports the importance of intellectual development on graduates’ perception about their own collegiate experience. The concept of general education and generic intellectual development skills is challenged by voices wishing to shorten the length of the undergraduate period either by eliminating general education entirely or to focus just on the major or professional education. This study also supports the value of graduates’ self-ratings of several areas of personal growth; satisfied graduates also had higher intellectual development scores in their college years. Often alumni perceptions are questioned as to their value: are they isolated or are they important as revelations to earlier collegiate development? Causal links are not made here, but relationships between alumni growth with earlier intellectual development was encouraging. This relationship supports college impact and value of alumni perceptions.

Future studies may utilize other conceptualizations of intellectual development and other alumni personal growth areas. Retesting in intellectual development during the undergraduate period and also in direct testing of alumni in intellectual development may also enhance, or cast other perspectives on these findings. Other areas of student development besides intellectual development may be used such as moral or psychosocial development. Using more content-related measures of general education such as scientific reasoning or communication abilities might be examined too. The undergraduate experience is complex, and additional dimensions of general education would be useful to study.

Nevertheless, this study encourages future work in intellectual development during the collegiate experience and in continued reliance on alumni perceptions. Longitudinal studies of this type are also desirable given the current emphasis on lifelong learning. The link of association in this study supports further activities in both areas of intellectual development and in alumni information.

Studying possible connections of collegiate student development with personal growth has implications for programming at the undergraduate level as well as our understanding of the lasting impact of development after college

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