

## Chapter 4: Impacts on Faculty

The second goal of the IGERT program is to catalyze a cultural change in graduate education for students, faculty, and institutions, by establishing innovative models for graduate education and training in a fertile environment for collaborative research that transcends traditional disciplinary boundaries. Part of this cultural change involves fostering the development of interdisciplinary perspectives and collaborations among participating faculty members. This chapter focuses on the impacts of the IGERT program on the faculty participating in the program and examines ways in which they are engaging in interdisciplinary collaborations in their professional lives. In this chapter we discuss faculty involvement with the IGERT program and its perceived impact on their teaching, networking, mentoring, research and productivity in turn, and address the following research questions:

- How do IGERT faculty differ from non-IGERT faculty in terms of their teaching, research, mentoring, networking, and productivity?
- How does participation in IGERT impact faculty teaching, research, mentoring, networking, and productivity?
- What is the perceived added value for faculty of participating in IGERT?

Without having surveyed faculty prior to their participation in the IGERT program, we cannot know for certain if the faculty behaviors and characteristics observed are due to pre-existing interest of IGERT faculty in interdisciplinary work, to participation in the IGERT program, or to a combination of both factors. Most faculty (IGERT and non-IGERT) reported that they are engaged in some interdisciplinary work. We thus attempted in this analysis to identify ways in which IGERT participation might advance this type of work.

### Faculty Characteristics

Drawn from departments that are comparable in size and disciplinary spread, at comparable institutions, the faculty in our IGERT and non-IGERT samples share similar time commitments. Both faculty participating in the IGERT program and their non-IGERT comparison group report that, on average, they spend about a third of their time on teaching, mentoring and advising students (33 and 34 percent respectively); just under half of their time on research (46 and 47 percent respectively); and the remaining time on related administrative tasks, such as serving on committees.

### Faculty Participation in IGERT

A little over half of the faculty (55 percent) involved with the IGERT program joined their project in the year prior to or within the first two years of the award of their project and have remained involved ever since. Over two-thirds (71 percent) of the faculty involved with the IGERT program reported that they “experience at least some IGERT activities as a separate demand on their time.”<sup>42</sup> Of these

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<sup>42</sup> *Initial Impacts Survey of Faculty 2004*. “Do you experience at least some of your IGERT activities/responsibilities as work separate from your other research/teaching/service responsibilities in your home department?” IGERT faculty N=346.

faculty members, the majority (85 percent) spend up to a quarter of their time on IGERT–related work, which is over and above their research, teaching and other service responsibilities in their home departments. Nine-tenths of the IGERT faculty have over time either maintained their initial level of participation in the program (41 percent) or become more heavily involved with the program (47 percent) indicating a strong level of interest in the program. IGERT faculty responsibilities range from advising graduate students to project management (Exhibit 4.1).

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**Exhibit 4.1**

**Ways in which Faculty Participate in the IGERT Program**

	<b>IGERT (N=245)</b>
I advise IGERT graduate students	89%
I serve on IGERT dissertation committees	83
I conduct IGERT-related research	77
I attend IGERT workshops or lectures	76
IGERT graduate students work in my lab	73
I teach IGERT courses	65
I contribute to IGERT project management	45

Note: Question was presented only to faculty members who responded to yes to the previous question, “Do you experience at least some of your IGERT activities/responsibilities as work separate from your other research/teaching/service responsibilities in your home department?”

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Source: *Initial Impacts Survey of IGERT Faculty 2004.*

Question: “In what ways do you participate in the IGERT project?”

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Despite the commitment of time and responsibilities over and above their departmental activities, IGERT faculty report that their participation in the IGERT program has not altered the amount of time they spend on departmental activities. Most say they spend equal time on such activities as teaching departmental courses, advising students, and engaging in departmental leadership activities, as they did before they got involved with the program (Exhibit 4.2). The one exception to this is research. While two-thirds of the faculty report spending the same amount of time conducting research with other faculty in the department as before, 21 percent report that they are now spending **more** time on such research, suggesting that IGERT projects stimulate research activities among faculty members in participating departments.

IGERT department chairs concur that participation in IGERT does not interfere with faculty members’ departmental obligations. Most selected ‘1’ (56 percent) or ‘2’ (26 percent) on a scale of 1 (“Not at all”) to 5 (“Extensively”) when asked to what extent they think participation in the IGERT grant interferes with faculty members’ ability to meet their non-IGERT departmental responsibilities. None selected 5 (“Extensively”) and 81 percent reported that they did not think participation in the IGERT grant had “drawn time and attention of faculty away from the department.”<sup>43</sup> In addition, most IGERT faculty report support for their work from their departmental colleagues, with only 19

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<sup>43</sup> Initial Impacts Survey of Department Chairs 2004.

percent reporting that their department colleagues resent the time they spend on IGERT related activities.

## Exhibit 4.2

### Changes in Time Spent on Departmental Activities as a Result of IGERT Participation

	Percent of IGERT Faculty (N=244)		
	Less Time	Equal Time	More Time
Teaching department courses	13%	84%	3%
Advising department students	10	81	9
Engaged in department leadership activities	14	74	12
Conducting research with other departmental faculty	12	66	21

Notes: One respondent did not answer the question.

Question was presented only to faculty members who responded to yes to the previous question, "Do you experience at least some of your IGERT activities/responsibilities as work separate from your other research/teaching/service responsibilities in your home department?"

Source: *Initial Impacts Survey of IGERT Faculty 2004.*

Question: "Please indicate whether your IGERT participation has resulted in your spending less time, equal time, or more time on each of the non-IGERT responsibilities listed below."

The IGERT program provides little to no monetary benefit to the faculty. Whatever benefits of participation in this program accrue to the faculty are thus gained through interactions with students and collaboration with colleagues. Despite the fact that participation in the program is an add-on to their already busy academic lives, faculty both participate in the program and stay involved for long periods of time. Over time many faculty members' participation in the program has increased. These findings suggest that faculty members perceive benefit from participating in the IGERT program.

## Impact on Teaching

### Team Teaching

IGERT and non-IGERT faculty members share similar teaching loads, on average teaching two or three courses each year. However, IGERT faculty are significantly ( $p < .0001$ ) more likely to team-teach with faculty members from other disciplines than non-IGERT faculty members, suggesting a stronger interest in team-teaching as well as the opportunity to do so. Site visit data suggests that IGERT projects may provide some of these team-teaching opportunities. Forty-two percent of the IGERT faculty have, over the past two years, team-taught a course with faculty members from outside their home discipline as compared with 28 percent of non-IGERT faculty. The proportion of faculty members who expect to team-teach courses in the future is also significantly higher for the IGERT faculty as compared with their non-IGERT counterparts (54 versus 38 percent,  $p < .0001$ ) (Exhibit 4.3).

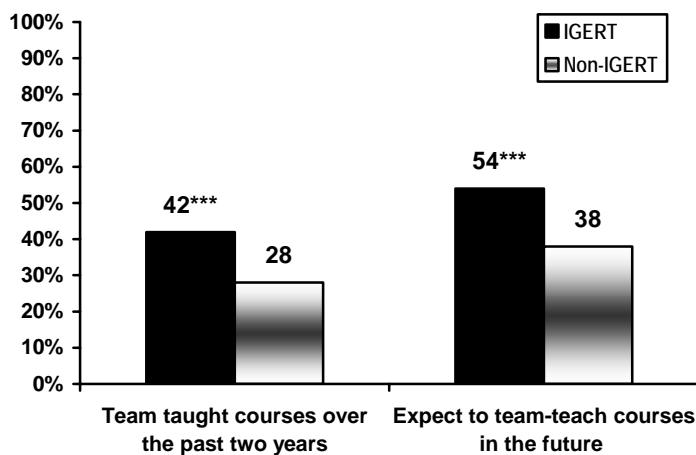
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**Exhibit 4.3**

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**Percent of IGERT and Non-IGERT Faculty Who Have Team Taught with Faculty Members Outside Their Home Department, or Plan to in the Future**

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IGERT N=346. Non-IGERT N=556.

Significance denoted as: \* (p<.01) \*\* (p<.001) \*\*\* (p<.0001)

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Source: *Initial Impacts Survey of Faculty 2004.*

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*Questions: "Have you team-taught any courses in the last two years with faculty member(s) outside your home department?" (yes, no) and "How likely do you think it is that you will team-teach courses in the future with faculty members from departments outside your own department?" Response Scale: 1 ("Not likely") to 5 ("Very likely"). Reporting the percentage who selected either '4' or '5'.*

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### Interdisciplinary Teaching

IGERT faculty report that their participation in IGERT has directly impacted the interdisciplinary nature of their teaching and working with students. As a result of their participation in the IGERT program, two-thirds of the IGERT faculty (67 percent) believe that they are able to work with a greater variety of students, and 53 percent report that IGERT has resulted in their addressing a broader range of topics and incorporating readings from other fields in their teaching. As a result of participating in IGERT, close to half of the IGERT faculty (53 percent) report that they are more likely to consider team-teaching with faculty members outside their own department.<sup>44</sup>

### Impact on Interdisciplinary Networks

Participation in IGERT has expanded faculty members' interdisciplinary networks. Close to three-quarters (72 percent) of the faculty participating in the IGERT program report that their participation in the program has enabled them to work with faculty in other departments whom they would

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<sup>44</sup> Based on all those who selected the response options 4 and 5 on a five-point scale ranging from "1=strongly disagree" to "5=strongly agree."

otherwise not have met, and 77 percent say that being a part of this program has enabled them to get exposure to new ideas outside their area of knowledge.<sup>45</sup>

## Impact on Mentoring Students

In addition to expanding their networks by working with faculty from other disciplines, IGERT faculty members have had the opportunity to work with a greater variety of students. Both IGERT and non-IGERT faculty report mentoring graduate students outside their own disciplines, on average between 2 and 3 such students. A significantly greater proportion of IGERT faculty (67 percent,  $p < .0001$ ) report mentoring graduate students outside their home discipline than non-IGERT faculty (47 percent), suggesting that faculty participating in the IGERT program are more likely to expand their interactions with students in other disciplines.

## Impact on Research

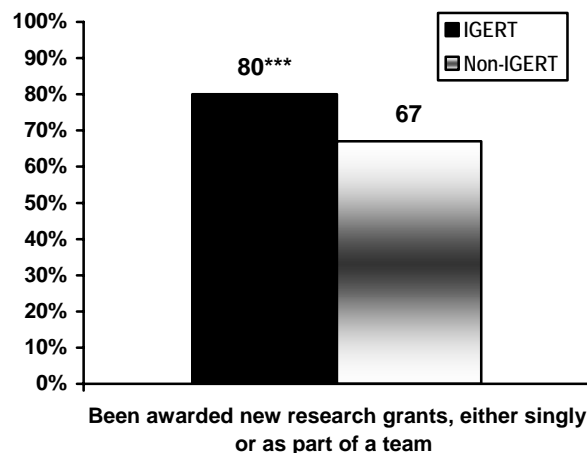
Both IGERT and non-IGERT faculty are engaged in research related activities, spending a little less than half their time on research. Working singly or in teams, both IGERT and non-IGERT faculty report that they have been awarded new research grants. This is significantly more so for the IGERT faculty (80 percent) than non-IGERT faculty (67 percent) (Exhibit 4.4).

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### Exhibit 4.4

#### Percent of IGERT and Non-IGERT Faculty Awarded New Research Grants in the Last Two Years

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IGERT N=345. Non-IGERT N=554.

Significance denoted as: \* ( $p < .01$ ) \*\* ( $p < .001$ ) \*\*\* ( $p < .0001$ )

Source: *Initial Impacts Survey of Faculty 2004.*

*Question: "Have you engaged in any of the following research activities in the last two years? ...Been awarded new research grants, either singly or as part of a team."*

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<sup>45</sup> Based on those who selected the response options 4 and 5 on a five-point scale ranging from "1=strongly disagree" to "5=strongly agree."

## Interdisciplinary Research

Virtually all of the IGERT faculty (99 percent) and most of the non-IGERT (89 percent) faculty reported that they consider part of their research to be interdisciplinary. While many non-IGERT faculty report that they are engaged in interdisciplinary research activities, IGERT faculty are significantly more likely to do so. Both IGERT and non-IGERT faculty have worked on research projects (90 versus 78 percent), and have written research proposals with individuals outside their own disciplines (86 and 64 percent respectively), but the number of IGERT faculty reporting these activities is significantly higher than that of the non-IGERT faculty (Exhibit 4.5).

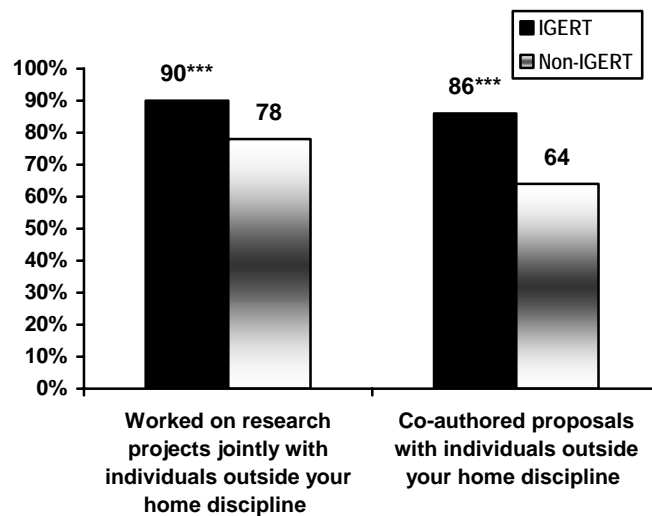
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### Exhibit 4.5

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#### Percent of IGERT and Non-IGERT Faculty Engaged in Interdisciplinary Research Activities

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IGERT N=346. Non-IGERT N=556.

Significance denoted as: \* (p<.01) \*\* (p<.001) \*\*\* (p<.0001)

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Source: *Initial Impacts Survey of Faculty 2004.*

Question: "Have you engaged in any of the following research activities in the last two years?"

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## Impact on Faculty Productivity

Publications and presentations are two indicators of faculty productivity. It might be expected that as faculty get more exposure to interdisciplinary research either through IGERT or in general in their home institutions, it will be reflected in their work. We discuss below data obtained from survey questions asking the faculty where and with whom they publish and present their research, and from a bibliometric analysis of faculty publications and citations as listed in their *curriculum vitae*. (The complete bibliometric analysis report is included in Appendix B).

In the last two years IGERT faculty have produced more multi/interdisciplinary publications than non-IGERT faculty. The proportion of faculty who have co-authored books and articles with colleagues from other disciplines in the last two years is significantly higher for IGERT as compared

with non-IGERT faculty (76 and 60 percent respectively) (Exhibit 4.6). The number of such co-authored books is roughly the same for both groups: IGERT faculty have on average co-authored 5 such books and articles in the last two years, as compared with non-IGERT faculty (4 books and articles).<sup>46</sup>

The impact of interdisciplinary work is visible in the publications and presentations made by both the IGERT and non-IGERT faculty. Both IGERT and non-IGERT faculty members reported that they have presented the results of their research at conferences outside their home discipline, but IGERT faculty are one and a half times more likely than non-IGERT faculty to do so. Over the past two years IGERT faculty have made an average of 4.5 presentations at conferences outside of their home discipline, each as compared with the average of 3.5 presentations for the non-IGERT faculty.<sup>47</sup>

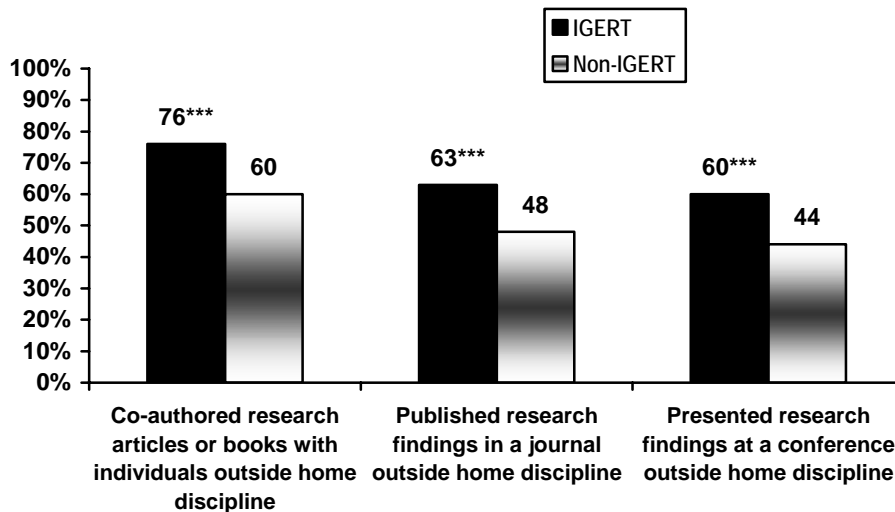
Although the median number of articles published (2.0) was the same for both groups, a significantly larger proportion of IGERT faculty (63 percent compared with 48 percent) report that they have published their research findings in journals outside their home disciplines.

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**Exhibit 4.6**

**Interdisciplinary Publications and Presentations by IGERT and Non-IGERT Faculty**

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IGERT N ranges from 344-346. Non-IGERT N ranges from 551-555. Range is due to missing responses.

Significance denoted as: \* (p<.01) \*\* (p<.001) \*\*\* (p<.0001)

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Source: *Initial Impacts Survey of Faculty 2004.*

Question: "Have you engaged in any of the following research activities in the last two years?"

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<sup>46</sup> Initial Impacts Survey of Faculty 2004.

<sup>47</sup> Ibid.

Data from the **bibliometric analysis** of faculty publications and citations supports the survey data on faculty productivity and provides some additional indicators of the inter/multidisciplinary nature of the faculty publications. *Curriculum Vitae* for all faculty members were analyzed and publications for the last five years 1999-2003 were included in the analysis. Both IGERT and non-IGERT faculty were equally prolific in their writing and publications (with an average of 8.5 and 8.9 papers per author respectively over 5 years). A majority of both IGERT and non-IGERT faculty (approximately 85 percent of each group) publish books, articles and papers both in and outside their own disciplines, but IGERT faculty are slightly more likely to publish out of field. Overall, 54 percent of all IGERT publications were published outside the author's discipline compared with 50 percent of all non-IGERT publications. In certain disciplines such as Biology, Psychology, Mathematics and the Humanities, IGERT faculty were much more likely to publish out of field than non-IGERT faculty.<sup>48</sup>

IGERT faculty are more frequently cited than their non-IGERT counterparts, with an average of 16 citations per paper as compared with 12 citations per paper for the non-IGERT group, and this is true for all disciplines except the social sciences. The more frequent citations may indicate that the IGERT authors generally have a higher scientific impact than others, but this difference may be unrelated to participation in IGERT. Both the IGERT as well as the non-IGERT faculty reference materials outside their own disciplines. Overall, 60 percent of all references used by IGERT authors and 55 percent of all references listed by non-IGERT faculty are to fields outside their own disciplines. IGERT faculty in Biology, Psychology, Mathematics and the humanities are more likely to reference authors out of field than non-IGERT faculty. Another measure of collaboration and cooperation among authors is co-authorship. As reported earlier, a significantly larger proportion of IGERT faculty have coauthored books and articles as compared with non-IGERT faculty, but the number of people they collaborate with on each of their publications is about the same for both the IGERT and non-IGERT faculty.

## **Perceived Added Value of Participating in IGERT**

IGERT faculty members report that participation in the IGERT program has enhanced their own interdisciplinary opportunities. A little over three quarters of the IGERT faculty report that as a result of participation in IGERT they have been exposed to new ideas outside their area of knowledge. Close to half have learned new research techniques (49 percent) and are more likely to collaborate with colleagues outside their own disciplines (61 percent) (Exhibit 4.7). In addition, they believe that as a consequence of their IGERT participation they can explore new research topics that may otherwise not be funded, and that they are in a better position to win new research grants. Very few faculty report that participation in IGERT takes time away from their own research.

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<sup>48</sup> *Bibliometric Analysis Report: Appendix B.*



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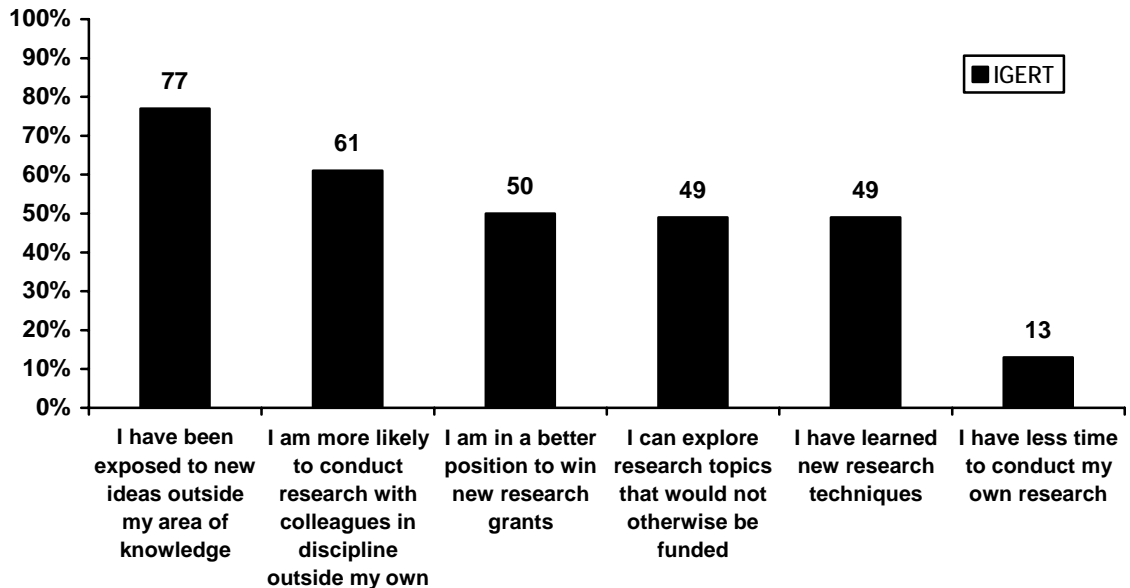
**Exhibit 4.7**

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**Impact of Participation in the IGERT Program on Faculty Research**

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*“As a result of participating in IGERT...”*



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IGERT N=344. Two respondents did not complete this question.

Note: Reporting the percentage who selected the response options 4 and 5 on a five-point scale ranging from “1=strongly disagree” to “5=strongly agree.”

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Source: *Initial Impacts Survey of Faculty 2004.*

*Question: “To what extent do you agree or disagree with the following statements about the impact that participating in the IGERT project has had on your professional life?”*

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Many IGERT department chairs agree that participation in IGERT has impacted faculty behavior to some extent (Exhibit 4.8). Close to half of these chairs report that the IGERT grant has improved the quality of faculty research (54 percent), altered the research scope of involved faculty (44 percent), and improved faculty mentoring of students (49 percent).<sup>49</sup>

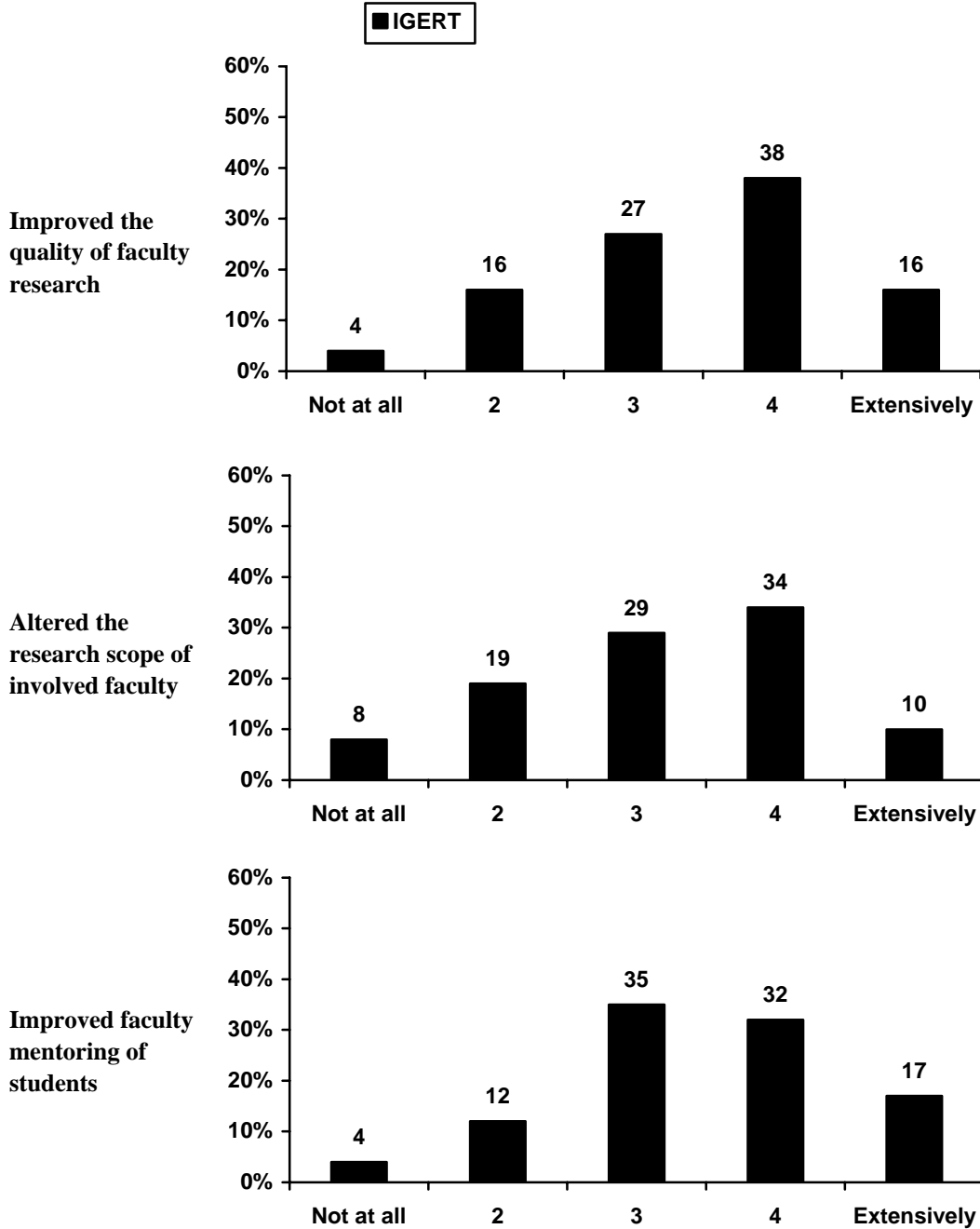
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<sup>49</sup> Initial Impacts Survey of Department Chairs 2004. Based on those who selected response options “4” and “5” on a five-point scale where “1=not at all” and “5=extensively”.

Exhibit 4.8

Percent of Department Chairs Reporting Impacts of the IGERT Grant on Their Departments' Faculty

*“To what extent has the IGERT grant affected your department in the following ways?”*



N= 77. (missing=8)

Note: Percentages do not sum to 100% due to rounding.

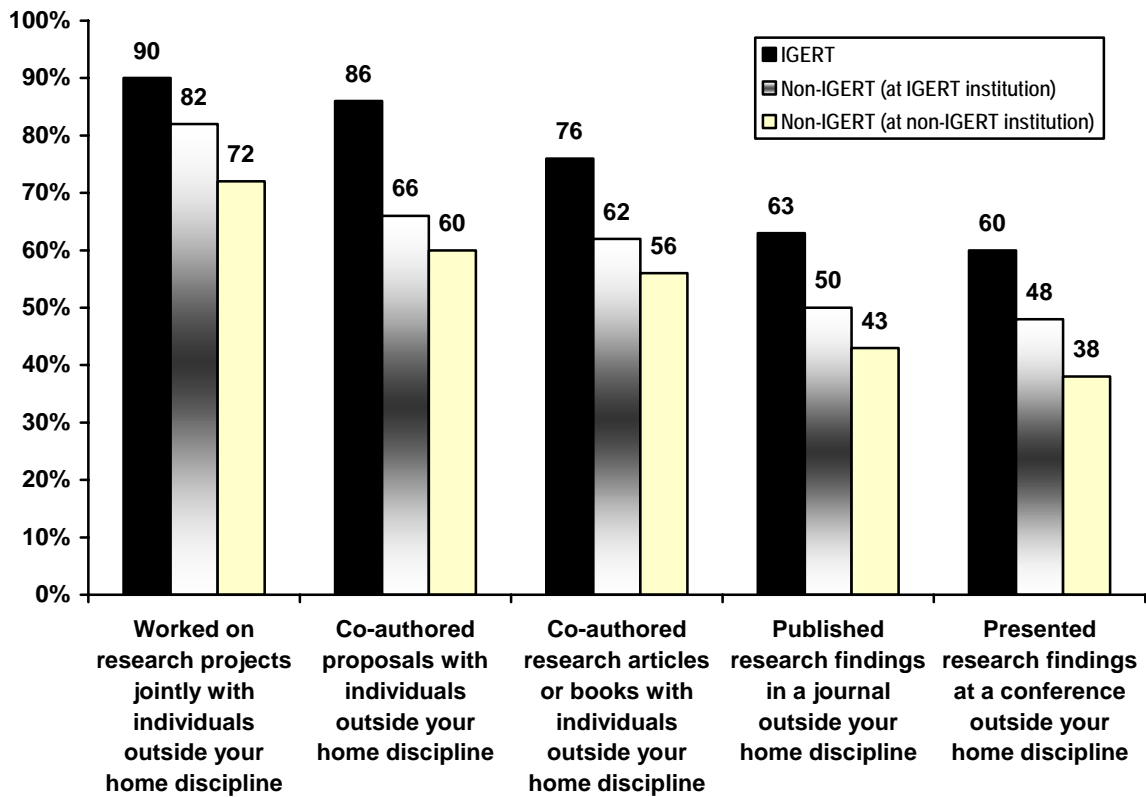
Source: Initial Impacts Survey of Department Chairs 2004.

Question: *“To what extent has the IGERT grant affected your department in the following ways?”*

When faculty engagement in interdisciplinary research activities is examined with the non-IGERT respondents split into those at institutions with and without IGERT projects, those at IGERT institutions consistently report greater engagement and productivity in interdisciplinary research than those at non-IGERT institutions (Exhibit 4.9). This suggests there may be something about the institutional environment of institutions with IGERT grants that has both attracted the IGERT project and encourages all faculty to participate in interdisciplinary work. It also suggests the possibility of added value for non-IGERT faculty at institutions with IGERT projects; these non-IGERT faculty perhaps benefit from the increased interest in working with colleagues from other disciplines reported by IGERT faculty.

**Exhibit 4.9**

**Interdisciplinary Activities of Non-IGERT Faculty at Institutions With and Without IGERT Projects Compared to IGERT Faculty**



IGERT N=346. Non-IGERT (with IGERT program) N=353. Non-IGERT (no IGERT program) N=196. Seven non-IGERT faculty members did not complete this question.

Source: *Initial Impacts Survey of Faculty 2004.*

Question: *Have you engaged in any of the following research activities in the last two years?*

## Summary

IGERT has been successful in promoting a fertile environment for faculty to engage in interdisciplinary teaching and research. While interdisciplinary activities are common among all faculty surveyed, IGERT faculty and department chairs report an additional shift towards more interdisciplinary work as a result of IGERT participation. IGERT faculty members team-teach with colleagues outside their departments and mentor graduate students from other disciplines in greater frequencies than non-IGERT faculty members. A majority of IGERT faculty members report that participating in IGERT has enabled them to teach a greater variety of students and incorporate a broader range of topics in courses. With respect to interdisciplinary research, more IGERT faculty publish and present research in journals and conferences from outside their home disciplines, and are more likely to work on research projects and co-author publications with colleagues from other disciplines.

According to the IGERT faculty respondents, participating in the program has been a stimulating professional experience, one to which they are willing to devote substantial time with little direct compensation while generally maintaining other departmental responsibilities. Large majorities of the faculty members feel that IGERT enabled them to establish work with colleagues in other departments and exposed them to new ideas. About half of the faculty members reported learning new research techniques, exploring research that would not otherwise be funded, or being in a better position to win new grants as a result of IGERT. These outcomes suggest important benefits for faculty participating in IGERT that have the potential to increase support for interdisciplinary approaches to graduate education. The following chapter discusses the impacts of the IGERT program on award institutions and changes that institutions have made in response to the presence of IGERT projects.