Assessment of Critical Inquiry:

A New Model for Transitional Education

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Abstract

This paper describes the methodologies employed to assess the impacts of Critical Inquiry courses at a large, urban, public university. Critical Inquiry (CI) is a set of courses designed to help enhance academic performance in discipline courses and the development of transferable learning strategies. CI courses are linked to specific content courses and are designed to facilitate student understanding and critical analysis of specific readings in the course and other essential academic skills. The authors report how qualitative and quantitative evaluation results were used to demonstrate that CI courses are effective support mechanisms for students with prior academic deficiencies.

Assessment of Critical Inquiry Courses: A New Model of Transitional Education

Introduction

Past research has shown that high school and college expectations, especially in reading, writing, and critical thinking, are very different (e.g., Chase, Gibson, and Carson, 1994; Wambach, 1998). Many institutions have offered various opportunities for academic support, including a long-standing program in remedial reading and study skills. However, recent trends have led teachers and researchers to contest the assumptions embedded in such traditional remedial programs and develop new approaches to cultivating first-year student success. They have argued for crafting paradigms that work to transition students from high school to college, rather than "fix" students before they are placed in real college courses (Boylan, 1999; Lundell and Collins, 1999).

Critical Inquiry (CI) courses have been designed to address the transitional learning needs of a wide range of students. Widespread difficulties with academic success for many first year students at our institution necessitated a broad-based and multi-faceted approach. Such an approach also mitigates against the negative effects of the stigma attached to remediation. According to Bean (1996) using actual discipline-based reading assignments and/or supplemental texts of a similar nature is a key strategy to achieving the general goals of enhancing student abilities in critical thinking, writing, information literacy, and active learning study strategies.

This paper describes the implementation and evaluation of CI courses. Many incoming students attending our institution possess characteristics that place them at a greater risk for academic failure such as not completing a rigorous high school college-preparatory curriculum, being first generation college students, attending classes part-time, living off campus, and significant off-campus work commitments.

CI is a variable (1-2) credit hour course linked to an introductory discipline-based course. These academic support courses were designed and implemented to help students develop collegiate-level reading abilities and vocabulary, understand the components and strategies for critical thinking, develop appropriate written and oral communication skills, and engage in active learning in the discipline course to which CI is linked. Thus, CI courses were essentially developed to help enhance academic performance in discipline courses with high reading content (e.g., Biology, Psychology, Anthropology, and History) and the development

of transferable learning strategies. This paper describes how qualitative and quantitative assessment results were employed to comprehensively assess the impacts of CI courses.

Assessing Critical Inquiry Courses: Using Qualitative and Quantitative Methods

Assessment scholars contend that assessment needs to be an integral part of the strategy when planning and implementing programs and academic courses (e.g., Banta 2002; Siegel, 2003; Swing, 2001). Barefoot (2000; 2001) urges assessment planners to move beyond merely measuring program impacts on student retention to investigating effects on grade point averages, student-to-student interaction, student-to-faculty interaction, learning objectives, attitudes, and behaviors. Further, Simpson (2002) recommends that a variety of qualitative and quantitative instruments should be employed to facilitate understanding regarding "why" programs and interventions produce specific outcomes.

In order to demonstrate and improve the effectiveness of CI courses qualitative and quantitative approaches have been implemented. These two approaches have been employed as complementary techniques. Quantitative analyses have been conducted to understand program-related related effects for participants in CI compared to non-participants with regard to academic performance (e.g., semester cumulative grade point averages, average discipline course grades) while controlling for background characteristics. In order to have meaningful and valid comparisons when conducting quantitative analyses of program impacts, CI participants are compared to other students enrolled in the same discipline content course section when feasible. In some cases, students in other sections of the content course are added to the comparison group to produce an appropriate sample size.

Qualitative evaluations have also been used to provide in-depth process information that faculty, staff and students need to enhance understanding regarding why certain interventions are effective. For instance, open-ended surveys, focus groups with students enrolled CI sections, and interviews with faculty have been utilized to provide increased understanding of the CI implementation strategies (processes) and outcomes.

Assessment Results

In fall 2000, CI was implemented as a pilot program in five disciplines. Preliminary evaluation results of the pilot program suggested that CI may be an effective support mechanism for students with prior academic deficiencies. CI participants outperformed the non-participants by earning higher course grades in three of the four evaluated pilot sections: Anthropology, Biology, and Psychology.

Table 1 highlights the focus and results from a qualitative study of the pilot sections of Critical Inquiry courses.

Table 1: Assessing Pilot Critical Inquiry Courses

- *Focus: Processes and outcomes in pilot sections of Critical Inquiry course in fall 2000 and spring 2001.*
- *Assessment: Open-ended survey and discussions with students in 8 sections; post-semester feedback to instructors.*
- *Process Findings: For many, progress in the linked course was facilitated by increased class time and development of study skills, although skill focus varied with subject area of linked course.*
- *Outcome Findings: 90% of students would recommend CI to a new student, and 75% would take another CI section linked to another course; some were uncertain about meaning of CI; some expressed doubts about value of CI.*
- *Program Implications: Focus models of critical inquiry, tighten linkage to academic course.*

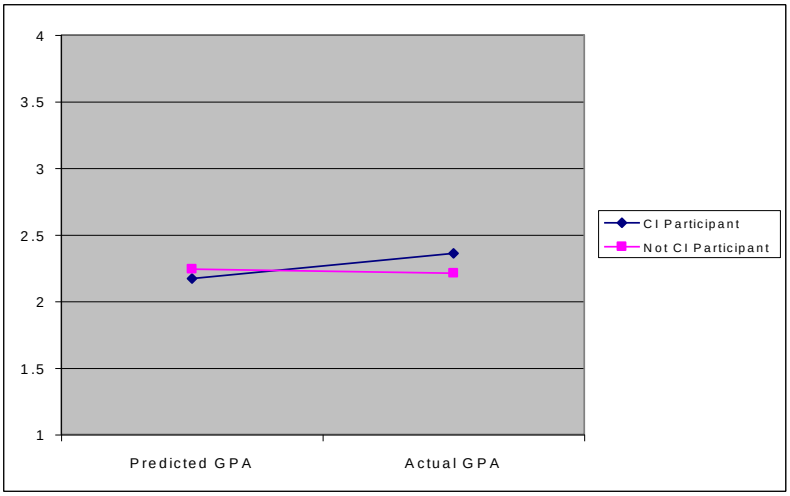
Due to the early success of CI, the program was expanded in fall 2001. Implementation in 2001 included more students as well as more courses in the following disciplines: Anthropology, Psychology, English, Biology and Women's Studies. In order to have meaningful and valid comparisons when conducting quantitative analyses of program impacts, CI participants were compared to other beginning freshmen enrolled in the same discipline content course section when feasible. In some cases, students in other sections of the content course were added to the comparison group to produce an appropriate sample size. Students who withdrew from the CI course were excluded from the analyses due to the fact that they did not receive the full treatment.

Shown in Figure 1 are the results of an examination of the overall impact of CI participation on 2001 Fall GPA (excluding CI course grade). An initial linear regression was performed to determine the student background characteristics that best predicted fall cumulative grade point averages for beginning freshmen.

The following background characteristics produced the strongest prediction model: high school percentile rank, ACT reading score, units of math completed in high school, hours planned to work, first generation status, age, gender, ethnicity, and High school Assignment Diligence. The High School Assignment Diligence construct was formed by summing 3 items from the 2001 Entering Student Survey: 1) How often students read all assigned readings for class during the last year of high school, 2) How often students completed class assignments on time, and 3) How often students were careful in completing assignments for class during the last year of high school (alpha = .69). These nine variables accounted for 11% of the variability of Fall GPA. This regression model was used to generate 'predicted' fall cumulative grade point averages for CI participants and non-participants. These predicted outcomes were subsequently compared to 'actual' fall cumulative grade point averages in order to assess the overall impact of Critical Inquiry on academic performance. Results suggest that students who participated in Critical Inquiry courses preformed significantly better than expected ($\underline{p} < .05$). On the other hand, non-participants did not perform significantly better than expected.

Figure 1: Fall 2001 Expected verses Actual Fall GPAs (excluding CI grade)

	N	Predicted GPA	Actual GPA
CI Participant	115	2.17	2.36
Not CI Participant	907	2.24	2.21



Findings based on focus groups conducted during spring 2002 suggested that the CI was achieving intended goals. A total of nine CI sections, with 87 students, were studied in spring 2002. Most students felt that CI helped them succeed in a specific linked academic course and also would help them in other college

courses. There was a difference between sections linked to Liberal Arts and Science courses in how students responded to instruction in the critical inquiry approach to college-level reading. In the Liberal Arts sections, students seemed to see learning the critical inquiry method as helpful to success in the linked course, while in the Science sections, many students saw the critical inquiry method as a distraction to learning what they needed to succeed in the linked academic course. Overall students praised class practices that helped with analysis of lectures and writing assignments, provided opportunities for discussion and active learning, and (especially in science-linked sections), vocabulary review and test preparation. Many students reported that the CI course had helped them improve on thirteen abilities targeted by the course template, especially in learning from class discussions, understanding difficult material, and preparing for class tests. Students in Liberal Arts sections as a group were more likely to report improvement overall than students in Science sections. There was little difference between the two groups, however, in the generally positive disposition towards the CI class, as indicated by the findings that 74 % of the students would recommend CI to others, and 62% would take CI again linked to another academic course.

In order to gain a more comprehensive understanding of the impacts of CI on academic performance, a series of quantitative analyses of the spring 2002 sections were also conducted. Displayed in Table 2 are the results of the spring 2002 CI evaluation. Matched control groups were created to allow more meaningful comparisons in the CI courses linked to the following discipline courses: Anthropology, Biology, and English. CI non-participants enrolled in the corresponding discipline course were matched on key background characteristics such as gender, ethnicity, and beginning spring cumulative GPAs.

Table 2. Spring 2002 Impact of Critical Inquiry Courses on Student Performance

Course	Critical Inquiry Participant	N	Average Grade in CI Course	Average Grade in Discipline Course*	Sem. GPA Exc. CI Grade	Avg Grade Beg Spring Sem.	Avg Beg. Credit hrs.	ACT Reading Score	Avg. H.S. Pctile Rank	Avg. SAT Score	% Female	% Afrn Amer	Avg Age
ANTH A104	Yes	14	2.46	3.39	2.68	2.37	16.64	78	48	930	78%	14%	19
	No[1]	26	na	3.00	2.47	2.33	38.35	78	56	944	88%	11%	21
BIOL N100	Yes	16	2.95	2.66	2.57	2.17	25.50	78	44	872	38%	19%	23
	No[1]	25	na	2.35	2.32	2.40	37.56	84	58	952	32%	8%	21
COMM C180	Yes	9	4	2.63	2.68	2.52	13.78	78	44	886	78%	33%	22
	No	21	na	3.03	2.64	2.47	41.38	83	48	868	67%	24%	23
ENG W131	Yes	28	2.40	1.75	1.58	2.03	14.04	85	51	900	46%	43%	22
	No[1]	35	na	2.44	2.03	2.08	20.09	82	51	927	57%	43%	20
HIST H106	Yes	11	2.18	2.81	2.88	2.54	15.27	85	63	959	18%	9%	19
	No	29	na	2.75	2.56	2.52	34.72	84	59	977	69%	0%	21
PSY B104	Yes	33	3.46	1.76	2.24	2.16	16.49	82	54	891	61%	27%	20
	No	83	na	2.21	2.22	2.36	26.52	84	51	964	55%	10%	22

[1]A matched control group was created in order to make meaningful comparisons

Results suggested that students participating in CI courses linked to Anthropology and Biology had higher average grades in the discipline courses and had higher overall semester grade point averages (excluding grades in the CI course) than students in the non-participant matched control groups. Students in CI courses linked to the discipline courses of Communication Studies (Comm C180), English (ENG W131), History (HIST H106), and Psychology (PSY B104) did not have higher discipline course average grades or cumulative spring 2002 grade point averages compared to students not in CI courses. It is possible that CI course participation is not effective in boosting academic performance in courses that require more memorization than critical analysis of reading material. Results from the qualitative examinations of students' perceptions and self-reported learning gains cited above helps to facilitate understanding of effective CI course content and strategies.

Shown in Table 3 are the results of a series of quantitative analyses examining the impact of CI on fall 2002 beginning freshmen academic performance. Results suggest that CI participants performed significantly better than non-participants with regard to average fall semester grade point average (excluding CI course grade) even while controlling for background characteristics.

Table 3. Fall 2002 Impact of Participation in a Critical Inquiry Course for All Beginning Freshmen:

Critical Inquiry	N	Average Fall GPA	Adjusted Fall GPA
Participants	87	2.83	2.95
Non-Participants	1621	2.59	2.57
Overall	1708	2.59	

Note 1: Adjusted controlling for differences in demographics and academic preparation (significant predictors of GPA: age, gender, HS percentile rank, SAT score, course load).

Differences in GPA among participants and non-participants are significant.

Note 2: Based on Multivariate Analysis of Covariance and Multiple Regressions.

Note 3: Students who withdrew from CI were excluded from the analyses

Displayed in Table 4 are the results of the spring 2003 CI evaluation. Matched control groups were created to allow more meaningful comparisons in the CI courses. Additionally, students participating in the "concurrent" discipline course were compared to CI participants enrolled in the same discipline course in an effort to control for possible instructor and time-of-day confounds. When possible, CI non-participants enrolled in the corresponding discipline course were matched on key background characteristics such as gender, ethnicity, beginning spring cumulative grade point averages, and enrollment status (e.g., whether or not students were freshmen). Results suggest that students participating in CI courses linked to Anthropology, Biology, Psychology (only one section) had higher average grades in the discipline courses and had higher overall semester grade point averages (excluding grades in the CI course) than non-participants. Please note that only the CI beginning freshmen in the concurrent Anthropology course had higher cumulative semester grade point averages than non-participating beginning freshmen in the concurrent section. In other words, the analyses that included all students (not exclusively beginning freshmen) in the concurrent Anthropology section did not suggest that CI participants did better in terms of overall semester performance. Students in CI courses linked to the discipline courses of Communication Studies, Psychology (second section), Religion, and Sociology had higher discipline course average grades. However, CI students enrolled in these courses did not have higher cumulative spring 2003 grade point averages compared to students not in CI courses.

Students in CI courses linked to the discipline courses of English (ENG W131 and W132), History (HIST H105 and H106), and Psychology (first section) did not have higher discipline course average grades or cumulative spring 2003 grade point averages compared to students not in CI courses.

A post-course instrument was developed to assess students' self-reported learning outcomes and perceptions of course benefits. The questionnaire was designed to assess the degree to which the following key course learning objectives were achieved:

- Use a method of Critical Inquiry to read, annotate, analyze and understand more fully complex reading material within a specific discipline.

- Examine and understand contextual information.
- Pose and explore good questions about textual and lecture material.
- Evaluate information, ideas and arguments critically, delineating facts from opinions where appropriate, weighing evidence and identifying fallacies.
- Analyze and synthesize concepts in collegiate texts, course lectures, and materials.
- Identify and define new vocabulary from textual and lecture material
- Unpack assignments, successfully identifying the tasks embedded within them.
- Prepare for examinations in an effective manner.
- Communicate effectively an understanding of course material through written and oral processes.
- Work productively in collaborative groups.
- Complete assignments on time.
- Keep comprehensive and useful course notes.

Table 4. Spring 2003 Impact of Critical Inquiry Courses on Student Performance

Course	Critical Inquiry Participant	N	Average Grade in CI Course	Average Grade in Discipline Course*	Sem. GPA Exc. CI Grade	ACT Reading Score	Avg. H.S. Pctile Rank	Avg. SAT Score	Avg Grade Beg Spring Sem.	Avg Beg. Credit hrs.	Avg Age	% Female	% Afrn Amer
ANTH A104 (all students in concurrent section)	Yes	23	2.91	2.82	2.47	84	50	928	2.72	21	20	61%	22%
	No	24	na	3.49	3.00	87	63	977	3.02	43	21	71%	13%
ANTH A104 (beg. Fr. in concurrent section)	Yes	21	2.97	2.84	2.53	84	53	891	2.92	12	19	67%	19%
	No	11	na	2.44	2.51	81	52	925	2.86	15	18	72%	18%
BIOL N100 (all students in concurrent section)	Yes	20	3.36	2.66	2.61	81	63	928	2.92	13	18	85%	5%
	No	147	n/a	2.41	2.51	85	53	956	2.62	28	22	60%	3%
BIOL N100 (beg. fr. in concurrent section)	Yes	19	3.33	2.59	2.58	81	64	928	2.92	14	18	72%	5%
	No	35	na	2.37	2.41	82	57	9	2.82	12	18	57%	3%
COMM C180 (All students in concurrent section)	Yes	13	2.92	3.26	2.53	81	53	863	2.66	11	23	46%	31%
	No	12	na	3.22	2.74	86	61	968	2.88	34	20	83%	25%
ENG W131 (matched sample)	Yes	25	2.10	2.25	1.84	85	48	965	2.19	10	20	40%	8%
	No	27	na	2.81	2.49	85	52	969	2.19	10	19	37%	7%
ENG W132 (all students in sections C018 and C019 -	Yes	9	2.70	2.19	2.06	79	58	928	2.85	14	19	78%	0%
	No	38	na	2.32	2.28	88	55	1007	2.70	25	21	68%	8%
ENG W132 (all beg fr in sections C018 and C019 -	Yes	8	2.75	2.09	1.92	79	62	935	2.90	14	18	88%	0%
	No	12	na	2.37	2.40	85	53	1032	2.81	13	20	58%	17%
ENG W132 (all students in concurrent section C121)	Yes	5	2.34	2.48	2.33	91	64	998	2.89	14	27	73%	20%
	No	19	na	2.83	2.52	84	51	952	2.46	33	22	56%	70%
HIST H105 (all students in concurrent section)	Yes	14	2.15	1.60	2.09	82	67	904	2.81	18	22	29%	14%
	No	110	na	1.78	2.23	85	52	947	2.24	24	21	46%	8%
HIST H105 (beg. fr. in concurrent section)	Yes	10	2.21	1.60	2.04	81	74	904	2.75	13	21	20%	40%
	No	16	na	1.41	2.09	83	55	955	2.36	12	19	6%	56%
HIST H106 (all students in concurrent section)	Yes	18	2.76	2.56	2.20	89	49	995	2.49	13	19	22%	6%
	No	81	na	2.65	2.56	86	56	987	2.68	33	22	59%	4%
HIST H106 (beg. fr. in concurrent section)	Yes	11	3.03	2.49	2.16	89	44	932	2.72	11	18	2%	9%
	No	19	na	2.47	2.52	88	62	1021	2.97	13	19	12%	5%
PSY B104 1 (all students in concurrent section)	Yes	22	3.27	2.20	1.90	82	54	958	2.52	12	19	27%	55%
	No	43	na	2.98	2.66	85	63	997	2.72	27	21	9%	51%
PSY B104 1 (beg. fr. matched sample in	Yes	15	3.47	1.75	1.71	81	56	934	2.47	12	18	47%	33%
	No	15	na	2.52	2.24	86	64	1012	2.57	12	18	47%	13%
PSY B104 2 (all students in concurrent section)	Yes	19	2.84	3.13	2.52	85	51	1004	2.60	12	19	37%	11%
	No	20	na	3.02	2.82	83	60	924	2.86	32	21	65%	5%
PSY B104 2 (beg. fr. in concurrent section)	Yes	16	2.79	3.02	2.45	84	51	997	2.55	12	18	31%	13%
	No	9	na	3.03	2.79	83	64	953	2.98	13	18	56%	0%
PSY B104 3 (all students in concurrent section)	Yes	18	3.42	3.19	2.62	84	62	946	2.62	9	21	33%	17%
	No	18	na	1.94	2.27	85	61	968	2.61	20	22	56%	17%
PSY B104 3 (beg. fr. in concurrent section)	Yes	10	3.33	3.14	2.22	86	61	928	2.46	13	19	40%	20%
	No	7	na	2.57	2.20	86	61	930	2.49	11	22	71%	0%
REL R133 (all students in concurrent section)	Yes	9	3.33	2.73	2.32	84	51	938	2.46	11	20	67%	33%
	No	37	na	2.33	2.38	86	58	988	2.68	38	22	73%	8%
REL (beg. fr. matched sample in concurrent section	Yes	11	3.03	2.49	2.16	89	44	932	2.72	11	18	2%	9%
	No	19	na	2.47	2.52	88	62	1021	2.97	13	19	12%	5%
SOC R100 (all students in concurrent section)	Yes	21	3.35	2.62	2.41	81	44	891	2.74	13	19	67%	14%
	No	167	na	2.60	2.61	83	56	967	2.66	28	20	69%	7%
SOC R100 (beg. fr. matched sample in concurrent	Yes	20	3.37	2.57	2.37	80	44	891	2.70	13	19	65%	15%
	No	20	na	2.15	2.52	83	50	932	2.74	13	19	75%	10%

*Note: Students who withdrew from CI were excluded from the analyses

During spring 2003 a total of 126 students responded to the questionnaires. Questionnaires were administered during the last class period and students were asked to report the degree to which the course helped them achieve various academic skills including the following: understanding difficult reading material, completing heavy reading assignments, using college texts effectively, preparing for class tests and examinations, increasing college-level vocabulary, and developing the ability to think critically about reading

materials. Students were asked to respond to series of Likert-type scale items ranging from 0=not at all to 4=a great deal (the extent to which the CI course helped them). Additionally, three opened-ended items were included: 1) "Please describe what you found most valuable about this class:," 2) "Please describe what you found least valuable about this class:," and 3) "What specific suggestions do you have for improving this class? Please describe:"

Displayed in Table 5 are the spring 2003 questionnaire results. Results suggest the CI courses are perceived as particularly helpful in the following areas: preparing for class tests and examinations, doing well in the linked course, using class discussions to help learning, small-group discussions, whole-class discussions, using college texts effectively, and thinking critically about reading material. Eighty-six percent of the respondents reported that they would recommend CI to other students and 71% would be willing to take another CI course linked to another academic course in the future.

Shown in Table 6 are the spring 2003 questionnaire results comparing Liberal Arts sections (e.g., English, History, Communications) to Science Sections (e.g., Biology and Psychology). It appears that there were notable differences in students' perceptions of course benefits and learning outcomes depending on whether the CI course was linked to a Liberal Arts course or to a Science course. Questionnaire results suggest that sections linked to Liberal Arts courses were notably more helpful in many areas compared to CI courses linked to Science courses. CI courses linked to Liberal Arts sections were perceived as particularly helpful in the following areas: preparing for class tests and examinations, using class discussions to help learning, thinking critically about reading materials, receiving guidance about doing assignments, and doing well on writing assignments (when Liberal Arts responses were ranked ordered by mean value). However, CI courses linked to Science sections were perceived as particularly helpful in the following areas: preparing for class tests and examinations, doing well in the linked course, using class discussions to help learning, small-group discussions, whole-class discussions, and using college texts effectively (when Science responses were ranked ordered by mean value). Ninety percent of the Liberal Arts respondents reported that they would recommend CI to other students, while 80% of the Science respondents would recommend CI to other students. Seventy-five percent of the Liberal Arts respondents reported that they would be willing to take another CI course linked to another

academic course in the future and 64% of the Science respondents reported that they would be willing to take another CI course linked to another academic course in the future.

Table 5: Spring 2003 Post-CI Course Questionnaire Results

Spring 2003 Critical Inquiry Questionnaire Results: Descriptive Statistics (n=126) Students were asked to report the degree to which Critical Inquiry improved their abilities in the following areas based on a likert-type scale ranging from 0=not at all to 4=a great deal

	N	Mean	Std. Deviation
Prepare for class tests and examinations	124	3.26	.94
How much did the Critical Inquiry class help you to do well in the linked course?	125	3.15	.94
Use class discussions to help my learning	124	3.15	.92
Small-group discussions	123	3.07	.96
Whole-class discussions	124	3.05	1.01
Use college texts effectively	122	3.03	.92
Think critically about what I read	124	2.98	.96
Get the most out of instructors' lectures	125	2.96	1.00
Complete assignments on time	120	2.93	1.11
Understand difficult reading material	121	2.93	1.06
Guidance about doing assignments	122	2.90	1.06
Asking questions about readings	125	2.90	1.01
Do well on writing assignments	116	2.84	1.12
Learn from other students	125	2.80	1.04
Writing assignments	118	2.78	1.14
Increase my college-level vocabulary	122	2.77	1.04
Take good notes in class	125	2.75	1.12
Writing comments about readings	123	2.70	1.06
Complete heavy reading assignments	119	2.64	1.15
How much do you expect the Critical Inquiry class to help you do well in other classes?	121	2.63	1.09
Memorization techniques	117	2.62	1.06
Manage my time for studying	121	2.60	1.05
Diagrams of course content	115	2.57	1.06

Table 6: Spring 2003 Post-CI Course Questionnaire Results: Liberal Arts Compared to Biology Sections

Spring 2003 CI Questionnaire Results (n=126). Students were asked to report the degree to which CI improved their abilities in the following areas based on a Likert-type scale ranging from 0=not at all to 4= a great deal

	CItype	N	Mean	Std. Deviation
Understand difficult reading material	Liberal Arts	75	3.24	.84
	Science	46	2.41	1.18
Complete heavy reading assignments	Liberal Arts	75	3.12	.90
	Science	44	1.82	1.06
Use college texts effectively	Liberal Arts	76	3.29	.76
	Science	46	2.61	1.00
Prepare for class tests and examinations	Liberal Arts	78	3.41	.86
	Science	46	3.00	1.01
Increase my college-level vocabulary	Liberal Arts	78	3.12	.87
	Science	44	2.16	1.06
Think critically about what I read	Liberal Arts	78	3.36	.81
	Science	46	2.35	.87
Get the most out of instructors' lectures	Liberal Arts	78	3.22	.88
	Science	47	2.53	1.04
Take good notes in class	Liberal Arts	78	3.03	1.01
	Science	47	2.30	1.16
Learn from other students	Liberal Arts	78	3.00	1.02
	Science	47	2.47	1.00
Use class discussions to help my learning	Liberal Arts	77	3.39	.78
	Science	47	2.74	.99
Manage my time for studying	Liberal Arts	75	2.92	.98
	Science	46	2.07	.95
Complete assignments on time	Liberal Arts	76	3.26	.96
	Science	44	2.36	1.14
Do well on writing assignments	Liberal Arts	77	3.32	.77
	Science	39	1.90	1.12
How much did the Critical Inquiry class help you to do well in the linked course?	Liberal Arts	78	3.31	.90
	Science	47	2.89	.96
How much do you expect the Critical Inquiry class to help you do well in other classes?	Liberal Arts	77	2.91	.95
	Science	44	2.14	1.15
Writing comments about readings	Liberal Arts	78	3.06	.96
	Science	45	2.07	.91
Asking questions about readings	Liberal Arts	78	3.17	.92
	Science	47	2.45	1.02
Memorization techniques	Liberal Arts	72	2.83	1.06
	Science	45	2.29	.97
Diagrams of course content	Liberal Arts	72	2.83	1.05
	Science	43	2.12	.93
Guidance about doing assignments	Liberal Arts	77	3.35	.81
	Science	45	2.13	1.01
Writing assignments	Liberal Arts	77	3.31	.80
	Science	41	1.78	1.01
Whole-class discussions	Liberal Arts	77	3.19	1.01
	Science	47	2.81	.97
Small-group discussions	Liberal Arts	77	3.27	.88
	Science	46	2.72	.98

Improvements Implemented based on Assessment Results

A series of CI course improvements have been implemented based directly on qualitative and quantitative assessment findings. For instance, course administrators and instructors have continued to adapt and expand CI method to different disciplines. Additionally, linkages between Science and Liberal Arts sections have been clarified. In an effort to develop more intentional learning strategies, administrators and instructors collaboratively developed a comprehensive "CI Handbook" which contains recommended instructional strategies and clearly defined learning objectives. Furthermore, CI developers have increased training and support for all CI faculty.

Conclusion

In summary, quantitative results have consistently suggested that student participation in CI does positively impact academic performance and qualitative studies have shown students seem to have positive reactions to the course. However, CI implementation seems to vary across sections and some course strategies may have more positive effects on student academic performance than others. Further investigation is needed to explicate what CI implementation strategies are most effective. Results from qualitative assessments and quantitative assessments have been provided in the form of feedback reports to instructors and administrators so that course improvements can be continuously implemented.

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