

Chapter 5

Research and Teaching: The Changing Views and Activities of the Academic Profession

5.1 Conceptual Framework

A close link between teaching and research is widely viewed as desirable by academics throughout the world. Indeed, it is considered to be an essential feature of the modern university over the last about two centuries. However, we note differences across countries and institutions both in the relative emphasis placed on research and teaching as well as in the understanding of the relationship between teaching and research. In the Carnegie International Survey of the Academic Profession undertaken in the early 1990s, Arimoto and Ehara (1996) proposed a tripartite classification of research and teaching orientations: (a) a German type with a prevailing strong research orientation, (b) an Anglo-Saxon type with a more or less balanced emphasis on research and teaching and (c) a Latin American type with a strong teaching orientation.

In the recent public debates on the changing function of higher education, much emphasis has been placed on the research function as the principle characteristic of ‘world-class universities’, so much so that one might assume that academia in recent years has come to stress the research orientation over teaching. But in contrast is the continuing growth of enrolment rates in higher education which has led to enhanced attention being paid to the teaching function of higher education—in part, because the tertiary level sectors that have experienced the most rapid growth in many countries are those where teaching and learning are paramount—for example, in community colleges, technical institutes and distance education providers. Particularly in these sectors much attention is being devoted to professionalising the teaching competencies of the professoriate.

As many of the questions posed in the comparative survey of the academic profession conducted in the early 1990s have been asked again in the 2007 ‘Changing Academic Profession’ (CAP) study, it is possible to examine how the roles of research and teaching have changed as well as what the members of the academic professions think about these changes. It is possible, for example, to explore whether the Humboldtian ideal emerging in the early nineteenth century, according to which

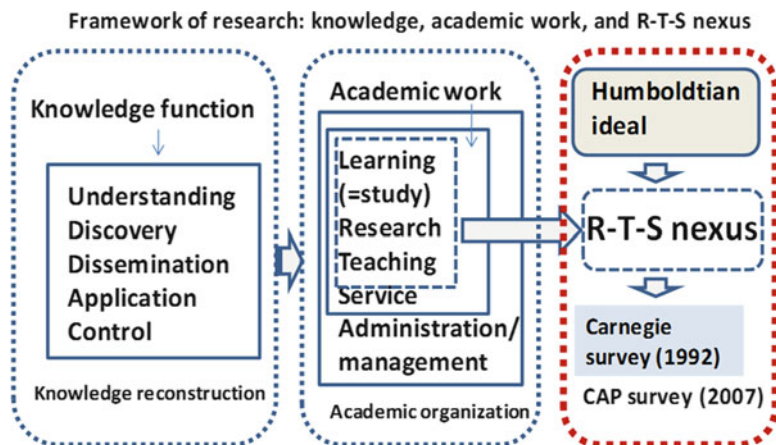


Fig. 5.1 Framework of research, knowledge, academic work and nexus between research, teaching and service. Source: Based on Arimoto 2010

research is the driving force in shaping the relationship between research and teaching, has spread over a larger number of countries and whether research also has become more important in countries which have remained basically within the tradition of the Anglo-Saxon and Latin American types. And it is possible as well to examine whether more elaborate concepts as regards the quality of teaching and learning have taken root recently in countries where teaching traditionally was viewed as subordinate to research (cf. the conceptual framework in Fig. 5.1).

Therefore, the analysis in this chapter will not only address the views and activities as regards teaching and research. Rather, it also will examine how the links between teaching and research are viewed and shaped and what this means for the degree of compatibility between research and teaching in the various countries included in the CAP survey.

The interpretation of the survey findings is based on the conviction that a close link between research and teaching is essential for academic work, as expressed in Fig. 5.1. First, we follow Clark (1983) in assuming that knowledge is the basic component—the raw material for academic work. Knowledge has several dimensions: understanding, discovery, dissemination, application and control. These different dimensions of knowledge have to be translated into learning, research, teaching and service, and they affect management and administration as well. Second, ‘academic work’ is the most suitable term to translate this function into operation; this work is best described as the discovery of knowledge (‘research’) and its dissemination (‘teaching’). However, the history of the modern university has shown that a close link between research and teaching is not guaranteed. The issue of ‘balance’, ‘compatibility’ and ‘harmony’ between teaching and research is a continuing challenge. According to the Humboldtian ideal underlying the establishment of the University of Berlin at the beginning of the nineteenth century, the ‘unity of teaching and research’ was realised through the inclusion of students in the process of knowledge

generation. The training process of scholars was understood to focus on research, and the seminars and laboratory work were viewed as integrated processes of research, teaching and study (see Von Humboldt 1970; Clark 1997, 2008). Students were an integral part of the research process (Ushioji 2008, p. 24).

The notion of research being the most pervasive element of universities has spread internationally in the nineteenth and twentieth centuries, but not to the same extent as the Humboldtian concept of the linkage between teaching and research. For example, Geiger (2000, p. 1) argues that the nineteenth century colleges in the USA were ‘institutions that conveyed only textbook knowledge to mostly adolescent boys’. Also, other countries adapting elements of the Humboldtian approach realised it to a varying extent (Rudolph 1962; Oleson and Voss 1979; Arimoto 1996). The English tradition of a strong educational approach during the first years of study did not vanish. And the Napoleonic division of labour between teaching and research is often viewed as a third model which spread across many countries. Finally, it is worth noting that many countries have opted for diversification within higher education where different notions of the link between teaching and research shape the most prestigious sectors on the one hand and other sectors of the higher education system on the other hand. For example, Japan successfully established several research universities (Nakayama 1978, pp. 42–43) and thus put research at the apex of the academic function, even though research plays a subordinate role in the majority of universities.

5.2 Preferences for Research and Teaching

It is widely assumed in research on the academic profession that the academics’ views as regards the desirable relationships between teaching and research play a powerful role in shaping the actual activities in those domains. Therefore, academics have been asked in the CAP study about their preference as regards teaching and research: whether their interests lie (a) ‘primarily in teaching’, (b) ‘in both, but leaning towards teaching’, (c) ‘in both, but leaning towards research’ and (d) ‘primarily in research’.

Actually, academics in all countries point out that they themselves are **in favour of a nexus between teaching and research**. As Table 5.1 shows, the two categories ‘in both ...’ are named as prime interest by academics in all countries surveyed. On average across countries, three-quarters are interested in such a nexus. Thereby, we note that this nexus is most strongly emphasised (more than 80%) by academics in Korea, Italy and in the majority of majority of emerging countries: In contrast, the nexus is underscored by less than two-thirds of academics in Finland, Germany, the Netherlands, Norway, Australia, the UK and the USA. Actually, the nexus between both functions but leaning towards research is more widespread on average across countries (45%) than leaning towards teaching (30%). Leaning towards research prevails in the most advanced countries, while the leaning towards teaching is as frequent as leaning towards research in most emerging countries.

Table 5.1 Preference for teaching and research (per cent)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	AR	Avg ^a	AR	BR	MX	ZA	CH	MY	Avg ^b
Primarily in teaching	6	27	15	12	2	22	2	10	10	7	6	3	11	13	10	13	9	20	18	12	8	13
Both, leaning towards teaching	26	31	20	23	22	28	15	43	23	23	23	29	28	36	26	36	44	37	35	44	45	40
Both, leaning towards research	54	33	36	39	64	36	51	40	40	40	57	60	49	44	46	44	42	36	37	39	43	40
Primarily in research	15	10	29	26	12	14	31	7	27	31	14	8	12	18	18	7	6	7	9	5	4	6

Question B2: Regarding your own preferences, do your interests lie primarily in teaching or in research?

^aAverage among advanced countries

^bAverage among emerging countries

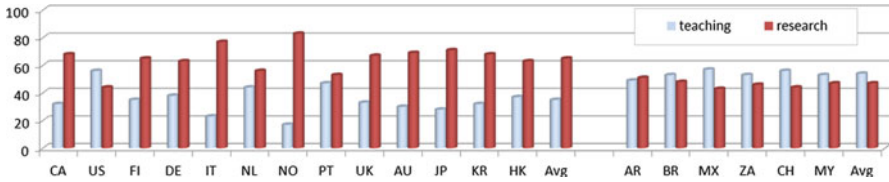


Fig. 5.2 Preference for teaching and research—aggregated categories (per cent, categories 1 and 2 merged to a single category ‘teaching’, categories 3 and 4 to a single category ‘research’). Question B2: Regarding your own preferences, do your interests lie primarily in teaching or in research?

A prime interest in teaching is stated by only 11% of academics on average across countries. This rate is exceptionally high in the United States (27%), the Netherlands (22%) and Mexico (20%)—that is, some of the countries where certain institutional types or certain institutions hardly have any research tasks. The proportion of those with a clear emphasis on research is 14% on average, that is, only moderately higher than that with a clear emphasis on teaching. The clear emphasis on research is most frequent in Australia and Norway (31% each), Finland (29%), the United Kingdom (27%) and Germany (26%)—not only in countries with a strong Humboldtian legacy but also among some Anglo-Saxon countries where rigorous incentive systems in recent years have underscored the research function of higher education.

By combining the responses (c) and (d), we can establish the frequency of a (dominant) research orientation and of a (dominant) teaching orientation. Actually, we note *research orientation* according to this measure among 58% of the respondents on average across the 19 countries. Focusing at the country level (see Fig. 5.2), it can be inferred that a research orientation is:

- *Clearly dominating* (more than 65%) among the academics surveyed by the CAP survey in Norway (83%), Italy (77%), Japan (71%), Australia (69%), Canada and Korea (68% each) and the United Kingdom (67%)
- *Somewhat dominating* (51–65%) in Finland (65%), Germany and Hong Kong (63%), the Netherlands (56%), Portugal (53%) and Argentina (51%)
- *Only true for the minority of academics* (less than 50% of the respondents) in Brazil (48%), Malaysia (47%), South Africa (46%), China and the USA (each 44%) and Mexico (43%)

Obviously, a research orientation is more widely emphasised by academics in advanced countries than in emerging countries. The USA is the clear exception with only a minority of respondents expressing a preference for research.

In the Carnegie International Survey on the Academic Profession, the same question was posed (see Altbach 1996, p. 20). In classifying the countries in the same way as above, we note that among the ten higher education systems participating in both the Carnegie and the CAP survey, a research orientation was clearly (65% and more) evident in 1992 in three countries (the Netherlands, Japan and Germany),

and in the recent CAP survey in four countries (Japan, Australia, Korea and the United Kingdom), a research orientation is somewhat prominent (between half and 65%) in 1992 in three countries (Korea, the United Kingdom and Australia) and also in the recent survey in three countries (Germany, Hong Kong and the Netherlands), and research-oriented academics are a minority in the same three countries in both surveys (Mexico, the USA and Brazil).

Among the ten countries participating in both surveys, only Japan is classified at both points of time as strongly research oriented. Germany and the Netherlands have moved from a strong research orientation towards more of a balance between research and teaching, while, in reverse, Korea, Australia and the United Kingdom have moved from a balance towards a strong research orientation. Hong Kong has remained unchanged in the middle position, and Mexico, the USA and Brazil have remained unchanged as countries with a minority emphasis on research. On average of the ten countries, the proportion of research-oriented academics increased from 54% in the early 1990s to 58% in recent years.

In looking at the different types of higher education institutions and the status of the respondents, we note, as was pointed out by Jacob and Teichler (2011), first that professors at 'universities', understood as institutions emphasising both teaching and research, tend to have a strong interest in research. This holds true for more than two-thirds (68% on average across countries) of the respondents in the CAP study (see Table 5.2).

This has been true in the Carnegie Survey in all countries except for Mexico (47%) and Chile (38%) in 1992, and it is true for all of the countries in the CAP survey. Among academics at universities, the research orientation did not change from the early 1990s until recently (68% on average across all countries in both cases).

Table 5.2 shows as well that junior staff at universities tend to have similar preferences as university professors in their respective countries. There are striking exceptions, though. In Finland, junior staff are more interested in research than senior staff (81% vs. 69%); in contrast, a clearly stronger emphasis on research by senior academics at universities than by junior academics is reported for four countries: Australia (87% vs. 70%), Hong Kong (75% vs. 54%), the USA (55% vs. 45%) and Malaysia (55% vs. 41%).

As one might expect, scholars at other institutions of higher education, understood as institutions emphasising teaching predominantly, have a stronger interest in teaching than scholars at universities. However, we note a substantial change over time. While only the academics at teaching-oriented institutions in the single country of Japan differed from the rule in the survey of the early 1990s in being predominantly research oriented, a research orientation also is dominant at the other institutions of higher education in the CAP survey in five cases: Australia, Hong Kong, Japan, Korea and the Netherlands (see Table 5.2).

Thus, altogether, the move towards a slightly stronger research orientation among the academics surveyed is primarily a 'research drift' at teaching-oriented institutions. In contrast, the orientation of academics at universities both in charge of teaching and research hardly changed on average across countries.

Table 5.2 Preference for teaching and research—aggregated categories—by type of higher education institution and status group (per cent^a)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^d
<i>All respondents</i>																					
Teaching	32	56	35	38	23	44	17	47	33	30	28	32	37	35	49	53	57	53	56	53	54
Research	68	44	65	63	77	56	83	53	67	69	71	68	63	65	51	48	43	46	44	47	47
<i>Seniors at universities</i>																					
Teaching	32	45	21	25	24	22	20	39	31	13	16	25	25	26	56	40	41	52	50	44	47
Research	68	55	79	75	77	78	80	62	70	87	85	75	75	74	44	60	58	48	49	55	52
<i>Juniors at universities</i>																					
Teaching	30	55	20	29	25	22	16	47	33	29	17	17	45	30	48	47	38	57	55	59	51
Research	70	45	81	71	75	79	84	53	67	70	83	83	54	70	51	53	62	43	45	41	49
<i>Seniors at other HEIs</i>																					
Teaching	.	83	64	77	.	49	25	54	b	19	32	36	.	49	.	61	66	b	77	49	63
Research	.	16	36	23	.	51	75	46	b	81	67	65	.	51	.	39	34	b	23	50	37
<i>Juniors at other HEIs</i>																					
Teaching	.	76	85	63	.	83	13	57	b	45	32	31	.	52	.	64	65	b	66	56	63
Research	.	24	15	37	.	17	88	44	b	54	68	69	.	49	.	36	35	b	34	43	37

Question B2: Regarding your own preferences, do your interests lie primarily in teaching or in research?

^aCategories 1 and 2 merged to a single category 'teaching', categories 3 and 4 to a single category 'research'

^bToo small number of respondents

^cAverage among advanced countries

^dAverage among emerging countries

. No other HEIs or no other HEIs surveyed

5.3 Factors Underlying Research and Teaching Orientation

As the research orientation and the teaching orientation can be viewed as crucial for academic work, an overview will be provided here about the factors which might explain the academics' options for a preference of research versus a preference for teaching. Thereby, differences by country will be taken into consideration. Differences according to the academics' status and type of higher education were considered in the previous section.

First, the *discipline* is relevant for the orientation towards teaching and research. Actually, 62% of the academics in science and engineering—on average across countries—state a preference for research as compared to 56% of the academics in the humanities and social sciences:

- In *science and engineering*, around 70% of academics in most advanced countries state a preference for research; this preference is only more pronounced in Norway (86%) and clearly less pronounced in the USA (50%). In emerging countries, the respective figure is more than 10% lower on average, whereby it ranges from 43% in South Africa to 61% in Argentina.
- In the *humanities and social sciences*, preference for research is most widespread in Italy (76%), and it also dominates in most other advanced countries except for the USA (42%). In emerging countries, the preference for research in the humanities and social sciences dominates only in Argentina (52%), while the respective figure is about 40% in China, Malaysia and Mexico.

The *distinction between the two disciplinary groups* is more pronounced in emerging countries (10% difference on average across countries) than in advanced countries (4%). In Italy, hardly any *distinction* exists among the academics in this respect (77% vs. 76%), while research preference is substantially higher among respondents in science and engineering than those in the humanities and social sciences in the Netherlands (66% vs. 50%), China (53% vs. 40%), Malaysia (52% vs. 40%) and Germany (67% vs. 56%).

These findings are consistent with the argument that there are different cultures embedded in the various academic disciplines. Becher called these 'academic tribes' with their own cultures and territories (Becher 1989; Becher and Trowler 2001), and Clark (1987) referred to the 'small world and different world'. Zuckerman and Merton (1971) pointed out that there is less of a consensus in the humanities and social sciences concerning what might be regarded as creativity and originality. And Arimoto (1981) underscores that values associated with 'universalism' and 'achievement' play a major role in the sciences, while the humanities and social sciences stress values reflecting 'particularism' and 'ascription'. Yet, in comparison to these general assumptions, the preference for research differs only moderately by disciplinary group in the responses to the CAP questionnaire.

Second, the *gender* effect seems to be small. Sixty-three per cent of the men (68% in advanced countries and 52% in emerging countries) and 56% (63 and 41%) of the women surveyed indicate a research orientation. As women in many countries

are underrepresented in science and engineering, this relatively small difference is primarily a compositional effect rather than a different gender-based orientation.

There are noteworthy differences, though, by country. On the one hand, slightly more women than men are research oriented in Germany (65% vs. 62%), Norway (84% vs. 82%) and Brazil (49% vs. 47%); on the other hand, women in China are by far less research oriented than men (31% vs. 56%).

Third, in order to examine the possible impact of *age*, the respondents have been subdivided into those being 45 years old or elder and those being younger than 45 years. Actually, older academics (62%) somewhat more frequently expressed a research orientation than younger academics (57%). This holds true both for advanced countries (70% vs. 62%) and for emerging countries (51% vs. 45%). Only in three countries is the reverse true: Germany (57% vs. 68%), Korea (66% vs. 71%) and Norway (81% vs. 86%). Altogether, we note that a research orientation prevails both among older and younger academics.

Fourth, the research orientation does not vary on average by the academics' *income*. In splitting the academics surveyed into a high income and a low income group, we find that those with low income are more strongly research oriented in some countries, while in other countries those with a high income are more strongly research oriented. But on average across countries, income does not help in explaining differences in the strength of the research orientation.

Fifth, having an *advanced academic degree* plays a key role in influencing the research orientation versus the teaching orientation of academics. Seventy-two per cent of the doctoral degree holders (73% on average across advanced countries and 70% in emerging countries) express a preference for research in contrast to 43% of those not holding a doctoral degree (46% in advanced countries and 35% in emerging countries).

Such a difference is most pronounced in Mexico (80% vs. 28%), the Netherlands (80% vs. 30%) and Hong Kong (72% vs. 29%). Also in the UK and China, more than twice as many doctoral degree holders than those without a doctoral degree are research oriented. In contrast, this difference hardly exists in Germany (63% vs. 62%), where most academics at higher education institutions without a degree are young scholars working on their dissertation, and it is relatively small in Norway (87% vs. 75%) and Italy (84% vs. 70%).

Sixth, *part-time employed academics* (47% on average, 51% in advanced countries and 37% in emerging countries) show less frequently a preference for research than full-time employed academics (61% on average, thereby 67% in advanced countries and 48% in emerging countries). This holds true for the majority of countries and is very pronounced in Latin American countries where part-timers are often employed for teaching purposes only. Moreover, part-timers are more frequent among persons without a doctoral degree. However, there are four countries where a preference for research is more pronounced by part-timers: in China, Japan, Malaysia and Portugal.

Seventh, *professional mobility* seems to be associated with having a research orientation. Sixty-four per cent (70% in advanced countries and 50% in emerging countries) of those having been active at more than two institutions underscore their

preference for research as compared to 58% (64 and 45%, respectively) of the academics who have never moved or moved only once. Research orientation differs most strikingly with the extent of mobility in China (68% of the more mobile vs. 44% of the less mobile or nonmobile respondents), the UK (77% vs. 62%), Hong Kong (71% vs. 58%), Australia (76% vs. 66%) and South Africa (53% vs. 43%). In contrast, those who have been mobile only once or not at all are slightly more research oriented than their mobile peers in Argentina (58% vs. 57%), Brazil (48% vs. 47%) and Norway (84% vs. 83%). The link between professional mobility and the research orientation might be due to the practice among universities to prefer recruiting academics externally who are prominent with respect to their research calibre (see Shinbori 1965; Arimoto 2008).

5.4 Allocation of Working Time to Research and Teaching

Actually, the stronger leaning towards research than towards teaching among academics active at universities both in charge of research and teaching is also reflected in the actual allocation of working time. Both in the Carnegie Survey and in the CAP survey, academics have been asked to estimate the number of weekly hours spent on teaching (and teaching-related activities) and research (and research-related activities) as well as other activities. They have been asked to estimate this both for the period of the year when classes are in session and for the period when classes are not in session. On that basis, the time allocation over the whole year could be calculated.

As shown in detail in Chap. 4, university professors surveyed in the CAP study report on average across countries that they spend 38% of their working time on research and 32% on teaching. There are striking differences by country, though: While university professors in Korea and Australia spend more than one and half times as much of their working hours on research than on teaching, more time is spent on teaching than on research by university professors in South Africa, Brazil and Malaysia.

Junior academics at universities spend a higher proportion of their working time on research and a lower proportion on teaching than university professors on average across countries. A closer look reveals, however, that the time allocation of junior academics and senior academics is similar in various countries. In some countries, though, research activities are clearly more pronounced among junior academic staff than among senior staff at universities: in Norway (65% vs. 39%), Finland (58% vs. 37%) and Germany (53% vs. 38%). Actually, in the countries most clearly shaped by the Humboldtian concept, junior academics are expected to spend substantial time on research in order to qualify for a professoriate.

Senior academics, as one might expect, spend a clearly lower proportion of their work time on research than senior academics at universities on average across countries. The extent to which the time allocation is similar or different, however, varies substantially by country. The most striking differences can be found in

Finland, Germany and the Netherlands where senior academics at other institutions of higher education spend only about two-thirds as much of their overall time budget on research as their colleagues at universities do on average. Again, we note that the functional distinction between universities in charge of research and teaching and other institutions of higher education is most pronounced in countries with a strong emphasis on the Humboldtian understanding of universities.

5.5 Perceived Links Between Research and Teaching Orientation

The actual relationships between research and teaching were addressed in the CAP study by asking the academics to state the extent to which they agreed to two statements:

- ‘Your research activities reinforce your teaching’.
- ‘Teaching and research are hardly compatible with each other’.

About three quarters of the academics surveyed share the view that their **research activities reinforce their teaching**. As Fig. 5.3 shows, this is stated by more than four-fifth of the academics in seven countries: Korea (85%), Argentina (84%), Canada, Italy, Norway, Mexico (83% each) and Brazil (81%). In contrast, academics in South Africa least often agree to this statement (65%).

University professors are the ones who convinced that their research activities reinforce their teaching, as Table 5.3 shows. Eight-four per cent state this on average across countries; the differences by country are relatively small: They range from 91 to 80% with the exception of South Africa, where such a reinforcement is observed less frequently (68%). Among junior staff at universities, the proportion of those believing in such a reinforcement is clearly lower (73% on average across countries), and the responses vary more substantially between countries (ranging from 60 to 82%). Also at other institutions of higher education, the conviction is widespread that research is reinforcing teaching: It is stated by 76% of the senior academics at these institutions on average, whereby the responses by country range from 65 to 87%.

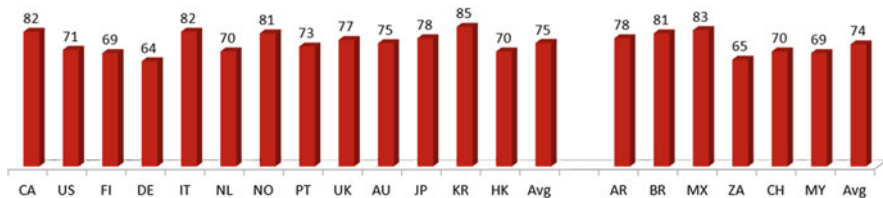


Fig. 5.3 Perceived reinforcement of teaching and research activities (per cent, responses 1 and 2 on a scale from 1 = strongly agree to 5 = strongly disagree). Question C4: Please indicate your views on the following: ... Your research activities reinforce your teaching

Table 5.3 Perception of teaching and research as hardly being compatible with each other by institutional type and status group (per cent^e)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^d
All respondents	20	12	37	34	14	26	14	31	25	28	52	11	27	25	6	7	11	21	42	30	20
Seniors at universities	18	10	37	33	12	18	13	19	25	19	41	8	19	21	10	6	11	21	44	18	18
Juniors at universities	22	13	35	34	17	25	14	28	25	29	61	15	30	27	5	8	14	22	42	37	21
Seniors at other HEIs	.	10	38	47	.	31	20	32	^b	17	53	12	.	29	.	7	11	.	42	10	14
Juniors at other HEIs	.	11	45	27	.	26	10	36	^b	36	56	11	.	26	.	8	12	.	39	30	18

Question B5: Please indicate your views on the following: ... Teaching and research are hardly compatible with each other

^aResponses 1 and 2 on a scale from 1 = strongly agree to 5 = strongly disagree

^bToo small number of respondents

^cAverage among advanced countries

^dAverage among emerging countries

^e.No other HEIs or no other HEIs surveyed

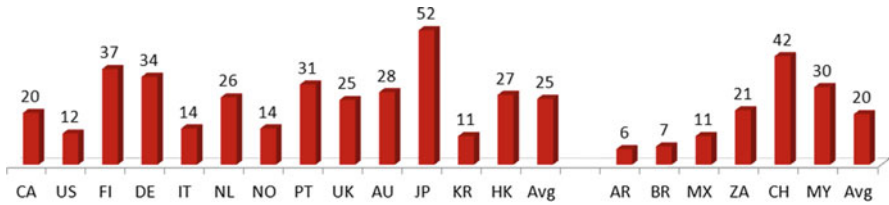


Fig. 5.4 Perception of teaching and research as hardly being compatible with each other (per cent, responses 1 and 2 on a scale from 1 = strongly agree to 5 = strongly disagree). Question B5: Please indicate your views on the following: ... Teaching and research are hardly compatible with each other

The responses of junior academic staff at these institutions are somewhat similar as those senior academics with exceptions. In Finland, Germany and the Netherlands, only a minority states such a reinforcing value. One has to bear in mind that the number of junior academics at other institutions of higher education is relatively low, whereby a substantial proportion of them are not employed for regular teaching and research purposes, but rather for various service functions.

On average across countries, 23% of the academics surveyed have come to the conclusion that **teaching and research are hardly compatible**. There are striking differences by country. The notion that teaching and research are hardly compatible is least frequent, as Fig. 5.4 shows, in Argentina (6%), Brazil (7%), Korea, Mexico (each 11%) and the USA (12%). In contrast, the problem of the incompatibility between teaching and research is somewhat more frequently noted by academics in Japan (51%), China (42%), Finland (38%), Germany (33%) and Malaysia (30%).

Actually, problems of compatibility between teaching and research are named most often in countries characterised by a strong research orientation. In contrast, problems of compatibility are seldom named in countries characterised by a strong teaching orientation of the academics. This pattern, however, does not hold true for all countries. For example, academics in Italy and Korea are strongly research oriented but seldom name problems of compatibility between teaching and research.

Taking into account the institutional type and status of the respondent, we note that only one-fifth of university professors note problems of compatibility between teaching and research as compared to one-fourth of junior staff at universities and as compared to one-fourth of academics at other institutions (see Table 5.3). The finding certainly is due to the fact that senior academics in charge of both research and teaching have more flexibility in shaping the teaching-research nexus according to their intentions than other academics. Among the countries where such problems of compatibility are named frequently, we note that junior academics at universities state these clearly more often than university professors (61% as compared to 41%). In Malaysia, such a difference between junior and seniors holds true for both institutional types. Finally, senior academics at other institutions of higher education in Germany note more often problems of compatibility between teaching and research than senior academics at universities (43% vs. 33%).

These responses to the themes addressed in this section suggest that the relationship between research and teaching is not without tensions, but that the majority of

academics note a productive relationship. However, we have to take into consideration that academics have been asked whether research reinforces teaching, but not whether teaching reinforces research.

5.6 Factors Affecting Compatibility Between Research and Teaching

Building on the above review of the factors associated with the academics' preference for research or teaching, a similar review has been undertaken of several factors that were thought to be associated with the academics' belief in the compatibility of research and teaching.

First, the proportion of respondents considering research and teaching as hardly compatible does not differ by *disciplinary group*. Slightly less than a quarter of academics in the humanities and social sciences as well as in science and engineering note a compatibility problem. In Japan—the country where academics most frequently raise doubts about the compatibility of teaching a research—this notion is almost equally spread across all disciplines (52% in the humanities and social sciences as compared to 50% in science and engineering).

Second, *gender* as well does not seem to be associated with the belief in the compatibility of teaching and research. Overall, only 2% of women question such compatibility more often than men.

Third, the influence of *age* seems to be small as well. The proportion of those noting problems of compatibility between research and teaching is only 4% higher among young academics (up to age 45) than among older respondents (45 years and older). The younger ones notably in Malaysia (34% vs. 17%), Australia (31% vs. 18%) and Hong Kong (31% vs. 20%) see more problems of compatibility.

Fourth, those not holding a *doctoral degree* are only slightly more likely to mention a compatibility problem between teaching and research (3% difference, i.e. 25% vs. 22%) than those holding a doctoral degree. Those not holding a doctoral degree mention most often such a problem as compared to doctoral degree holders in Korea (26% vs. 11%), Malaysia (33% vs. 24%), Australia (35% vs. 26%) and Portugal (33% vs. 25%). The reverse is true in Italy: Doctoral degree holders perceive more often a compatibility problem with research and teaching than those not holding a doctoral degree (16% vs. 12%).

Fifth, *employment conditions* also do not matter much as regards the notion of compatibility of research and teaching. South Africa is a notable exception: Full-time employed academics are clearly more sceptical as regards the compatibility of research and teaching than part-timers (22% vs. 11%).

Sixth, academics' *income* is somewhat more linked to compatibility between research and teaching than the previously discussed factors. Those with relatively low income raise doubts as regards compatibility more often (6%) than those with a relatively high income. This is most pronounced in Hong Kong (30% vs. 20%) and China (46% vs. 38%).

Seventh, those persons who have been *professionally mobile* several times view research and teaching as slightly more compatible than those who have little or no mobility. There is not a striking difference in any of the countries surveyed.

Thus, altogether the factors that have been taken into account above fail to adequately account for the likelihood that an academic will express the belief that research and teaching are compatible. One might assume that the perception of compatibility problems depends on specific conditions that cannot be generalised.

5.7 Teaching Approaches

In the CAP survey, the academics have been asked to characterise their *teaching approaches* with respect to five dimensions:

- Practice-oriented approach (‘Practically oriented knowledge and skills are emphasised in your teaching’)
- International approach (‘In your courses you emphasise international perspectives or content’)
- Value-oriented approach (‘You incorporate discussions of values and ethics into your course content’)
- Honesty approach (‘You inform students of the implications of ‘cheating and plagiarism in your courses’)
- Meritocratic approach (‘Grades in your courses strictly reflect levels of student achievement’)

Slightly more than two-thirds of all the academics surveyed—on average across countries—consider their teaching as *practice oriented*. As Table 5.4 shows, this is more typically the case for academics from emerging countries (more than three-quarters) than from advanced countries. Rates of four-fifths or even more are stated by academics in Mexico (88%), Brazil (81%), Argentina (80%) as well as Germany (80%), that is, the highest ratio among advanced countries. While, in contrast, only about half of the respondents in Finland, Italy, Norway and Japan describe their teaching as practice oriented.

In some countries, a practice orientation is considered typical for other institutions of higher education, while the academics at universities place their emphasis on theories as contrasted to practice. This is most pronounced in Finland, where only 31% of the university professors describe themselves as practice oriented as compared to 79% of the senior staff at other institutions of higher education, and the Netherlands, where the respective figures are 40 and 84%. A clearly more moderate difference in the same direction can be observed in Germany (75% vs. 93%), Australia (65% vs. 81%) and Japan (38% vs. 55%), while such a distinction between a more theoretically and practically oriented institutional type does not seem to hold true at all for the majority of countries.

Sixty-two per cent of the academics on average across countries view their teaching as *internationally oriented*. There are no substantial differences between

Table 5.4 Teaching approaches by type of higher education institution and status group (per cent^a)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^d
<i>All respondents</i>																					
Practice-oriented approach	60	71	54	79	54	70	50	79	68	74	53	76	69	66	80	81	88	76	76	68	78
International approach	60	49	50	55	61	53	65	79	64	67	53	74	71	62	48	53	77	59	65	62	61
Value-oriented approach	64	68	48	41	38	59	41	67	70	71	48	61	63	57	66	85	79	69	61	71	72
Honesty approach	77	83	44	45	31	61	37	80	90	85	49	66	79	64	54	82	81	86	70	82	76
Meritocratic	84	86	92	63	80	48	74	53	83	80	57	76	79	73	72	56	78	75	31	83	66
<i>Seniors at universities</i>																					
Practice-oriented approach	56	68	31	75	54	40	49	75	69	65	38	71	65	58	89	80	82	76	78	71	79
International approach	60	51	63	79	62	64	69	90	66	75	59	81	77	69	67	62	80	59	70	71	68
Value-oriented approach	64	67	53	57	40	48	45	71	69	68	48	58	63	58	81	80	72	68	59	75	73
Honesty approach	77	81	41	53	32	53	36	78	94	82	42	63	86	63	64	71	76	84	72	85	75
Meritocratic	86	85	95	72	79	54	78	55	87	87	60	81	83	77	79	59	80	75	35	85	69
<i>Juniors at universities</i>																					
Practice-oriented approach	65	74	48	77	54	42	51	77	67	75	53	71	71	63	79	77	86	79	76	63	77
International approach	60	46	46	50	60	60	60	82	60	64	58	75	67	61	46	52	77	59	63	58	59
Value-oriented approach	62	66	41	36	34	44	36	71	70	68	44	34	62	51	64	83	79	73	60	71	72
Honesty approach	77	84	38	41	28	58	36	88	86	82	32	64	76	61	52	81	80	88	69	81	75
Meritocratic	80	87	89	59	81	59	71	53	79	78	33	76	78	71	72	61	81	78	28	84	67
<i>Seniors at other HEIs</i>																					
Practice-oriented approach	.	72	79	93	.	84	57	81	^b	81	55	75	.	76	.	86	90	.	77	74	65
International approach	.	51	52	60	.	58	61	68	^b	77	56	71	.	62	.	50	76	.	67	75	74
Value-oriented approach	.	73	53	54	.	71	39	73	^b	78	50	59	.	64	.	91	83	.	70	66	82
Honesty approach	.	89	60	58	.	67	41	72	^b	89	53	65	.	69	.	88	83	.	83	86	88
Meritocratic	.	87	98	80	.	42	80	47	^b	81	59	76	.	73	.	53	77	.	35	88	71

Juniors at other HEIs

Practice-oriented approach	. 76	80	99	. 90	70	82	^b	77	59	81	. 79	. 81	91	. 71	82	65
International approach	. 52	45	40	. 38	64	75	^b	65	37	76	. 58	. 45	76	. 54	59	47
Value-oriented approach	. 78	57	21	. 62	48	62	^b	78	42	68	. 59	. 86	80	. 64	65	59
Honesty approach	. 82	55	81	. 62	60	75	^b	91	47	70	. 72	. 89	83	. 67	81	64
Meritocratic	. 86	95	76	. 44	52	51	^b	81	54	73	. 70	. 52	76	. 25	79	.

Question C4: Please indicate your views on the following:

^aResponses 1 and 2 on a scale of answer from 1 =strongly agree to 5 =strongly disagree

Items: Practically oriented knowledge and skills are emphasised in your teaching

In your courses you emphasise international perspectives or content

You incorporate discussions of values and ethics into your course content

You inform students of the implications of cheating or plagiarism in your courses

Grades in your courses strictly reflect levels of student achievement

^bToo small number of respondents

^cAverage among advanced countries

^dAverage among emerging countries

. No other HEIs or no other HEIs surveyed

advanced and emerging countries in this respect, but international dimensions are very strongly emphasised in selected countries: Portugal (81%), Mexico (77%), Korea (74%) and Hong Kong (72%). In contrast, only slightly more than half of the respondents in Japan, Finland, the USA, Brazil and the Netherlands report that they place an emphasis on this dimension.

In Portugal (90% vs. 68%) and Germany (79% vs. 60%), senior academics at universities are clearly more strongly internationally oriented than are senior academics at other institutions of higher education. This holds true to a moderate extent as well for Finland and Korea, while we note the reverse in Malaysia.

A strong *value orientation* in teaching—reported by slightly less than two-thirds of all respondents—varies more substantially by country than the practice and international orientations. On average across countries, academics in emerging countries (73%) appreciate values and ethics in teaching more often than do academics in advanced countries (58%). This is most pronounced in Brazil (81%) and Mexico (77%) among the former countries, while among the latter this is emphasised by over half of the academics in Anglo-Saxon countries and Portugal and by less than half of the academics in Italy, Norway, the Netherlands and Japan.

In only a single country, the Netherlands, do we note a striking gap between senior academics at universities and at other institutions of higher education. Seventy-one per cent of the Dutch professors at other institutions consider the teaching of values to be important compared to 48% of the professors at universities.

The strength of the *anti-plagiarism approach* varies even more by country. Almost all academics in the United Kingdom (94%) underscore that they inform students about the consequences of cheating and plagiarism. This rate is also high among academics in advanced countries with an Anglo-Saxon tradition of teaching—Hong Kong (86%), Australia (82%) and the United States (81%)—and in South Africa (88%), Brazil, Malaysia (each 81%) and Mexico (80%) as well. In contrast, we note quite a low rate in Italy (32%), Norway (36%), Finland (41%) and Japan (42%).

In many countries, senior academics at other higher education institutions are slightly more likely to address cheating and plagiarism than senior academics at universities. This is quite pronounced in Germany (60% vs. 41%), the Netherlands (67% vs. 53%) and Japan (53% vs. 42%).

Finally, about 70% of the respondents underscore that their *grading is meritocratically based*. Affirmative responses are rare in China (31%) and only slightly above half in the Netherlands (51%), Portugal (55%) and Brazil (56%). In only two of the latter countries is such a meritocratic approach somewhat less frequent among senior academics at other institutions of higher education than among senior academics at universities: in China (25% vs. 35%) and in the Netherlands (42% vs. 54%).

By and large, junior academics hold similar views as senior academics as regards the desirable approaches for teaching and learning. There is no gap between generations in this respect.

5.8 Teaching Modes

Lecturing in classes is a common mode of teaching all over the world. Many experts argue, though, that more diverse modes of teaching and learning are needed. Among others, more complex modes of teaching are advocated to mobilise and motivate the rising number of students and notably the ‘nontraditional students’. New activities are seen as critical for increasing the societal relevance of higher education. Last but not least, new technologies provide new options for communication between the teachers and their students.

In the CAP survey, academics were asked to state whether they have been involved in the current year in several modes of teaching and communication with students—other than merely lecturing in classes. As Table 5.5 shows, the academics surveyed report on average that had been involved in 3.8 of these seven modes. On average the same *frequency of varied teaching modes* is reported for advanced and emerging countries. The country averages range from 4.5 in Mexico, 4.4 in Malaysia as well as 4.4 in Australia and the United Kingdom at the top to 2.8 in Germany at the bottom end. On average, academics at other institutions of higher education report a somewhat greater variety of teaching modes than academics at universities. We also note that junior academics—irrespective of type or higher education—are involved on average in a somewhat smaller range of teaching modes than senior academics.

As Table 5.5 indicates, the variety of teaching modes hardly differs by institutional type. However, junior academics at both types of institutions are involved in a slightly smaller variety of teaching modes than senior academics. This is not surprising because junior academics in various countries are to a lesser extent involved in teaching than senior academics.

Three of the modes of teaching and communication are reported by more than 70% of the respondents: *face-to face interaction with students outside class*, *electronic communication (e-mail) with students and individualised instruction*. As one might expect, these figures are high across all countries. The few exceptions visible in the Appendix Table 5.11 might be named here: Individual instruction is not common in Portugal (20%) and Argentina (42%), and only about half of the German academics report frequent face-to-face international with students outside class (50%) or the use of electronic communication with students (52%).

About half of the respondents are involved in *practice instruction/laboratory work* (49%) and in *learning in projects/project groups* (47%). The former is named least by academics in the Netherlands (29%) and the latter by respondents in China (26%).

ICP-based learning/computer-assisted learning is only named as a current practice by about one-third and ‘distance education’ by one-sixth of the respondents. The former is only affirmed by 11% in Korea. Distance education is a rare responsibility for academics in many countries, while South Africa is the exception with almost one-half of the respondents involved.

In addition, almost 70% of the academics surveyed report that they have been involved in the *development of course material*, and almost 60% have been involved in *curriculum/programme development*. Japanese academics are the least likely to engage in these latter practices—only about one-quarter each.

Table 5.5 Variety of teaching modes (mean^a) by type of higher education institution and status group

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^d
All respondents	3.9	4.0	4.1	2.2	3.7	3.4	3.7	3.5	4.2	4.2	3.2	3.2	3.9	3.6	2.7	3.9	4.7	3.8	3.0	4.4	3.7
Seniors at universities	3.9	4.0	4.4	2.6	3.7	3.0	4.0	3.2	4.5	3.8	3.2	3.4	4.1	3.7	3.6	4.1	4.4	3.8	3.1	4.5	3.9
Juniors at universities	3.85	3.9	3.6	2.0	3.7	3.1	3.3	3.6	3.9	4.2	2.5	2.8	3.7	3.4	2.8	3.7	4.5	3.8	2.9	4.6	3.7
Seniors other HEIs		4.1	5.1	3.1		3.7	3.7	3.4	^b	4.1	3.3	3.2		3.8		3.8	4.4		3.0	3.9	3.8
Juniors other HEIs		4.3	4.8	2.6		3.4	3.0	3.6	^b	4.7	2.9	3.3		3.7		3.7	4.7		2.9	4.2	3.9

Question C2: During the current (or previous) academic year, have you been involved in any of the following teaching activities?

^aAverage of 7 items: Individualized instruction; Learning in projects/project groups; Practice instruction/laboratory work ICT-based learning/computer-assisted learning; Distance education; Development of course material Curriculum/program development; Face-to-face interaction with students outside of class Electronic communication (e-mail) with students

^bToo small number of respondents

^cAverage among advanced countries

^dAverage among emerging countries

. No other HEI or nor other HEIs surveyed

5.9 Notions and Approaches to Research and Scholarship

The academics' views of the character of their research were addressed in the CAP questionnaire by two questions. First, they have been asked to state whether research and scholarship is to be understood ('is best defined') as original research, the synthesis of academic knowledge, and/or as the application of knowledge in real-life settings. Second, they have been asked more directly linked to their own activities whether the research they undertake is basic/theoretical, practically oriented, international in scope and as mono-disciplinary or multidisciplinary. These questions are posed because academics have a choice between different approaches, but expectations have grown in recent years for more attention to the societal relevance of research. In other words, some observers argue for an increased emphasis to be placed on the dissemination of knowledge, the 'transfer' of knowledge, to move from 'mode 1' to 'mode 2' research (Gibbons et al. 1994) or to engage in more 'applied' and 'commercial' research.

Figure 5.5 suggests that many academics do not see research to be geared in a single major direction. Rather, while three quarters of the respondents support the applied nature of academic research, two-thirds support the 'basic' and 'theoretical' character of research, and two-thirds also support the need for the synthesis of major findings.

It is surprising to note that the function of **basic research** is about as often stressed by academics from emerging countries as by academics from advanced countries. One could have expected that academics from advanced countries would emphasise this more strongly, because they certainly have better means as a rule to be active in basic research as well as in any kind of research with a theoretical emphasis. In contrast, the application of knowledge as well as commercially and transfer-oriented research are somewhat more frequently named as customary by academics from emerging countries, and this is even more pronounced as far as socially relevant research is concerned.

There are, however, noteworthy differences between individual countries. For example, as Appendix Table 5.12 shows, among the advanced countries basic

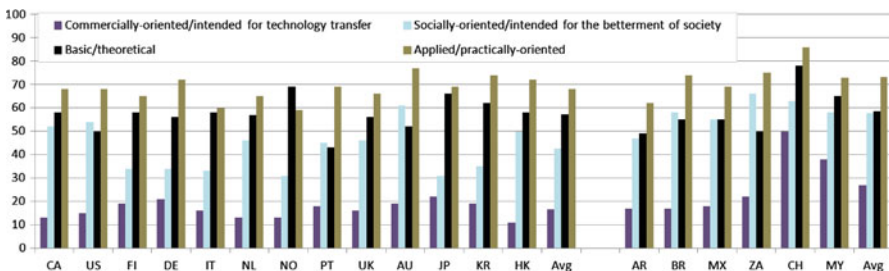


Fig. 5.5 Prime character of research (per cent, responses 1 and 2 on a scale of answer from 1 = very much to 5 = not at all). Question D2: How would you characterise the emphasis of your primary research this (or the previous) academic year?

research is least supported by academics from Finland (57% as compared to 69–90% in other advanced countries); in contrast, more of Malaysia's academics put a strong emphasis on the importance of basic research than their colleagues in the other emerging countries (78% as compared to 37–64%). The theoretical and basic nature of research is in some countries more often stressed by academics at universities than by those at other institutions of higher education. This difference is most pronounced among senior academics in Germany (83% vs. 56%), followed by the USA (74% vs. 57%), Finland (68% vs. 54%), the Netherlands (80% vs. 67%) and Norway (92% vs. 80%).

Application of knowledge is viewed as typical for scholarship by the majority of academics in all countries except for the Netherlands (46%). Otherwise, the rates range from 60% in Italy to over 80% in the three advanced and four emerging countries (with the highest rate of 86% in Mexico). A stronger emphasis on the application of knowledge can be observed among academics at other institutions of higher education compared to those at universities. Among senior academics, this difference is most pronounced in Norway (88% vs. 59%), the Netherlands (87% vs. 62%) and Germany (87% vs. 62%).

Synthesis of research findings is considered to be an important task of scholarship, as already pointed out, by about two-thirds of the academics surveyed. This mode is most frequently highlighted by the academics from Korea (91%), while it is exceptionally low in the Netherlands (45%) and Italy (46%). In this case, the responses differ by type of higher education institution to a lesser extent than the responses to the two research emphases already discussed.

In examining the responses by type of higher education institution and by status groups we note that the responses hardly differ on average between senior and junior academics at universities; the same holds true for senior and junior academics at other institutions. Therefore, we concentrate on responses of senior academics of the two institutional types. On average across countries the differences are smaller than one might have expected. University professors put somewhat more emphasis on basic research (61% vs. 47%) and somewhat less on applied research (69% vs. 78%), **commercial and transfer-oriented research** (20% vs. 24%) and socially relevant research (46% vs. 49%). As already shown above, there is only a small number of the countries addressed in the CAP survey where the functional profile between universities and other institutions of higher education is clearly polarised; this holds true notably for Finland, Germany and the Netherlands:

- Sixty-one per cent of the university professors as compared to 24% of the professors at other institutions of higher education in Finland underscore basic and theoretical research. The respective figures for Germany are 64 and 27% and for the Netherlands 62 and 34%.
- In contrast, an applied research emphasis is clearly more widespread at other institutions of higher education than at universities in these three countries, even though the affirmative responses by university professors are remarkably high: 89% versus 66% in Finland, 94% versus 67% in Germany and 93% versus 62% in the Netherlands.

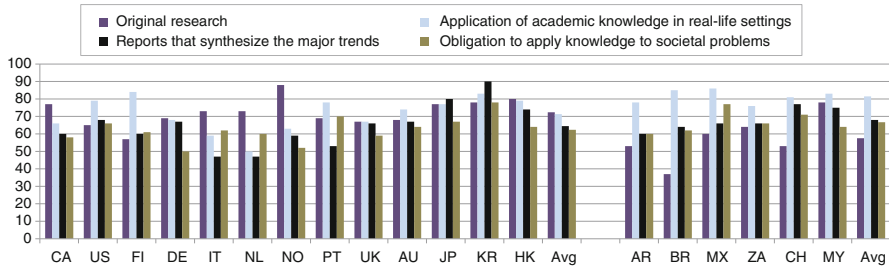


Fig. 5.6 Academics’ notion of scholarship as generation, synthesis and application of knowledge (per cent, responses 1 and 2 on a scale of answer 1=strongly agree to 5=strongly disagree). Question B5: Please indicate your views on the following. Items: Scholarship is best defined as the preparation and presentation of findings on original research; Scholarship includes the application of academic knowledge in real-life settings; Scholarship includes the preparation of reports that synthesise the major trends and findings of my field; Faculty in my discipline have a professional obligation to apply their knowledge to problems in society

- The same holds true for commercially oriented and transfer-oriented research in the former two countries: 32% versus 16% in Finland and 43% versus 15% in Germany. In the Netherlands, the respective figure is 15% each for both senior academics at universities and other institutions of higher education.
- The emphasis on **socially relevant research** is not clearly divided by institutional type. In the case of these three countries, socially relevant research is more often emphasised by professors at universities as by those at other institutions of higher education in Germany (48% vs. 37%), about as often in Finland (33% vs. 32%) and less frequently in the Netherlands (39% vs. 69%).

Academics were asked in the CAP questionnaire as well to indicate their **general views on scholarship**. In contrast to the previous question, this question does not address the character of their current activities, but rather their view on research and scholarship. The responses to four categories posed in the questionnaire are shown in Fig. 5.6:

- ‘Scholarship is best defined as the preparation and presentation of original research’.
- ‘Scholarship includes the application of academic knowledge in real-life settings’.
- ‘Scholarship includes the preparation of reports and synthesis of the trends and findings of my field’.
- ‘Faculty in my discipline have a professional obligation to apply their knowledge to problems in society’.

The function of *original research* is emphasised by 68% of the academics on average across countries. As one might expect, this is more often the case in economically advanced countries (73% on average across countries) than in emerging countries (58%). By far the highest rate is stated, as Fig. 5.6 shows, by academics from Norway (90%) and by far the lowest by their colleagues from Brazil (37%).

The *applied research* function is highlighted by three quarters of all academics. As one might expect from the previous responses, applied research is named more often by academics from emerging countries (81% on average across countries)

than from advanced countries (71%). It is most often selected by Chinese academics (86%) but also is selected by more than 70% of the academics in four advanced countries and four additional emerging countries. Altogether, the responses vary to a lesser extent by country than those regarding original research. The lowest rate as regards applied research is almost 60% (59% in Norway).

The *synthesising research function* finally is selected on average across countries by 65% of the academics, and the differences between advanced countries and emerging countries are small (64% vs. 67%). Differences by country range from 91% in Korea and 81% in Japan on the one hand to less than half in Italy and the Netherlands on the other hand.

In response to the query on multidisciplinary scholarship, 65% on average across countries describe their current primary research activities as *multi-/interdisciplinary* and 39% as *based on a single discipline*. Thus, only about 5% select both descriptors. In most of the countries, a majority describes the research as multidisciplinary. But in Norway (68%) and Japan (60%), the reverse is true, and also in the Netherlands (51%) and Mexico (55%), slightly more than half of the respondents characterise their research as mono-disciplinary.

In examining the differences by type of higher education institution and status group (see Appendix Table 5.13), we note a similar pattern as in the responses to the previous question. The responses between junior academics and senior academics are similar at universities as at other institutions of higher education. The differences according to type of higher education institution, therefore, will be illustrated only with respect to senior academics. As one might expect, university professors define scholarship more often as linked to original research than do professors at other institutions (72% vs. 65%) and less often to application (72 and 80%) and to the synthesis of findings (66% vs. 69%). But these differences with regard to their general views are even smaller than those in response to the previous question addressing their activities.

In this case, we note the most striking differences as regards original research and application again occur in Germany and the Netherlands. Clearly, more university professors than senior academics at other institutions consider scholarship is linked to original research in Germany (83% vs. 56%), whereas the respective difference is smaller in the Netherlands (80% vs. 67%). In contrast, more senior academics at other institutions of higher education than at universities underscore the importance of application in Germany (87% vs. 62%) and in the Netherlands (63% vs. 41%). In other countries, differences tend to be smaller.

5.10 Research Activities

Reports about the research function of higher education mostly address the output of research, notably publications, while the research activities as such often remain a 'black box'. In the CAP survey, the process of research is probed with the help of several questions. While these do not cover all aspects of the research activities, they do touch on several interesting aspects.

Table 5.6 shows that about half of the respondents have been involved recently in *preparing proposals for research projects*. One-third say they have been involved in

Table 5.6 Research activities by type of higher education institution and status group (per cent^a)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^d
<i>All respondents</i>																					
Preparing experiments	61	42	58	59	55	37	52	37	31	38	62	61	39	49	56	40	38	17	36	45	39
Conducting experiments	63	0	51	54	53	34	43	35	28	36	70	71	43	45	54	40	39	19	47	47	41
Supervising assistants	61	41	40	49	61	30	39	25	27	39	46	54	53	43	43	28	28	31	26	43	33
Publishing results	81	67	66	75	80	45	79	54	51	66	81	88	79	70	82	64	54	59	61	64	64
Technology transfer	17	13	26	17	15	8	12	12	11	14	13	13	12	14	27	9	11	13	19	17	16
Calls for proposals	67	50	52	55	70	32	74	23	39	50	69	90	63	56	66	42	31	33	61	53	48
Managing research	58	30	31	44	43	13	37	19	25	37	45	65	52	38	29	22	18	18	16	36	23
Purchasing supplies	52	32	39	43	58	10	34	29	23	30	68	46	42	39	47	29	33	16	27	44	33
<i>Seniors at universities</i>																					
Preparing experiments	58	52	70	59	54	54	51	37	45	47	65	68	43	54	50	53	52	18	36	53	44
Conducting experiments	61	0	54	48	50	46	44	36	41	44	69	74	51	48	49	53	53	19	52	59	48
Supervising assistants	62	57	79	75	69	57	51	41	45	72	56	70	72	62	50	51	46	31	39	73	48
Publishing results	80	77	83	84	80	69	83	62	73	86	91	94	93	81	78	88	79	56	70	82	76
Technology transfer	21	18	29	22	15	16	15	18	17	23	15	21	15	19	27	13	12	13	25	27	20
Calls for proposals	63	60	73	76	72	51	79	38	58	78	85	96	77	70	56	70	49	31	73	78	60
Managing research	58	43	61	69	51	25	50	35	44	69	59	81	69	55	31	41	33	17	22	60	34
Purchasing supplies	51	42	49	57	59	15	37	35	37	46	81	56	53	48	45	53	51	17	36	64	44
<i>Juniors at universities</i>																					
Preparing experiments	65	36	57	64	59	57	50	36	38	47	69	69	34	52	46	47	53	16	34	46	40
Conducting experiments	66	0	52	64	59	54	40	35	37	46	77	84	36	50	46	46	52	15	38	48	41
Supervising assistants	58	33	38	36	52	46	16	17	28	40	67	75	37	42	23	28	35	35	11	40	29
Publishing results	83	54	74	77	78	69	71	50	61	74	91	97	67	73	71	70	74	68	47	65	66
Technology transfer	13	14	28	11	13	10	7	11	8	15	16	8	8	12	21	11	5	15	10	13	13
Calls for proposals	75	42	56	48	68	50	64	18	41	56	89	98	50	58	53	47	45	35	43	52	46
Managing research	59	24	26	33	32	18	15	12	19	39	56	85	37	35	17	21	21	20	8	33	20
Purchasing supplies	57	31	45	38	59	16	27	25	29	34	76	58	32	41	31	32	46	17	17	43	31
Preparing experiments	65	36	57	64	59	57	50	36	38	47	69	69	34	52	46	47	53	16	34	46	40

(continued)

Table 5.6 (continued)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^d
<i>Seniors at other HEIs</i>																					
Preparing experiments	.	29	63	42	.	37	59	38	^b	39	57	59	.	46	.	33	34	.	39	36	28
Conducting experiments	.	0	59	38	.	33	40	30	^b	36	66	72	.	40	.	33	34	.	53	35	31
Supervising assistants	.	15	29	30	.	15	46	27	^b	55	42	51	.	33	.	15	21	.	14	50	40
Publishing results	.	53	59	54	.	40	84	51	^b	85	77	85	.	62	.	51	46	.	64	80	68
Technology transfer	.	7	36	25	.	4	6	22	^b	11	11	16	.	18	.	5	12	.	14	22	17
Calls for proposals	.	30	38	38	.	27	81	24	^b	60	59	88	.	47	.	29	24	.	62	60	55
Managing research	.	13	38	28	.	9	44	23	^b	52	40	60	.	33	.	13	12	.	8	47	36
Purchasing supplies	.	18	40	35	.	9	38	27	^b	33	61	45	.	34	.	16	26	.	19	48	28
Preparing experiments	.	29	63	42	.	37	59	38	^b	39	57	59	.	46	.	33	34	.	39	36	28
<i>Juniors at other HEIs</i>																					
Preparing experiments	.	30	43	40	.	7	70	27	^b	31	65	61	.	42	.	25	29	.	42	31	25
Conducting experiments	.	0	41	35	.	7	51	25	^b	30	73	68	.	37	.	25	31	.	37	33	25
Supervising assistants	.	20	6	22	.	2	27	10	^b	26	30	47	.	22	.	13	19	.	5	31	14
Publishing results	.	50	23	37	.	6	60	41	^b	64	70	87	.	49	.	42	39	.	44	49	41
Technology transfer	.	7	20	19	.	3	9	7	^b	13	4	10	.	12	.	4	10	.	9	15	8
Calls for proposals	.	28	14	26	.	2	51	9	^b	40	59	94	.	36	.	17	21	.	33	39	29
Managing research	.	19	10	38	.	1	25	6	^b	28	27	63	.	25	.	8	11	.	6	22	16
Purchasing supplies	.	21	17	45	.	1	44	20	^b	20	55	48	.	31	.	12	22	.	9	29	14
Preparing experiments	.	21	17	45	.	1	44	20	^b	20	55	48	.	31	.	12	22	.	9	29	14

Question D3: Have you been involved in any of the following research activities during this (or the previous) academic year?

^aItems: Preparing experiments, inquiries etc.; conducting experiments, inquiries etc.; supervising a research team or graduate research assistants; writing academic papers that contain research results or findings; involved in the process of technology transfer, answering calls for proposals or writing research grants; managing research contracts and budgets, purchasing or selecting equipment and research supplies

^bToo small number of respondents

^cToo small number of respondents

^dAverage among advanced countries

^eAverage among emerging countries

. No other HEIs or no other HEIs surveyed

various aspects of *starting and carrying out research*: preparing experiments and inquiries, purchasing relevant materials, managing projects, supervising other researchers and actually conducting inquiries. Finally, about two-thirds are involved in *writing up the results* of research. As one might expect, the responses to these three questions are intertwined. We note that academics active in preparing research proposals are also more likely to indicate that they are involved in the research process and in reporting results.

Turning to differences across countries, on the one hand, there is a group of research active countries (Korea, Norway, Italy, Japan and Canada) where research proposals are written by more than two-thirds of the academics and on the other hand are a group of countries (Portugal, Mexico, the Netherlands and South Africa) where relatively few academics spend time preparing proposals. Activities of preparing and conducting research are distributed similarly. The differences by country in writing up research results are smaller, because many scholars publish books and articles that do not depend on the acquisition of research grants and the availability of substantial resources for research.

We might also expect substantial differences in the research activities between senior and junior academics at *universities*, that is, institutions both more or less equally in charge of teaching and research:

- Actually, 54% of junior academics at universities are involved in the *writing of research proposals* in comparison to 66% of the professors. In 11 countries, a smaller proportion of junior staff than of senior academics are involved in these activities, with the most pronounced differences in Portugal (18% vs. 38%) and China (43% vs. 73%). In the eight other countries, there were no substantial differences.
- As one might expect, senior academics at universities are more likely than their junior colleagues to have a **supervisory role in research activities**. In fact, there is on average across all countries a gap of 58–38%.
- Overall, half of the senior academics and junior academics report that they are *actually involved in the process of inquiry*. There are only two countries where a clearly lower proportion of senior academics at universities are involved in the research process itself than of junior academics: in Germany (48% vs. 64%) and Korea (74% vs. 84%).
- Finally, across countries 79% of the senior academics and 71% of the junior academics report that they have recently been involved in *writing the research results* for publications.

In many countries, academics at *other institutions of higher education* are involved in research to a lesser extent than are the academics at universities. Among those countries for which information is available on the two types of higher education institutions, 48% of professors at other institutions of higher education are involved in writing research proposals as compared to 69% of the university professors; the respective rates for research supervision are 38% versus 59%, for actual research activities 40% versus 48%, and for writing the research results for publication 66% versus 81%.

Three quarters of the academics report that they *collaborate with other persons in their research activities*. This is not confined to their own institution of higher education, as Table 5.7 shows: six out of ten of those collaborating have research

Table 5.7 Collaboration in research by type of higher education institution and status group (per cent of all undertaking research)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^b	AR	BR	MX	ZA	CH	MY	Avg ^c
<i>All respondents</i>																					
Working individually	65	71	16	65	45	73	31	40	53	78	52	37	51	52	42	39	39	64	66	29	47
Project collaboration	85	79	89	67	82	86	80	57	84	89	61	74	83	78	77	77	77	63	72	86	75
National collaboration	68	61	68	58	77	59	56	65	67	67	49	64	53	62	63	60	55	53	33	56	53
International collaboration	63	33	69	44	59	52	60	45	60	59	22	29	57	50	43	28	35	41	10	32	32
<i>Seniors at universities</i>																					
Working individually	64	71	9	65	42	75	27	28	59	86	44	29	52	50	34	32	36	62	74	24	44
Project collaboration	84	85	93	74	83	93	84	71	84	96	76	83	87	84	83	89	82	62	75	91	80
National collaboration	70	70	83	82	79	73	65	80	72	80	61	71	60	73	70	72	62	51	43	69	61
International collaboration	67	49	87	75	62	77	72	70	68	85	38	44	71	67	52	41	46	37	16	51	41
<i>Juniors at universities</i>																					
Working individually	67	66	16	66	51	78	36	38	47	75	32	42	50	51	43	42	40	61	57	28	45
Project collaboration	85	78	90	68	80	90	75	56	84	89	77	81	80	79	76	75	82	63	73	88	76
National collaboration	65	59	66	54	73	67	48	61	64	66	51	68	48	61	62	54	63	56	25	49	52
International collaboration	57	24	68	40	54	74	50	46	58	55	25	44	49	50	41	28	40	45	6	23	31
<i>Seniors at other HEIs</i>																					
Working individually	.	75	19	66	.	69	21	27	^a	82	54	40	.	50	.	41	39	.	73	33	47
Project collaboration	.	68	83	46	.	82	93	71	^a	92	57	72	.	74	.	75	74	.	67	76	73
National collaboration	.	45	67	57	.	50	79	77	^a	79	49	60	.	63	.	51	49	.	34	48	46
International collaboration	.	16	56	26	.	26	65	59	^a	68	20	27	.	40	.	19	27	.	6	42	24

Juniors at other HEIs

Working individually	. 75	23	56	. 73	34	45	^a	76	56	34	. 52	. 46	40	. 65	46	49
Project collaboration	. 67	77	71	. 65	82	53	^a	81	57	72	. 69	. 58	70	. 58	71	64
National collaboration	. 50	60	50	. 32	48	64	^a	56	39	68	. 52	. 48	42	. 25	53	42
International collaboration	. 17	51	27	. 11	61	39	^a	43	13	25	. 32	. 12	22	. 6	25	16

Question D1: How would you characterise your research efforts undertaken during this (or the previous) academic year?
Scale from 1 = yes to 2 = no

Items: Are you working individually/without collaboration on any of your research projects? Do you have collaborators in any of your research projects? Do you collaborate with persons at other institutions in your country? Do you collaborate with international colleagues?

^aToo small number of respondents

^bAverage among advanced countries

^cAverage among emerging countries

. No other HEIs or no other HEIs surveyed

partners abroad, and eight out of ten who are collaborating have research partners in their country but outside their own institution. Half of the respondents state that they undertake research work individually; this suggests that many scholars are concurrently involved in collaborative research and in undertaking research on their own.

5.11 Research Output

In the CAP questionnaire, the academics are asked to state the numbers of publications, papers and other research output they have produced during the last 3 years. The question addresses simply the quantity of the various products without any effort to elicit information that might be used for an in-depth assessment of academic productivity, for example, co-authorship and publication in select journals, because it seemed impossible to acquire additional information which could be used to weigh the research productivity according to criteria valid across all countries, disciplines and types of institutions.

Altogether, the responses of all academics—average across countries—show (see Tables 5.8 and 5.9) that:

- Sixty-five per cent have published articles in academic books and journals—on average 5.1 articles over the past 3 years.
- Sixty-three per cent have presented papers at scholarly conferences—on average 4.6.
- Thirty-five per cent have written research reports/monographs—on average 1.1 reports.
- Twenty-five per cent have authored or co-authored a scholarly books—on average 0.5 books.
- Sixteen per cent have edited or coedited scholarly books—on average 0.3 books.
- Twenty-five per cent have written professional articles for newspapers and magazines—on average 1.1 articles.
- Five per cent or less each have produced other research results, such as patents (4%—on average 0.1), computer programmes for public use (4%—on average 0.1), artistic work (5%—on average 0.3), films (4%—on average 0.1) and others (5%—on average 0.3).
- Twenty per cent have not produced any visible research results within the recent 3 years.

An aggregate *publication index* was created by counting the authorship and editorship of books as 3, the authorship of articles in scholarly books and journals as well as research reports as 2, and finally conference papers and articles for newspapers and magazines as 1. According to this index, the average score for all academics—21—does not explain very much, because it varies substantially not

Table 5.8 Research activities (means of all respondents)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^a	AR	BR	MX	ZA	CH	MY	Avg ^b
Books (co-)authored	0.3	0.2	0.4	0.3	1	0.4	0.4	0.5	0.3	0.3	1.8	1	0.5	0.6	0.5	0.6	0.5	0.4	0.7	0.8	0.6
Books (co-)edited	0.2	0.2	0.3	0.3	0.5	0.3	0.2	0.5	0.2	0.2	0.5	0.7	0.4	0.3	0.3	0.2	0.2	0.2	0.7	0.4	0.3
Articles published	6.4	4.2	4.6	6.2	9.1	5.9	4.8	4.2	5.4	6.9	8.9	11.3	8.7	6.7	3.8	4.4	3	3	7.3	5	4.4
Report for funded project	1.4	1.6	1.3	1.7	1.6	1.1	0.6	1.3	1.2	1.5	1.1	2.6	1.5	1.4	1.8	1.4	0.7	0.8	1.2	1.6	1.3
Conference paper	8.2	5.2	4.3	5.4	7.7	4.2	4.3	6.4	4.9	5.7	4.8	7.9	7	5.8	5.8	5.5	3.8	3.4	2.2	5.9	4.4
Professional article	1.3	1.5	1.1	1.3	1.9	1.8	1.4	1.1	0.7	1.3	1.0	1.0	2.1	1.3	1.3	1.6	1.4	0.6	0.9	1.2	1.2
Patent secured	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.8	0.2	0.2	0	0	0	0	0.3	0.2	0.1
Computer programme written	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.1	0.2
Artistic work exhibited	0.3	1.7	0.3	0.5	0.1	0.2	0.5	0.5	0.2	0.4	1.2	0.5	0.2	0.5	0.2	0.3	0.5	0.2	0.1	0.2	0.3
Film produced	0.1	0.2	0.1	0.3	0.1	0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2
Others	0.6	0.9	0.3	0.3	0.2	0.1	0.6	0.4	0.4	0.2	0	0.5	0.6	0.4	0	1.0	0.6	0.3	0.1	0.4	0.4

Question D4: How many of the following scholarly contributions have you completed in the past 3 years?

Items: Scholarly books you authored or co-authored, Scholarly books you edited or coedited, Articles published in an academic book or journal, Research report/monograph written for a funded project, Paper presented at a scholarly conference, Professional article written for a newspaper or magazine, Patent secured on a process or invention, Computer programme written for public use, Artistic work performed or exhibited, Video or film produced, Others

^aAverage among advanced countries

^bAverage among emerging countries

Table 5.9 Number of research output (means for respondents with any respective research output)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^a	AR	BR	MX	ZA	CH	MY	Avg ^b
Books (co-authored)	1.4	1.3	1.5	1.4	2.0	1.4	1.7	2.1	1.4	1.4	3.1	2.1	1.6	1.7	1.5	1.8	1.8	1.7	2.4	2.4	1.9
Books (co-edited)	1.4	1.6	1.7	2.2	1.8	1.8	1.5	2.4	1.4	1.5	2.3	2.3	1.6	1.8	1.5	1.8	1.7	1.5	2.1	1.9	1.8
Articles published	7.1	5.9	6.2	7.6	9.6	7.5	5.7	5.8	6.1	7.9	10.3	11.5	9.6	7.8	5.1	5.7	5.1	4.1	9.0	7.1	6.0
Report for funded project	3.2	5.2	3.3	3.0	3.3	3.0	2.9	2.8	3.1	3.7	2.6	3.5	3.2	3.3	2.9	3.2	2.4	2.9	3.8	3.3	3.1
Conference paper	8.8	6.6	5.6	7.0	9.1	6.0	5.5	8.2	5.7	6.4	8.2	9.4	7.8	7.3	6.7	7.6	5.7	4.3	4.3	7.4	6.0
Professional article	3.4	5.3	3.4	4.6	6.6	3.7	3.9	3.3	2.7	4.4	3.5	4.4	6.7	4.3	3.1	4.6	4.3	2.6	5.1	5.7	4.2
Patent secured	1.7	1.7	1.7	2.1	1.9	2.0	1.6	2.0	1.8	1.7	2.5	3.7	2.6	2.1	1.2	1.6	1.4	2.2	2.7	3.7	2.1
Computer programme written	2.0	2.0	1.9	1.6	2.1	2.6	3.5	1.9	3.2	1.6	2.6	1.8	1.7	2.2	1.7	1.7	2.2	2.6	3.3	2.1	2.3
Artistic work exhibited	6.2	14.0	7.4	11.5	5.8	5.7	9.3	9.5	5.3	6.8	7.8	9.4	4.7	8.0	2.7	6.8	7.9	4.8	5.5	3.6	5.2
Film produced	1.9	4.0	1.6	3.9	4.5	1.3	3.3	2.5	2.3	1.8	1.7	2.4	2.1	2.6	1.3	3.4	3.5	2.4	4.7	2.9	3.0
Others	6.6	10.1	4.1	7.2	5.1	1.5	5.8	3.3	4.4	6.4	0	10.4	12.5	6.5	0	7.6	7.1	6.0	3.4	7.7	6.4

Question D4: How many of the following scholarly contributions have you completed in the past 3 years?

Items: Scholarly books you authored or co-authored, Scholarly books you edited or co-edited, Articles published in an academic book or journal, Research report/monograph written for a funded project, Paper presented at a scholarly conference, Professional article written for a newspaper or magazine, Patent secured on a process or invention, Computer programme written for public use, Artistic work performed or exhibited, Video or film produced, Others

^aAverage among advanced countries

^bAverage among emerging countries

only by country but also by the academics' status and type of higher education institution. Actually, the average score is:

- 37 for university professors
- 21 for junior staff at universities
- 19 for senior academics at other institutions of higher education
- 11 for junior academics at other institutions of higher education

According to this index, university professors publish almost twice as much as junior staff at universities and as senior academics at other institutions of higher education. Junior academics at other institutions publish substantially less.

Among *university professors*, as Table 5.13 shows, academic productivity, according to the index chosen, is:

- Very high in Korea (61), Germany (56) and Japan (50)
- High in Australia (49), Portugal (47), Hong Kong (46) and the Netherlands (41)
- Close to the average in Italy (39), Finland (38), Malaysia (36), China (34) and Canada (31)
- Low in the Argentina, Brazil and the UK (29), Norway (28), the USA (27) and Mexico (22)
- Very low in South Africa (14)

On average, the score is one and a half times as high in advanced countries as in emerging countries. The score is higher in 8 of the 13 advanced countries than in the emerging country with the highest score (Table 5.10).

Among *junior staff at universities*, who publish slightly more than half as much as senior academics, the score is exceptionally high in Japan (45) and Korea (37); both of these countries have an exceptionally small proportion of academics with junior level appointments. The score is high as well in Italy (29) and in the Netherlands (27), while it is very low in South Africa (12) and Norway (11). In half of the countries, the academic productivity of junior staff at universities is less than half of that of university professors.

Among *senior academics at other institutions of higher education*, the scores vary even more widely by country. The highest scores are reported for Malaysia (59), Portugal (42) and Korea (40). In contrast, the scores are exceptionally low in the Netherlands (7), the USA (9) and Finland (10).

Among *junior academics at other institutions of higher education*, who publish clearly least, the highest scores are reported in Korea (36) and Japan (20), where again the exceptionally small number of these junior staff positions in the two countries comes into play. In contrast, the score is exceptionally low in the Netherlands (5) and Finland (7)—that is, countries with a strong polarisation of the research function between universities that are expected to stress research in contrast to a more limited role for academics at other institutions of higher education.

The academics included in the CAP survey have been asked to provide some additional information about the modes of publications. Four issues are worth reporting.

Table 5.10 Index^a of academic productivity by type of higher education institution and status group (arithmetic mean)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^a
All respondents	26.7	19.4	19.2	24.4	35.4	22.2	18.5	21.4	20.4	25.2	32.9	41.9	32.0	26.1	20.5	21.2	14.8	13.5	24.6	23.7	19.7
Seniors at universities	30.9	26.8	37.7	55.8	39.4	41.3	27.8	47.0	28.6	49.3	50.2	60.7	46.2	41.7	29.3	29.1	21.8	14.0	34.0	36.2	27.4
Juniors at universities	19.5	17.9	16.2	19.5	28.8	27.4	11.4	22.6	15.0	20.4	44.8	36.7	20.9	23.2	19.3	18.4	16.6	11.6	15.9	17.5	16.6
Seniors other HEIs	.	8.9	9.9	19.2	.	7.1	21.3	41.6	^b 32.5	^b 30.7	40.4	.	24.1	.	16.7	11.9	.	25.2	58.8	25.2	
Juniors other HEIs	.	8.7	6.8	8.8	.	5.3	8.5	15.6	^b 15.8	^b 20.4	35.9	.	14.0	.	12.9	8.6	.	11.9	13.5	11.6	

Question D4: How many of the following scholarly contributions have you completed in the past 3 years?

^aScores built by giving different weights to different sorts of publications (3 for scholarly books (co-)authored, scholarly books (co-)edited, 2 for articles published in an academic book or journal, a research report/monograph written for a funded project, and 1 for papers presented at scholarly conference, professional articles written for a newspaper or magazine)

^bToo small number of respondents

^cAverage among advanced countries

^dAverage among emerging countries

. No other HEIs or no other HEIs surveyed

About three quarters of the respondents report that their publications have been *peer reviewed*. This holds true—according to the academics’ responses—on average across countries for 82% of the publications published by authors in advanced countries and 65% in emerging countries. ‘Peer reviewed’ is high in Canada (95%), the UK, Australia (94%) and Argentina (91%), while it is low in China (35%), Brazil and Malaysia (54% each).

About three quarters of the publications are reported to be *co-authored by colleagues of the country of employment*, while about one-third are *co-authored by colleagues of other countries*. The latter is most often stated by academics in the Netherlands (57%), Norway (50%) and Hong Kong (49%), and least often in China (3%), Brazil (19%) and South Africa (21%).

Slightly more than half of the publications are ‘published in a *language* different from the language of instruction at your current institution’. This is most often the case among academics in Norway (94%), the Netherlands (90%) and Italy (86%), while it is seldom the case in Australia (6%), the USA (10%) and the UK (12%).

5.12 Concluding Observations

The framework of the study, which underlined the relationship between knowledge and academic work, first, pointed out that academic work was located at the core of discovery and dissemination. Accordingly, in the processes of academic work, research and teaching are the most important vehicles. In fact, in modern universities, where a research orientation was institutionalised together with the teaching orientation that had existed since the medieval universities, these two functions had the potential for generating conflicts so the search for their intentional and systematic nexus became inevitable. The Humboldtian ideal, attempting to clarify their integration, is an aim to be realised in modern universities.

Second, fostering harmony between the research and teaching functions is often a challenge, as both are established activities of the contemporary university and as in most major universities both have their distinctive administrative settings. The former has been the role of higher education institutions since the middle ages; the latter has entered the university in conjunction with the institutionalisation of modern sciences and the scientific community. Integration of the values of both research and teaching has presented a great deal of difficulty as shown by the fact that cross-nationally there are several types in terms of academics’ consciousness. In the 1992 Carnegie survey, three types were identified, with the German type stressing research. By the time of the 2007 survey, arguably most systems had converged into one type, the research orientation type, or the German type. Arguably because, just at the same time that systems such as the UK system were heightening their stress on research, others such as the US and Japanese systems were striving to fortify their teaching orientation.

Third, recognising these ambiguities, still it is useful to ask why national systems and their academics might strengthen the research orientation at the expense of the teaching orientation. Modern universities are intrinsically committed to a research orientation. Moreover, the results of the emerging university rankings since the early twenty-first century have affected every system, bringing about a trend of identifying world-class universities, COEs and global universities. Finally, the market mechanism of university ranking, which was started originally in the USA, has emerged internationally in connection with the globalisation and marketisation of the knowledge society and has extended to almost all of the countries in the world.

At a time when the research orientation is itself becoming more pronounced, one has to ask, fourth, whether the integration between research and teaching has been adequately fostered. The Humboldtian ideal is, as it were, an abstract theory so there is no guarantee of its actual implementation. In reality, Germany, where this ideal was initially introduced, has been and is still going further towards a research orientation without realising the ideal. Despite the US system's recent efforts to favour quality teaching, the compatibility of teaching and research has a shaky foundation there. This is perhaps because the USA initially constructed a system realising both differentiation and integration simultaneously. However, even in the USA, the integration between teaching and research is continually confronted with constraints in which the deliberate pursuit of a teaching orientation is not attainable.

In this regard, Japan's trend is noteworthy because it is the country with the lowest compatibility of research and teaching. Recent higher education policies, especially the Faculty Development (FD) policy, seek to transform higher education in Japan from a research orientation to a teaching orientation. But these policies have encountered difficulties due to insufficient consideration of the scholarship on the factors that foster the compatibility of teaching and research. It would appear that the Japanese approach to faculty development has experienced a setback (Arimoto 2010).

This article, fifth, has testified to the compatibility of research and teaching in nineteen countries on the basis of the CAP survey. The factors highly associated with a research orientation are as follows: male gender, older age group, doctoral degree, sciences discipline, higher income, full-time employment and greater mobility. In contrast, factors associated with a teaching orientation are as follows: female gender, younger age group, lower level degree than doctorate, humanities and social sciences discipline, lower income, part-time employment and lower mobility. Based on these results, five countries are revealing high compatibility and five other countries are revealing low compatibility. The other countries are situated in between. It is realistic to say that there is the likelihood in the future of witnessing a decline in the compatibility of teaching and research.

Appendix

Table 5.11 Types of teaching modes by type of higher education institution and status group (per cent)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^b	AR	BR	MX	ZA	CH	MY	Avg ^c
<i>All respondents</i>																					
Individualised instruction	78	79	79	37	95	66	86	21	82	80	77	56	78	96	34	89	78	75	69	72	96
Project groups	45	54	45	38	33	66	49	44	57	50	25	45	59	70	32	45	58	41	24	78	70
Practice instruction	39	40	66	45	53	29	42	79	44	41	59	51	38	47	44	60	63	34	52	66	46
ICT-based learning	24	23	39	13	16	25	20	28	42	41	31	7	29	48	31	17	67	26	31	49	53
Distance education	11	24	32	2	9	11	7	15	20	35	5	12	9	26	12	18	15	48	5	15	37
Development of course material	88	86	75	33	85	78	46	85	82	87	28	63	77	15	62	50	76	86	25	70	19
Curriculum development	62	73	65	29	33	68	61	74	69	74	25	49	62	70	37	45	66	70	38	68	62
Face-to-face outside of class	94	92	65	42	83	72	78	77	83	85	67	85	88	57	61	80	86	83	67	86	54
E-mail with students	96	92	86	45	85	69	86	91	93	92	55	66	89	78	72	81	79	77	52	78	77
<i>Seniors at universities</i>																					
Individualised instruction	80	83	92	43	96	71	97	17	88	82	79	58	84	97	44	96	76	73	74	73	97
Project groups	44	51	54	39	33	44	58	43	66	45	32	54	64	75	41	54	53	42	30	76	73
Practice instruction	39	40	62	29	49	22	38	70	48	33	54	50	37	48	44	69	59	32	54	70	49
ICT-based learning	25	25	40	20	15	23	25	18	44	29	23	7	29	44	52	14	65	28	31	46	55
Distance education	11	23	29	2	10	9	9	9	21	21	3	15	9	25	22	15	13	45	5	18	39
Development of course material	87	83	84	37	84	70	51	85	89	84	26	59	81	13	79	55	76	84	30	71	20
Curriculum development	61	72	80	60	38	61	73	74	78	79	24	48	76	71	68	47	64	67	49	76	66
Face-to-face outside of class	95	91	75	61	86	68	85	79	89	82	67	83	93	63	79	83	90	83	68	85	62
E-mail with students	96	92	92	64	86	63	93	88	97	90	61	73	95	81	81	81	83	75	50	78	81

(continued)

Table 5.11 (continued)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^b	AR	BR	MX	ZA	CH	MY	Avg ^c
<i>Juniors at universities</i>																					
Individualised instruction	76	72	74	35	92	71	73	21	76	81	61	52	74	94	33	89	76	76	64	73	96
Project groups	46	55	32	34	32	46	40	47	51	52	23	47	56	66	31	46	54	41	21	80	69
Practice instruction	39	39	64	47	60	35	45	82	41	44	58	41	37	43	44	65	60	42	50	69	46
ICT-based learning	23	21	26	12	18	27	16	33	40	39	14	0	30	49	28	11	65	25	30	52	55
Distance education	12	23	21	1	8	5	5	13	18	28	8	6	9	23	11	13	19	38	5	15	35
Development of course material	91	85	65	32	86	71	39	85	73	87	10	55	74	12	60	40	81	87	19	67	17
Curriculum development	63	68	49	18	24	45	46	69	60	70	7	37	54	66	33	49	64	77	28	65	59
Face-to-face outside of class	93	91	60	35	78	67	71	81	78	85	42	80	84	47	59	83	88	83	64	88	53
E-mail with students	96	89	80	39	85	64	79	88	91	91	43	58	85	73	71	79	87	75	54	80	78
<i>Seniors at other HEIs</i>																					
Individualised instruction	.	83	80	30	.	73	90	18	^a	79	80	53	.	95	.	87	77	.	72	64	98
Project groups	.	62	73	69	.	75	43	58	^a	43	24	41	.	65	.	41	59	.	18	62	75
Practice instruction	.	37	78	49	.	29	52	65	^a	19	58	52	.	54	.	56	65	.	57	51	45
ICT-based learning	.	17	56	19	.	24	20	29	^a	47	34	7	.	49	.	21	69	.	31	44	57
Distance education	.	23	56	12	.	16	7	14	^a	47	6	14	.	28	.	23	13	.	3	7	41
Development of course material	.	90	89	43	.	79	59	81	^a	82	31	62	.	22	.	50	77	.	30	69	12
Curriculum development	.	81	85	73	.	81	69	69	^a	73	28	48	.	68	.	44	66	.	46	73	57
Face-to-face outside of class	.	96	73	70	.	75	73	72	^a	86	71	85	.	67	.	75	85	.	72	81	57
E-mail with students	.	97	97	66	.	76	90	86	^a	90	56	65	.	78	.	78	76	.	46	82	78

<i>Juniors at other HEIs</i>																
Individualised instruction	. 81	76	19	. 55	75	22	^a	79	69	60	. 91	. 83	85	. 70	67	96
Project groups	. 54	61	64	. 81	36	41	^a	52	23	50	. 62	. 36	66	. 15	76	76
Practice instruction	. 45	73	66	. 30	48	80	^a	46	67	51	. 52	. 52	64	. 50	55	48
ICT-based learning	. 27	65	0	. 24	13	28	^a	53	33	7	. 55	. 21	72	. 34	45	55
Distance education	. 29	54	7	. 9	7	16	^a	54	3	9	. 28	. 20	21	. 5	13	43
Development of course material	. 94	87	31	. 83	34	85	^a	91	18	68	. 21	. 47	80	. 22	81	15
Curriculum development	. 80	84	38	. 71	47	76	^a	78	22	53	. 67	. 41	69	. 27	70	58
Face-to-face outside of class	. 96	62	55	. 75	65	76	^a	88	54	88	. 61	. 79	86	. 65	85	52
E-mail with students	. 99	93	50	. 68	58	93	^a	96	45	66	. 74	. 84	80	. 56	75	79

Question C2: During the current (or previous) academic year, have you been involved in any of the following teaching activities?

Items: Individualised instruction, Learning in projects/project groups, Practice instruction/laboratory work, ICT-based learning/computer-assisted learning, Distance education, Development of course material, Curriculum/programme development, Face-to-face interaction with students outside of class, Electronic communication (e-mail) with students

^aToo small number of respondents

^bAverage among advanced countries

^cAverage among emerging countries

. No other HEIs or no other HEIs surveyed

Table 5.12 Prime character of research by type of higher education institution and status group (per cent^a)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^d
<i>All respondents</i>																					
Commercially oriented	13	15	19	21	16	13	13	18	16	19	22	19	11	17	17	17	18	22	50	38	27
Socially oriented	52	54	34	34	33	46	31	45	46	61	31	35	50	42	47	58	55	66	63	58	58
Basic/theoretical	58	50	58	56	58	57	69	43	56	52	66	62	58	57	49	55	55	50	78	65	59
Applied/practically oriented	68	68	65	72	60	65	59	69	66	77	69	74	72	68	62	74	69	75	86	73	73
<i>Seniors at universities</i>																					
Commercially oriented	58	53	61	64	60	62	72	41	58	57	76	68	59	61	46	57	58	53	81	68	61
Socially oriented	68	68	66	67	60	56	57	76	68	72	62	76	74	67	59	71	65	72	87	76	72
Basic/theoretical	16	17	16	15	14	15	12	22	18	25	19	21	11	17	20	15	16	22	51	39	27
Applied/practically oriented	45	51	33	48	33	39	32	50	37	58	32	23	54	41	53	50	55	65	65	62	58
<i>Juniors at universities</i>																					
Commercially oriented	58	57	62	60	52	67	65	42	55	54	57	62	60	58	53	50	52	42	73	68	56
Socially oriented	71	68	63	67	62	57	60	69	64	76	72	69	68	67	52	63	68	81	86	71	70
Basic/theoretical	11	22	21	18	17	12	15	17	15	19	14	27	10	17	14	17	8	25	52	36	25
Applied/practically oriented	54	49	29	26	34	41	29	52	42	62	25	16	46	39	46	55	41	68	60	62	55
<i>Seniors at other HEIs</i>																					
Commercially oriented	.	36	24	27	.	34	60	50	^b	52	62	58	.	45	.	64	51	.	81	58	64
Socially oriented	.	69	89	94	.	93	61	62	^b	82	69	73	.	77	.	82	73	.	83	88	82
Basic/theoretical	.	11	32	43	.	15	8	21	^b	6	20	22	.	20	.	22	20	.	42	33	29
Applied/practically oriented	.	48	34	37	.	69	18	47	^b	70	35	30	.	43	.	74	59	.	67	54	64

<i>Juniors at other HEIs</i>																					
Commercially oriented	.	50	20	35	.	24	70	41	b	40	61	64	.	43	.	48	53	.	68	61	58
Socially oriented	.	67	80	96	.	88	61	60	b	83	67	77	.	77	.	82	69	.	79	74	76
Basic/theoretical	.	21	25	65	.	19	17	18	b	16	11	18	.	26	.	16	21	.	46	36	30
Applied/practically oriented	.	46	33	25	.	42	18	47	b	63	27	40	.	39	.	59	56	.	62	47	56

Question D2: How would you characterise the emphasis of your primary research this (or the previous) academic year?

^aResponses 1 and 2 on a scale of answer from 1 = very much to 5 = not at all

^bToo small number of respondents

^cAverage among advanced countries

^dAverage among emerging countries

. No other HEIs or no other HEIs surveyed

Table 5.13 Academics' notion of scholarship as generation, synthesis and application of knowledge by type of higher education institution and status group (per cent^a)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^c	AR	BR	MX	ZA	CH	MY	Avg ^d
<i>All respondents</i>																					
Original research	77	65	57	69	73	73	88	69	67	68	77	78	80	72	53	37	60	64	53	78	58
Application of academic knowledge	66	79	84	68	59	50	63	78	67	74	77	83	79	71	78	85	86	76	81	83	82
Reports synthesise the major trends	60	68	60	67	47	47	59	53	66	67	80	90	74	64	60	64	66	66	77	75	68
Obligation to apply their knowledge	58	66	61	50	62	60	52	70	59	64	67	78	64	62	60	62	77	66	71	64	67
<i>Seniors at universities</i>																					
Original research	77	74	68	83	73	80	92	81	68	76	83	76	84	78	54	35	64	63	56	82	59
Application of academic knowledge	65	81	74	62	57	41	59	77	69	67	72	81	78	68	82	77	79	75	81	85	80
Reports synthesise the major trends	61	72	69	61	45	44	56	59	68	71	85	90	72	66	59	61	66	65	75	78	67
Obligation to apply their knowledge	55	63	65	61	62	45	50	73	58	67	62	79	62	62	63	56	69	62	70	67	65
<i>Juniors at universities</i>																					
Original research	76	61	61	69	74	82	86	74	66	69	73	79	78	73	53	39	70	66	52	79	60
Application of academic knowledge	66	76	84	67	64	42	65	76	65	75	74	85	79	71	77	83	83	79	82	86	82
Reports synthesise the major trends	58	64	59	67	49	41	61	62	63	65	86	88	74	64	60	60	58	67	79	78	67
Obligation to apply their knowledge	64	68	58	44	61	46	51	73	59	60	67	72	64	61	59	59	72	70	72	66	66
<i>Seniors at other HEIs</i>																					
Original research	57	54	56	56	67	88	80	80	^b 68	^b 68	77	78	69	42	55	50	75	56	56	56	56
Application of academic knowledge	83	92	87	87	63	56	88	88	^b 67	^b 78	82	82	77	94	88	81	79	86	86	86	86
Reports synthesise the major trends	71	75	72	72	53	68	57	57	^b 67	^b 80	89	89	70	69	68	78	63	70	70	70	70
Obligation to apply their knowledge	67	78	63	63	74	56	66	66	^b 71	^b 65	79	79	69	67	82	71	51	51	51	51	51

Juniors at other HEIs

Original research	. 62	35	49	. 67	81	64	^b	59	72	79	. 61	31	59	. 43	69	. 51
Application of academic knowledge	. 80	91	84	. 46	70	80	^b	78	78	86	. 75	86	93	. 78	74	. 83
Reports synthesise the major trends	. 67	54	83	. 48	63	47	^b	68	75	91	. 66	65	67	. 73	63	. 67
Obligation to apply their knowledge	. 66	64	75	. 63	74	68	^b	69	77	76	. 71	67	80	. 73	54	. 69

Question B5: Please indicate your views on the following:

^aResponses 1 and 2 on a scale of answer 1 =strongly agree to 5 =strongly disagree

Items: Scholarship is best defined as the preparation and presentation of findings on original research, Scholarship includes the application of academic knowledge in real-life settings, Scholarship includes the preparation of reports that synthesise the major trends and findings of my field, Faculty in my discipline have a professional obligation to apply their knowledge to problems in society

^bToo small number of respondents

^cAverage among advanced countries

^dAverage among emerging countries

. No other HEIs or no other HEIs surveyed

Table 5.14 Proportion of respondents producing different research outputs in the past 3 years (per cent of all respondents, multiple responses)

	CA	US	FI	DE	IT	NL	NO	PT	UK	AU	JP	KR	HK	Avg ^b	AR	BR	MX	ZA	CH	MY	Avg ^c
<i>Seniors at universities</i>																					
Books (co-)authored	24	19	32	34	51	25	40	36	27	32	69	46	35	36	38	37	35	14	23	40	31
Books (co-)edited	18	17	36	39	32	27	21	27	21	22	35	42	38	29	23	17	22	7	26	30	21
Articles published	77	78	87	87	94	68	85	60	72	84	89	97	93	82	70	82	76	40	49	75	65
Report for funded project	41	35	38	67	50	28	24	45	34	41	56	81	50	45	61	53	36	14	24	60	41
Conference paper	77	80	85	81	84	63	77	58	70	80	64	86	89	76	76	74	75	46	35	80	64
Professional article	38	28	47	40	30	41	38	28	23	32	38	25	38	34	48	37	36	14	10	27	29
Patent secured	6	5	6	17	6	5	5	7	3	10	15	25	10	9	2	5	4	1	8	9	5
Computer programme written	6	5	4	5	3	5	3	5	5	6	3	1	5	4	5	5	9	2	6	6	6
Artistic work exhibited	4	8	1	8	1	2	5	2	2	3	18	4	4	5	5	4	2	1	4	4	4
Film produced	3	5	3	9	3	3	4	4	3	4	6	4	5	4	4	5	6	4	1	7	5
Others	7	9	8	3	5	1	8	4	9	3	0	3	5	5	0	12	8	3	1	6	5
No research activity stated	15	6	4	4	2	28	8	34	21	15	4	1	4	11	14	9	7	43	42	9	21
<i>Juniors at universities</i>																					
Books (co-)authored	13	12	20	15	41	23	10	17	9	13	64	29	17	22	26	19	24	17	9	21	19
Books (co-)edited	9	7	11	8	17	13	6	11	5	7	19	13	10	10	14	9	9	6	10	12	10
Articles published	77	55	66	68	91	71	68	49	58	71	95	100	63	72	65	68	73	52	32	50	57
Report for funded project	30	23	33	47	43	30	15	32	23	31	41	88	31	36	53	36	30	18	9	34	30
Conference paper	83	59	69	67	84	65	66	54	56	73	49	80	64	67	76	65	78	57	18	60	59
Professional article	27	23	25	21	23	33	25	23	15	20	41	16	19	24	36	27	34	18	7	13	23
Patent secured	3	6	4	7	5	4	1	3	2	3	11	25	4	6	2	0	6	1	2	3	2
Computer programme written	3	4	7	6	4	7	4	4	4	4	7	1	3	4	6	2	5	1	4	2	3
Artistic work exhibited	5	10	3	3	2	2	4	4	2	4	16	1	4	5	8	3	6	4	1	5	5
Film produced	2	4	3	5	3	1	4	4	1	4	4	0	4	3	4	3	6	3	1	4	4
Others	11	5	5	4	4	2	9	10	4	2	0	2	3	5	0	9	10	3	1	3	4
No research activity stated	13	24	14	16	3	27	13	37	35	20	0	0	27	18	15	19	9	32	59	25	27

<i>Seniors at other HEIs</i>															
Books (co-)authored	. 13	15	23	. 9	43	22	^a 33	55	55	. 28	. 16	17	. 21	29	21
Books (co-)edited	. 9	11	16	. 4	7	20	^a 21	20	31	. 16	. 6	10	. 23	11	13
Articles published	. 50	38	51	. 28	86	56	^a 85	80	97	. 61	. 41	41	. 40	64	47
Report for funded project	. 20	32	35	. 18	18	33	^a 39	38	76	. 33	. 22	19	. 18	36	24
Conference paper	. 67	33	41	. 26	74	55	^a 84	55	83	. 56	. 41	50	. 20	59	43
Professional article	. 25	34	29	. 23	43	30	^a 30	25	25	. 29	. 21	26	. 12	27	22
Patent secured	. 0	3	5	. 0	2	10	^a 0	10	20	. 5	. 1	2	. 2	11	4
Computer programme written	. 3	3	6	. 2	7	5	^a 6	2	4	. 4	. 3	6	. 1	4	4
Artistic work exhibited	. 10	3	3	. 2	14	0	^a 7	13	4	. 7	. 3	5	. 2	4	4
Film produced	. 6	1	5	. 2	7	5	^a 4	5	3	. 5	. 2	4	. 0	6	3
Others	. 12	3	3	. 3	5	2	^a 4	0	6	. 4	. 6	7	. 0	4	4
No research activity stated	. 13	29	31	. 51	2	39	^a 11	8	0	. 22	. 45	31	. 51	16	36
<i>Juniors at other HEIs</i>															
Books (co-)authored	. 7	7	7	. 1	12	12	^a 9	47	40	. 15	. 14	12	. 4	13	11
Books (co-)edited	. 6	2	0	. 1	0	11	^a 5	10	28	. 6	. 3	7	. 5	6	5
Articles published	. 44	12	32	. 5	66	40	^a 58	73	99	. 48	. 36	38	. 21	38	33
Report for funded project	. 18	14	21	. 2	25	23	^a 28	33	67	. 25	. 19	17	. 5	19	15
Conference paper	. 61	12	32	. 4	44	44	^a 62	49	83	. 44	. 32	45	. 7	47	33
Professional article	. 23	9	20	. 4	27	16	^a 22	26	21	. 20	. 18	24	. 5	9	14
Patent secured	. 3	0	11	. 0	7	1	^a 2	5	20	. 5	. 1	2	. 1	1	1
Computer programme written	. 5	0	5	. 1	0	5	^a 2	1	5	. 3	. 2	5	. 2	3	3
Artistic work exhibited	. 19	5	2	. 0	10	3	^a 6	14	7	. 7	. 1	6	. 0	4	3
Film produced	. 8	2	2	. 0	5	3	^a 2	3	2	. 3	. 3	4	. 0	2	2
Others	. 6	4	16	. 1	17	8	^a 2	0	6	. 6	. 11	8	. 0	6	6
No research activity stated	. 21	67	44	. 89	18	41	^a 26	9	0	. 36	. 47	33	. 75	41	49

Question D4: How many of the following scholarly contributions have you completed in the past 3 years?

^aToo small number of respondents

^bAverage among advanced countries

^cAverage among emerging countries

. No other HEIs or no other HEIs surveyed

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