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UTFORSK Partnership Programme 2013–2016: Analysis of project results

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Preface

This report reviews the pilot period of the UTFORSK Partnership Programme that ran from 2013 to 2016. UTFORSK (2013-2016) targeted research collaborations funded by the Research Council of Norway in Brazil, Russia, India, China, South Africa and Japan. The aim of the programme was to use research as a basis for educational cooperation. Judging by a total of sixty-nine applications in two separate calls, UTFORSK has been well received in the higher education sector. The UTFORSK (2013-2016) portfolio consisted of sixteen projects. The largest concentration of projects was in partnerships with Chinese HEIs (seven projects), and most of the projects in the portfolio (thirteen projects) involved universities. The UTFORSK portfolio covered a wide range of academic disciplines, from linguistics, pedagogy and political science research to physics, biology and energy/climate research. Natural sciences, technology and engineering were the most strongly represented disciplines, constituting just under half of the projects. The UTFORSK pilot phase was jointly administered by SIU and the Research Council of Norway.

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Executive summary

This review shows that the UTFORSK partnerships have been productive in most respects and accomplished good results throughout the project period. The programme has stimulated the expansion of research partnerships to the field of education, which has resulted in new courses, revised curricula, joint supervision and new teaching methods. A high number of students have travelled for the purpose of education through the partnerships. UTFORSK has also allowed research collaborations to extend their time frame and, therefore, also improve their output in the realm of research. This has enabled the majority of partnerships to strengthen their collaboration and find new ways of collaborating in the future.

- The qualitative data in the project reports clearly show that linking research activities to educational activities is found to be both productive and rewarding. It serves to generate and maintain scholarly networks, increases the research capacity of the collaboration and it motivates students and provides them with important skills, experience and knowledge. The projects also report a higher rate of research publication activity as a consequence of UTFORSK. The ratio of total scientific publications is seven per project.

- Thirteen courses were developed on the basis of an UTFORSK research collaboration. Seven of the courses are at master's level, four are PhD courses, one is at bachelor's level, and one combines master's and PhD levels. Six of these were larger courses worth 10–15 ECTS, while seven were smaller courses worth 1–3 ECTS. Fifteen of sixteen projects developed teaching tools based on the cooperation. Fourteen of the projects used the research collaboration actively to revise the curricula of existing courses.

- A total of 270 students have travelled on the basis of partnerships formed by sixteen research collaborations financed through UTFORSK to Brazil, South Africa, China, Japan, India, Russia and Norway for longer or shorter periods. The UTFORSK programme's performance, as regards the programme objective of student mobility, is very good.

- Student mobility between Norway and China dominates the statistics. The highest percentage of student exchanges in UTFORSK are short term, with 234 students visiting partner countries for three months or less. Mobility is mainly concentrated at master's and PhD levels, and intensive courses are the most dominant form of student mobility. Master's students make up the highest percentage of mobility from Norway to partner countries.

- Overall, student mobility under the UTFORSK programme is fairly well balanced. A balance in inward and outward student mobility indicates balanced partnerships. It signals mutual investment and mutual educational interest, which is essential to the sustainability of the collaboration. In nine of the ten projects[1], the project has contributed to a broadening and formalising of the partnership and resulted in plans for future collaboration. Six of the ten projects have already secured new funding for their collaboration. UTFORSK has thus succeeded in its objective of strengthening institutional partnerships that will last beyond the UTFORSK project period.

[1] These data are only available for those projects that are finalised, currently ten projects.

- There has been more student mobility than staff mobility in the majority of projects in the UTFORSK portfolio. This shows a high level of student involvement in the UTFORSK programme. The programme has succeeded in reaching its overall aim of linking educational activities embedded in student mobility to partnerships based on research collaborations. All of the projects had joint supervision, close to all of the projects included students in research workshops and seminars, and thirteen of sixteen projects included the students in data collection.

- Six of the projects had a concentration of student mobility and educational activity at PhD level. Since PhD students are both researchers and students, the programme risks student involvement being limited to arenas that already include PhD students. We can see from the report that there is a risk of more lasting educational structures remaining underdeveloped in such projects.

- The implicit assumption of the programme has been that educational quality is improved by simply linking education to research activities. However, findings in this report suggest that the organisational and pedagogical framework relating to student mobility plays an important role both in developing educational quality and in increasing student mobility. The translation of research to high quality educational frameworks requires systematic attention.

- In total, UTFORSK has financed 176 staff mobility stays through the partnerships. Mobility from Norway is almost twice as high as mobility from the respective partner institutions abroad. One source of this imbalance is differences in the educational workload for the academic partners in some of the Panorama countries, particularly China and Japan.

1. Introduction

The UTFORSK Partnership Programme was funded by the Norwegian Ministry of Education and Research and administered by the Norwegian Centre for International Cooperation in Education (SIU) together with the Research Council of Norway (RCN). The overall aim of the programme is to enhance long-term cooperation in higher education with the countries encompassed by the Norwegian Government's *Panorama* strategy[2]: Brazil, China, India, Japan, Russia and South Africa. UTFORSK supports academic partnerships based on mutual, strategic interests of the partner institutions, and aims to enhance the quality of international cooperation in education by encouraging integration with research collaborations and involving non-academic partners.

In the pilot phase of the Programme (2013–2016), the overall aim of UTFORSK was to stimulate the development of international cooperation in education based on existing international research collaborations. Furthermore, only applicants with previous or ongoing research collaborations funded by RCN with partners in Brazil, China, India, Japan, Russia or South Africa were eligible for support. Two separate calls were issued in the pilot phase with NOK 8 million in the 2013 call and 6,4 million NOK in the 2014 call. The total financial framework of the programme period was NOK 14,6 million. A total of 16 projects received financial support: eight three-year projects in 2013 and eight two-year projects in 2014.

The aim of this report is to review the project portfolio from the pilot phase of UTFORSK in order to identify lessons learned and best practice from the projects, and how the cooperation has developed in terms of activities and results during the period.

1.1 What are UTFORSK's main objectives?

The main objectives for the UTFORSK Partnership Programme given in the calls from 2013 and 2014 were the following:

- to increase the number of international collaborative relationships involving both research and higher education activities
- to increase the number of international collaborative relationships involving research, higher education activities and increased mobility of students and academic staff between Norway and the partner countries
- to include student participation in international research projects
- to contribute to increasing the number of joint study programmes and/or joint degrees between Norwegian HEIs and HEIs in the partner countries
- to strengthen the institutional cooperation between Norwegian HEIs and HEIs in the partner countries and create partnerships that will last beyond the UTFORSK project period

In the 2014 call, the first programme objective was extended to include collaboration with private and public enterprises;

[2] While the pilot phase of UTFORSK precedes the Panorama strategy (2016-2020), it reflects the ambitions of the strategy. UTFORSK is one of the key instruments under the Panorama strategy for promoting bilateral cooperation in higher education and research with Brazil, China, India, Japan, Russia and South Africa (https://www.regjeringen.no/en/dokumenter/panorama/id2457714/).

- to increase the number of international collaborative relationships involving both research, higher education and enterprises in the public and private sectors.

The programme mainly targeted educational cooperation at master's and PhD levels. The programme's overall goals rested on two main assumptions. Firstly, that developing educational cooperation based on existing research collaborations would serve to increase the efficiency of establishing educational cooperation. Using research collaborations as a starting point was also seen as a means of improving educational quality by linking teaching, supervision and the development of courses to ongoing international research. Secondly, that expanding the areas of cooperation to education would strengthen the institutional linkages and durability of the partnerships with the strategic countries that UTFORSK targets. Educational cooperation with the BRICS countries prior to the initiation of UTFORSK was found to be less developed compared to research collaborations with the same countries.

In sum then, the UTFORSK partnership programme aims to improve the quality of international cooperation in higher education and research and to strengthen long-term institutional cooperation with strategic partner countries.

1.3 Data and method

The main sources of data for this report are the calls for applications, project documents and the annual project reports. Of the eight projects allocated funding in 2013, five have submitted their final project reports. Of the eight projects that received funding in 2014, five have submitted their final project reports. We therefore have complete data for ten projects.[3]

Some of the aspects investigated in this report, such as "main challenges", "synergies between research and education" and "added value", are questions that were posed in the final project reports, and consequently, this information is only available for ten of the projects. In addition, this review includes information based on interviews with four of the project coordinators.[4]

The project report data also contain project-assessment parameters to access the project coordinators' views on the results of the collaboration. The project coordinators were asked to use the scale 1–5 (1 is "to a small extent" and 5 is "to a great extent") on a set of pre-defined result parameters. These were arranged under three different headings:

- Assessment of contribution to programme goals
- Synergies between research and education
- Increased collaboration involving enterprises in the public and private sectors

Asking the project coordinator to assess what the project has achieved meant asking someone who is well-informed about the project, but who also has vested interests in communicating its success. While you cannot do away with this dimension of self-interest in reporting, the report scheme is structured in a way that invites the project coordinator to reflect on synergies, added-value, delays and challenges in the project in narrative form before assessing the parameters of the

[3] The remaining projects will submit their final reports in 2018.
[4] The project leaders of the following projects were interviewed: UTF-2013/10070, UTF-2014/10032, UTF-2013/10136, UTF-2013/10018.

abovementioned headings. This contributes somewhat to strengthening the realism of the assessment. The results from this overall project assessment will be presented as part of the data material under relevant sub-headings.

2. General features of the UTFORSK Partnership Programme

The pilot phase of the UTFORSK programme ran from 2013 to 2016 and encompassed two calls for applications. In the call issued in 2013, each project could be allocated a maximum of NOK 1.5 million over a three-year period, while the call issued in 2014 had a maximum allocation of NOK 800,000 per project over a two-year period. The total budget for the two calls was NOK 16 million.

In 2013, UTFORSK received forty applications, and eight were allocated financial support for three years**.** The allocation rate is one out of five applications (allocation rate of 20percent). The call issued in 2014 received twenty-nine applications, and eight projects were allocated financial support for two years. Approximately one out of four projects received support (allocation rate of 27 percent). Given that UTFORSK privileged research environments with ongoing research collaborations funded by RCN in a limited number of countries, we consider the interest in the programme to be good.

Table 1: *Overview of project distribution in the Panorama countries*

Call	Brazil	Russia	Japan	South Africa	India	China
2013	1	0	1	1	2	3
2014	1	2	1	0	0	4
Total	**2**	**2**	**2**	**1**	**2**	**7**

2.1 Higher Education Institutions in the UTFORSK portfolio

A review of the UTFORSK project portfolio (2013-2016) shows that the majority of projects in UTFORSK were based at universities. The University of Oslo (UiO) and Norwegian University of Science and Technology (NTNU) had the highest concentration with three projects each (Table 2). Three of the projects were located at two university colleges, Oslo and Akershus University College of Applied Sciences (HiOA) and Western Norway University of Applied Sciences (HVL, formerly HiB).

There were sixteen different main partners in the UTFORSK portfolio; seven in China, two in India, two in Brazil, one in South Africa, two in Japan, and two in Russia. None of the institutional partnerships were identical, even in the case where the same HEI in Norway had received funding through UTFORSK for two partnerships in the same country.

The UTFORSK projects represented a balanced set of academic disciplines (Appendix 1). UTFORSK contains projects that range from linguistics, pedagogy and political science research to physics, biology and energy/climate research. Just under half of the projects in the UTFORSK portfolio fell within the fields of natural sciences, technology and engineering.

Table 2: *Higher Education Institutions, partner countries and disciplines in UTFORSK*

Norwegian Higher Education Institutions	Numbers of projects	Countries	Disciplines
University of Oslo (UiO)	3	Japan, India and China	Physics, Political Science, Computer Sciences
University of Bergen (UiB)	2	China (2)	Clinical medicine, Ecology and Environmental Sciences
Norwegian University of Science and Technology (NTNU)	3	China, Brazil (2)	Mechanical Engineering, Sports Science, Physics
The Artic University of Norway (UiT)	2	Russia, Japan	Linguistics and Languages, Marine Technology
Norwegian University of Life Sciences (NMBU)	2	China, India	Ecology and Environmental Sciences, Veterinary Medicine (2)
Nord University	1	Russia	Economics
Western Norway University of Applied Sciences (HVL)	1	China	Educational Sciences and Pedagogy
Oslo and Akershus University College of Applied Sciences (HiOA)	2	South Africa, China	Educational Sciences and Pedagogy (2)

3. The UTFORSK Partnership Programme's activities

The following section analyses the level, form and pattern of activities in UTFORSK. This review attempts to differentiate between the activities financed by the programme and the results that these activities have generated. Section 3 looks at the quantities and forms of staff and student mobility that have taken place as part of UTFORSK. Section 4 analyses the output of this mobility. Both section 3 and 4 also include textboxes that provide short examples of best practice and lessons learned.

3.1 Student mobility and educational levels

A main aim of the UTFORSK Programme was to increase student and staff mobility between Norway and the strategic countries. Considering that the portfolio only contains sixteen projects, the amount of student mobility tied to research collaborations is high. The overall performance of UTFORSK programme in relation to its programme objective of student mobility is therefore very good.

Table 5 show that there is a quite good balance between student mobility to and from Norway: 141 students travelled from Norway and 129 students travelled to Norway. The majority of students from Norway are master's students, followed by bachelor's students. The number of bachelor's students travelling from Norway is almost twice the number of bachelor's students coming to Norway.

Table 5: *Student mobility and educational level.*

Mobility	Bachelor	Master	PhD	Total
From Norway	49	58	34	141
To Norway	24	63	42	129
Total	**73**	**121**	**76**	**270**

However, it is more correct to say that the projects financed by UTFORSK were primarily focused at master's and PhD levels (Table 5). The exchange of bachelor's students is mainly concentrated in one specific project between a Norwegian and Chinese institution (see Textbox 1).

The percentage of students travelling from Norway under an UTFORSK project is higher for master's students than PhD students. Of the Norwegian students travelling abroad, the number of master's students is almost twice as high as the number of PhD students. The number of PhD students travelling to Norway is slightly higher than those travelling from Norway.

Women and men are close to equally represented in student mobility; there are slightly more men than women in the student mobility statistics both to and from Norway.[5] However, if we look closer at the figures for the specific countries, student mobility between Japan to Norway is almost exclusively male. Male students also dominate mobility between Norway and Brazil, while female students dominate mobility between China and Norway. This may be attributed to differences in gender balance within the different disciplines.

[5] 245 Male: 237 Female

3.2 Student mobility by country

Overall, student mobility in UTFORSK is fairly well balanced. This is a positive result for the UTFORSK programme. A balance in inward and outward student mobility can be seen as reflecting mutual investment and educational interest and thus a balance in the partnerships.

Most of the student mobility in UTFORSK is between Norway and China (Table 6). This is to be expected since almost half of the projects are based on partnerships with Chinese institutions. Student mobility from Norway to China is greater than student mobility from China to Norway, with 19 more Norwegian students visiting China. When examining the UTFORSK partnerships in the different countries, this pattern is found in the majority of the strategic countries. The exception is student mobility between Russia and Norway, where mobility to Norway is three times higher than mobility to Russia. [6]

Table 6: *Student mobility – duration and countries*

Countries	Long-term mobility (over 3 months)		Short-term mobility (under 3 months)		Total	Total
	To Norway	From Norway	To Norway	From Norway	To Norway	From Norway
Brazil	1	-	6	8	7	8
China	26	1	44	88	70	89
India	-	-	11	11	11	11
Japan	-	2	18	16	18	18
Russia	2	-	10	4	12	4
South Africa	-	-	9	9	9	9
Total	29	3	98	136	127	139

Short-term mobility dominates student exchanges in UTFORSK, with 234 students visiting partner countries for three months or less. By comparison, only 32 students participated in exchanges longer than three months. Long-term mobility is dominated by student mobility to Norway. Only three Norwegian students had long-term educational exchanges in the partner countries. Short-term mobility is easier for the institutions to organise, and the recruitment of students is less demanding when the period in a faraway country is a few weeks rather than a semester.

[6] Imbalances in mobility to and from Norway: Brazil has a 14 percent higher student mobility from Norway, China has a 27 percent higher student mobility from Norway, and Russia has a 200percent higher mobility to Norway. In the case of India, South Africa and Japan, student mobility to and from Norway is balanced. In total, there is a 9.5 percent higher student mobility from Norway to the partner countries in UTFORSK.

Textbox 1: **A success story of large scale student mobility to China**

The collaboration between Western Norway University of Applied Sciences (HVL) and East China Normal University has been evolving since 2004 when they initiated a research collaboration with Norway. Their project "Fieldwork and research approaches in international Early Childhood Education" includes all aspects of the knowledge triangle with collaboration within the fields of research, education and internships. The project stands out in the UTFORSK portfolio as a particularly successful project in getting a substantial number of students on study exchanges between China and Norway. In the course of three years, forty-four Norwegian students spent six weeks in China, with courses and internships in Chinese kindergartens. Forty-two Chinese students came on study exchanges to Norway, and seventeen of these spent five months at HVL. The key to the success in terms of high student mobility numbers, according to the project coordinator Åsta Birkeland, was to make study exchanges to China obligatory as part of the course. Furthermore, the students travel together as a group with teachers from HVL to China. Birkeland stressed that the active supervision of the learning process by the Norwegian teachers during the exchange was vital to the learning output of the students. The presence of the teachers made it possible to prevent students from reinforcing stereotypes, rather than stimulating reflection and learning. These insights suggest that the organisational and pedagogical framework relating to student mobility plays an important role both in educational quality and in increasing student mobility.

3.3 Staff mobility between Norway and partner countries

The UTFORSK projects carried out in the pilot phase of the programme are based on existing research collaborations. In total, UTFORSK has financed 176 staff mobility stays through the partnerships. In contrast to student mobility, staff mobility from Norway is almost twice as high as that of the respective partner institutions abroad (Table 7). From the project reports, it can be seen that some of the projects found it difficult to organise staff mobility to Norway. The main explanation is that the partner institutions did not allow for long absences due to teaching responsibility. This imbalance of inward and outward staff mobility can be partly explained by this situation. For staff mobility we see that male mobility is twice as high as female within the partnerships. This is in contrast to the even gender balance for student mobility. The ratio between staff and student mobility is 176 (staff) to 273 (students). In other words, 1.5 students travelled under the programme per member of staff. Mobility figures for the projects show that:

- nine projects had a mobility ratio of two or more students per member of staff[7]
- two projects had an average mobility of one student per member of staff
- five projects had a higher level of staff mobility than student mobility

Linking educational cooperation to ongoing research collaborations exposes the programme to a risk of financing staff mobility in research activities, with low student involvement. The majority of projects in the UTFORSK portfolio, however, have had higher student mobility than staff mobility. In other words, the programme has to a large extent succeeded in its objective of linking educational

[7] Among the nine projects that had a mobility ratio of two or more students per member of staff, three projects had a ratio of three students per member of staff, and one project had a ratio of four students per member of staff.

activities (embedded in student mobility) to partnerships based on research collaborations. The fact that student mobility numbers are significantly higher than staff mobility numbers in the majority of projects shows a high level of student involvement in the UTFORSK programme.

Table 7: *Staff mobility by country*

Countries	To Norway	From Norway
Brazil	3	22
China	27	59
India	3	7
Japan	11	21
Russia	11	5
South Africa	4	3
Total	59	117

3.4 Mobility for what purposes?

The dominant form of student mobility is related to intensive courses (Table 8). Students directly linked to ongoing research activities are few in number, with only twenty students (7 percent of the total student mobility). Student participation in research workshops and seminars also appears to be quite low; only 30 students are reported to have been mobile for joint seminars and workshops. However, the number of students participating is actually higher, since these numbers are based on mobility of students alone and do not include local students that do not need to travel to participate. Depending on the type of research activity and workshops, there may also be limits to the number of students that can be directly involved in the academic activities. All in all, it is difficult to assess by student mobility numbers alone the extent to which students have been included in ongoing research activities.

Table 8: *Forms of mobility*

Forms of mobility	Number of travels	Student/staff mobility ratio
Administrative visits	13*	Staff mobility
Project planning	27	Staff mobility
Intensive courses	95	Student mobility
Internships	7	Student mobility
Joint courses	68	Staff and student mobility, ratio 21 (staff): 47 (students)
Joint courses/ study programmes/ degrees	1	Student mobility
Joint seminars/ workshops	130	Staff and student mobility, ratio 100 (staff): 30 (students)
Joint teaching and supervision	30	Staff and student mobility, ratio 29 (staff): 1 (student)
Semester mobility	27	Student mobility
Students' participation in research activities/ projects	20	Student mobility

*Only three of the projects had administrative visits, and one project dominated with eleven of thirteen visits.

Other data in the project reports show that UTFORSK has succeeded to a significant extent in its ambition to link research activities to educational activities. We see that the reported number of students participating in workshops and courses is much higher than the student mobility numbers indicate. [8] In the project assessment, eleven of sixteen project coordinators use the highest score (5= to a great extent) to represent the extent to which the projects had increased collaborations involving both research and higher education activities. The majority of projects have included students in research activities:

- Fifteen of sixteen projects report to have included students in workshops and seminars and twelve of the projects used the two highest scores to rate the projects' performance in this regard.
- Thirteen of sixteen projects report having included students in data collection and ten of the projects rated their performance with the two highest scores (4 and 5).

In sum, most of the projects in the UTFORSK portfolio report that they have included students in research activities and research arenas.

4. Results from the UTFORSK Partnership Programme

The previous section has shown the amounts, forms and directionality of mobility that has taken place under the programme, but what have these travels produced in terms of results? The following section looks at the projects' results in the form of student learning output, course development, research publication, co-supervision and guest lecturing.

4.1 Results of international student mobility

A variety of added value and outputs are described in the project reports. We must keep in mind, however, that these answers represent the perspective of the project coordinator. The students' experiences are not directly accessed. At the same time, we do get an impression of what may constitute educational value for the students, seen from the perspective of the teaching faculty. The project coordinators highlight the following areas of improved learning output for the students:

Increased quality of education: generic skills and perspectives

- Improved intercultural perspective
- A broadening of educational and disciplinary perspectives
- Stronger international orientation
- International experience as an asset for future employment
- Increased English skills and improved ability to access and navigate more efficiently in scholarly literature in English
- Improvement of verbal communication in English through the active adaptation and translation of knowledge in communication
- Increase in international student mobility and an increased interest in studies abroad at the HEIs

[8] It is not, however, possible to generate statistics from these numbers in Espresso.

The project reports show that disciplinary knowledge was broadened for the students. For instance, one project coordinator engaged in a collaboration within the field of technology observed an increased awareness among the students of the limits of transferability of technological solutions when infrastructure works differently from country to country. The students and scholars were also exposed to differences that stimulated reflection on the pros and cons of the different educational systems in the partnerships. In sum, the students who travelled under the UTFORSK programme have, according to their teachers, developed important generic competences comprising language skills, and intercultural reflection and communication. Student mobility is also attributed to the effect of increased awareness among other students of the opportunities student exchanges provide.

Five of the projects included cooperation with private and public organisations and all of these used the two highest scores to rate their performance in relation to having master's and PhD theses that addressed needs in the public and private sectors. Three of the projects reported having had student internships. The results of this educational component, however, are difficult to assess from the project data.

4.2 Results of international staff mobility

We see that a large number of scholars have had a stay at their partner institution during the UTFORSK project. What kind of results do we see from the activities they have engaged in during their stay?

4.2.1 Development of new courses/revised curricula

One important way research can be actively used to improve the quality of education is through the development of new courses (see Textboxes 2 and 3). In UTFORSK (2013-2016), thirteen courses were developed on the basis of the research collaborations. Seven of the courses are at master's level, four are PhD courses, one is at bachelor's level, and one combines master's and PhD levels (Appendix 2). Six of these were larger courses worth 10–15 ECTS, while seven were smaller courses worth 1–3 ECTS.

It is worth noting, however, that these courses were developed by just seven of the projects, which constitutes less than half of the UTFORSK portfolio. However, the general assessments of the projects show that twelve of sixteen projects have developed joint courses. The project reports also suggest that the joint course activity is higher than that shown in the list in Appendix 2. We find that, while the project coordinators have reported on the activity of joint courses for the purpose of budgets, not all of them have listed the joint courses in the project results. The reason for this discrepancy is not clear. One explanation may be that the project coordinators have only reported the courses that are formally allocated ECTS.

Some of the projects in UTFORSK that are mainly concentrated at PhD level appear to have opted for educational activities limited to the research project and do not seem to have prioritised developing more long-term educational collaborative structures.

However, project coordinators report that the collaboration has improved the quality of education through revised curricula, guest lectures and seminars, and new courses offered in English at their institution. The data show that country contexts provided special assets for research and teaching (see Textbox 2). New teaching models were also introduced in many of the partnerships. Fifteen of sixteen projects report having developed teaching tools based on the cooperation and ten of these

used the two highest scores to rate their performance. Fourteen of the projects used the research collaboration actively to revise the curricula of existing courses.

In sum, new courses based on ongoing research along with the revision of existing courses are prominent results of the pilot phase of UTFORSK.

Textbox 2: **A biology course developed in UTFORSK-2013/10074 TRANSPLANT**

The TransPlant project was based on a research cooperation between the Department of Biology at UiB and the Chinese Academy of Science focusing on climate change and its effect on plants. TransPlant was also tied to a larger network of research groups studying climate change straddling Asia and America. The project set out to train a new generation of Global Change Ecology students. This project is just one of several initiatives taken to create relevant and innovative education for future biologists at UiB. The same year TransPlant received UTFORSK funding, the Department of Biology at UiB was afforded the status as Center for excellence in education. The following course was created as part of the UTFORSK-funded project:

"The International Plant Functional Traits Course offers hands-on, field-based exploration of plant functional traits, along with experience in the usage of plant traits data in climate change research and ecosystem ecology. Trait-based ecology offers an important set of methods and new approaches that enable a more powerful approach to predict how climate and biotic interactions shape the diversity of communities and functioning of ecosystems. This course will provide students with the essential background and skills needed for trait-based ecology (…)

The course is held along an elevational gradient in Gongga Mountain in the Sichuan Province in China in the transition between the Tibetan Plateau and lowland forest ecosystems. The field work will be carried out along an elevational gradient (3000–4200 m.a.s.l.) that includes our experimental TransPlant project (…)

The course is aimed at graduate students - both master's and PhD. Participants will work with international instructors and in teams to focus on collecting data in the field to address a specific research question. They will gain experience in measuring plant functional traits and will learn standard protocols and multiple methods. They will get basic knowledge of the structure and analysis of trait data, and have experience with analyses and interpretation of these data."

Course description from project report

4.2.2. Co-supervision and guest lecturing

All of the projects involved co-supervision and guest lecturing. While this means that the quality of teaching was enhanced by temporarily increasing the teaching and supervision capacity, it also means the academic networks are broadened beyond the research project. One of the project coordinators explained that staff mobility between the partner institutions through guest lecturing and co-supervision allowed their partners to become acquainted with the rest of the department's scholars and further integrated the collaboration at the departmental level. International co-supervision was stressed in the reports as a resource that improves educational quality by offering students broader scholarly expertise. UTFORSK funding made it possible to invite experienced lecturers that exposed the students to top-level researchers and advanced scientific research.

Eight of the projects in the UTFORSK portfolio included collaborations with enterprises in the public and private sectors. Guest lectures and presentations were common ways in which such private/public collaborations were used in the projects.

4.2.3. Publication and dissemination

Publications constitute a tangible way of assessing the results of staff mobility. Several of the project coordinators reported that the seminars and workshops financed by the programme increased the number of publications spawned from their research collaboration. Some of the projects had recently finalised their joint research projects, and the UTFORSK funding enabled them to continue their collaboration and publish more.

From the list of publications that the project coordinators have provided, we see that the 16 research projects have published 58 scientific articles, five books and five book chapters. A total of 10 master's and PhD theses are included.[9] This means a publication ratio of over three articles per project over the course of three years. The ratio of total scientific publications to the number of projects is seven per project.

The overview of dissemination shows that the partnerships have actively communicated their projects and activities, with a dissemination ratio of nine presentations per project. We also see that the projects report 13 cases of media coverage, indicating that there has been public interest in the projects (for an overview of publications and dissemination, see Appendix 3).

4.2.4. Increased quality of research and partnerships

A number of results are highlighted in the project reports as having contributed to improving education and research, and developing stronger partnerships:

- New scholarly perspectives
- New and improved research data
- Increased quality and quantity of scholarly publications
- Links to new scholarly networks
- Increased awareness of the need of international cooperation in fields that had previously been less exposed to internationalisation
- Educational cooperation facilitates continued collaboration in the future

Many of the partnerships had developed new research projects and more long-term planning of collaboration in education. One of the projects reported that the collaboration had enabled the development of cooperation with other Norwegian HEIs. SIU's funding had helped to keep the collaboration going when the RCN project was concluded, and new research projects had yet to materialise. The last section in this chapter looks at the results of the programme in relation to two overarching goals of the UTFORSK programme: the development of strong and sustainable partnerships and synergies between research and education.

4.3 Results and overarching programme goals

As stated initially in this review, the UTFORSK programme builds on two central assumptions: firstly, that developing educational cooperation based on existing academic collaborations will improve

[9] This number may be higher since student theses are not always considered to be scientific publications.

educational quality by linking teaching, supervision and the development of courses to ongoing international research. Secondly, expanding the areas of cooperation will strengthen the institutional linkages and durability of the partnerships. What synergies between research and education do the partnerships feel they have achieved in the projects? And have the collaborative activities led to stronger partnerships?

4.3.1 Synergies between research and education

"The project has enabled us to collaborate on education and research initiatives, drawing from research to use in an education that offers perspectives beyond those of each participating country on its own, as well as using our educational discussions to further develop the theory driving the anchoring research project. Additionally, the collaboration has provided a way to deepen the conversation on future arenas of collaboration. The students who have visited China (for the course) and India (for the field research stays) have gained perspectives and data that would not have been possible without the collaboration." UTF-2013/10070

Given the primary objective of linking educational activities to ongoing international research collaborations, the project coordinators were asked to describe synergies between research and education as part of their project results. The quote above shows one answer we received to that question. The cooperation in education helped to develop themes and perspectives that led to new research initiatives. In one of the interviews conducted for this review, the project coordinator presented a telling example of how having a workshop on poverty and shame in Beijing deepened the understanding of such vulnerability and of environmental issues, especially among the Nordic students. The pollution rate in the city was dangerously high and prevented students and staff from leaving the hotel. Beijing's s poor did not have the same option.

Project coordinators also reported that students found being involved in research activities to be inspiring and motivating. The link to ongoing research provided them with hands-on practical knowledge on how to conduct and plan research. Research activities were also strengthened because the students' work helped to increase research capacity in the projects:

"The project was linked to the RCN research project that served as the foundation and motivation for the educational activity. The results of student activities directly supported the sounding rocket experiments. This had a strong impact on the student motivation and performance. Some simulation results were entirely new and were suitable for publication in international scientific journals. Through the projects, the students learned what real research looks like. They also had to design their experiments by themselves, meet deadlines, and learned how to work in international collaborations. For some students, these results became the starting point of their thesis. The students' results were also taken further and were incorporated into research with real data from sounding rocket experiments."

The project reports show that linking research activities to educational activities is both productive and rewarding. It serves to generate and maintain scholarly networks, increases the research capacity of the collaboration and it motivates students and provides them with important skills, experience and knowledge. The academic and societal effects of this are impossible to assess within the framework of this review. However, we may assume that the activity financed through UTFORSK has strengthened the academic capital (knowledge, network and potential recruitment) for the HEIs

involved. It remains to be seen how this capital is put into use to generate new research and new collaborative forms in education in the future.

4.3.2 Partnership durability and sustainability

Stimulating sustainable and long-term cooperation is one of the main objectives of the UTFORSK Partnership Programme. The report scheme contains three questions in the final report[10] that address the sustainability of the partnerships:

- Has the partnership developed to become broader or more formalised?
- Do the partners have plans for continued collaboration in joint educational activities or research?
- Have the partners attained new project financing or been allocated funds for collaboration in education or research?

UTFORSK has largely achieved one of its main objectives, namely "strengthening the institutional cooperation between Norwegian HEIs and HEIs in the partner countries and creating partnerships that will last beyond the UTFORSK project period". Nine of the ten projects[11] reported that the project had contributed to broadening and formalising the partnership and nine of ten projects have plans for future collaboration. Six of the ten projects have already secured new funding for their collaboration. Based on the final project reports of the ten projects that have been concluded, both sustainability and the prospects for continued partnerships are good. Several of the UTFORSK projects have applied for new funding from a SIU programme.

Three of the partnerships were discontinued for valid reasons. One of the projects discovered that a key academic partner had been conducting research fraud and a lacking response from the partner institution to impose sanctions made it impossible to continue the collaboration. Another project was unsuccessful due to critical changes in the educational policy within their field of research. A third project discontinued the partnership with the Chinese partners under the UTFORSK project, but will continue to develop the collaboration with the second Indian partner. The reason given was that they had not managed to develop sufficiently common ground on which to continue the collaboration with China.

5. What challenges did the projects face?

Examining the challenges the projects have faced is important for improving the advisory capacity of SIU, as well as the design of the programme itself. In the final project report, the project coordinators are asked what challenges they have encountered during the project period. In this section, these experiences have been analysed and organised according to overarching themes.

[10] These data are only available for those projects that are finalised, currently ten projects.
[11] Only ten of the projects have submitted their final reports and the remaining six projects have not yet answered these questions.

5.1 Challenges at national level

Changes in the political climate, the emergence of economic crises or changes in educational policies are challenges that affect international collaboration in research and education. These risks are hard to foresee.

Some projects experienced challenges relating to obtaining visas to Norway and China. The previously strained bilateral relationship between Norway and China was perceived as a limitation by some of the partnerships. Projects in Brazil were affected by the economic crisis, and one of the projects reports that labour strikes at the partner university posed a problem in the collaboration in terms of carrying through planned activity. A change in educational policy in South Africa made it difficult to continue an ongoing collaboration in vocational training.

5.2 Institutional differences and structures

Some of the projects faced challenges relating to different academic structures, such as different time schedules in academic calendars, and differences in academic workloads and expected attendance of staff and students. This was mentioned as a particular challenge for partnerships in China and Japan and made planning of staff and student mobility challenging. For instance, the difficulties imposed from being absent from a study programme for Japanese students was noted in one of the reports:

"We have also noticed that, for Japanese students, it is more difficult to leave their classes for longer time periods than for Norwegian students. This is due to obligatory meetings and also due to the job market (the students need to be actively involved in meetings with industry during their whole studies)." UTF-2014/10043

The project handled the problem by lowering the expectations of long-term student exchanges from Japan and worked instead to increase short-term exchanges for the Japanese students.

One of the projects pointed out lacking infrastructure as a major obstacle to student exchanges from Norway. Inadequate facilities for hosting non-Chinese students was a problem in one of the partnerships that made it impossible to send Norwegian students to China. Such issues should ideally be clarified in the project planning phase to enable a more realistic project design and ambitions.

One project found it difficult to recruit Norwegian students to courses in China, not because of an insufficient number of interested students, but because the students fixed their course programme well in advance and had few possibilities to make changes. The solution to this problem was for the partners to agree on the creation of a long-term course structure that created predictable conditions for the students. This was also an important step to increase the sustainability of the cooperation beyond the UTFORSK project.

5.3 Language challenges

A limited selection of courses in English at the Chinese partner institution is described as a challenge that made recruitment of Norwegian students difficult. The portfolio of courses in English at some of the Chinese institutions is only gradually being developed.

Insufficient English skills were described as challenging in one collaboration with a Japanese institution. The problem was mitigated in the project through the composition of student groups:

"There were no major cultural problems, which was mitigated by introduction to Japanese and Norwegian cultures before the travel. Language was sometimes a challenge, since not all students could communicate well in English. However, we divided students carefully into groups that could work well and that there was altogether a good language communication in the group. In addition, we have sometimes translated into both Norwegian and Japanese". UTF-2014/10043 Japan

The quote above shows how the project had included measures to facilitate both language learning and cultural learning by having introduction courses to culture and including language resources in the courses.

5.4 Differences in academic practices

Differences in the ways subjects are taught or ways in which scientific data are handled and shared posed challenges to some of the projects. Such differences are often challenging, but some of the projects found productive solutions, which improved both project efficiency and the quality of education for the students. An example of a project that managed to use the academic differences in teaching and scientific practices productively (UTFORSK 2014/10069 Sustainable energy in Cities), is where the project solved the challenge of different pedagogical approaches (Chinese, lecture based/ Norwegian institution problem-based learning) by combining the two: lectures in the morning and practical work in the afternoon (see also Textbox 3).

Another example from China was related to cultural differences in research work, data sharing and collaborative work on data sharing. The partnership in question involved a natural science collaboration in the field of biology. The solution was to write an extensive data sharing agreement, signed by the top level of all the collaborating institutions. This secured access to data and publications, and potential conflicts over these issues were mitigated by having clear rules that the institutions prepared together. The project coordinator reports that much was learned on both sides through this process.

Textbox 3: **Making productive use of differences at summer schools for PhD students**

In 2015-2016, NTNU Norwegian University of Science and Technology and SJTU Shanghai Jiao Tong University held two summer schools on Sustainable Energy in Cities (SEniC). The summer schools were hosted by SJTU in Shanghai, in cooperation with local industry and the municipality, providing case studies at the neighbourhood scale.

The summer schools allowed students and staff to gain hands-on knowledge and expertise in sustainable energy in cities, by exchanging and learning from Asian and Nordic perspectives on topics such as the potential role of buildings, solar energy, refrigeration, and energy systems and services, to obtain energy-efficient cities with high quality of life. Different pedagogical approaches for the Norwegian and Chinese partners implied a need for comprise between teaching-based courses with full lectures, and problem-based student group work. The solution was morning sessions with lectures and afternoon sessions where student groups worked on real-life case studies.

The summer schools were interdisciplinary and included scholars from the fields of architecture, mechanical engineering and urban planning. The lectures could therefore be actively used to train both students and faculty. Shanghai provided a set of new challenges to the Norwegian students, and the Chinese students were exposed to new ways of learning through fieldwork and problem solving that improved educational quality for all stakeholders.

UTFORSK 2014/10069 China

5.5 Difficulties in student recruitment

"We learned that it is much easier to recruit students to take a course abroad for a limited length of time than it is to recruit them to engage in fieldwork for a brief period of time. The course provides a comfortable base for the students to experience an unknown setting while engaging in research abroad, which requires not just a local contact, but also the ability to negotiate local rules, paperwork and administrations." UTF-2013/10070, China

Some of the projects did not manage to reach their set student recruitment targets for educational stays in the partner countries. In some cases, this was caused by a lack of communication with and active information given to the students. In short, student recruitment had not been devoted sufficient attention in the planning of the projects. Sometimes, the total number of students that could be recruited for mobility was too limited to be able to reach the set project goals. Future projects should be encouraged to seek out collaborations with other Norwegian institutions within the same disciplines to increase the potential number of students for their educational collaboration and achieve their mobility targets. Asking the applicants about the number of students at the department that form the basis for recruitment could also be included as necessary information as part of the evaluation of project applications.

6. Concluding remarks

Overall, the UTFORSK partnership programme has shown good results. The mobility figures demonstrate high activity in the partnerships. The ratio between staff and student mobility shows a high involvement of students in most of the projects.

The qualitative data in the project reports clearly show that linking research activities to educational activities is both productive and rewarding. It serves to generate and maintain scholarly networks, increases the research capacity of the collaboration and it motivates students and provides them with important skills, experience and knowledge. In some of the projects, educational cooperation spurs on new research initiatives. It is also apparent that the funding from UTFORSK allowed some of the projects to continue their collaborations when the research funding was terminated. This bought the partners more time to develop new research proposals, but most importantly, it stimulated the scholarly environments to develop educational cooperation tied to research activities.

At the time of this review, only ten of sixteen projects had submitted their final reports. This indicates that the programme's time frame is too narrow. Developing partnerships with countries beyond Europe and North America can be challenging and time-consuming. In our experience, it demands more time to accommodate and develop the structure and form of collaboration necessary to create sustainable partnerships in these parts of the world. The new programme period of UTFORSK has already taken this lesson into account and extended the long-term financing to four years.

The RCN requirement in the UTFORSK programme has been removed in the current programme period, and the size of the financial framework has increased. The new portfolio for UTFORSK 2016 for long-term financing currently contains twenty projects. The effect of increased funding and the removal of the RCN requirement is a broadened institutional representation in the programme: two more universities, the University of Agder and the University of Stavanger have been added to the list of projects funded through UTFORSK. Five university colleges hold six of the projects in the portfolio, compared to only two university colleges with three projects in the programme period under review (UTFORSK 2013-2016).

While linking research and education brings out important qualities for improved education in teaching, curricula and expanded scholarly networks, the programme needs to make sure that the collaboration does not remain limited to the timeframe of the research project. This means, for instance, that joint courses and summer school collaborations should be encouraged to develop a structure that enables them to be run more than once and beyond the project period. Several of the research projects in the UTFORSK programme focusing on PhD level have opted for educational activities limited to the research project, and do not appear to have prioritised the development of more long-term educational collaborative structures. This means that the students who were included probably learned a lot, but the next student group will not be able to harvest the same quality of learning output. It may therefore be wise to consider more explicit requirements in the projects, especially those that target PhD students exclusively. PhD students are effectively both researchers and students. Projects that target this group should be more explicitly encouraged to develop cooperative educational structures in doctoral courses or other arrangements that are attractive enough to be continued beyond UTFORSK.

Short-term mobility is dominant in the pilot period of UTFORSK. This seems partly to be a consequence of the programme's overall aim of linking research and education. Most of the courses, workshops and fieldwork in which the students participate last for a period of less than three months. However, increasing the share of long-term exchanges could be considered as a potential ambition for the programme in the future. At the same time, one should not underestimate the value of short-term mobility especially when it is linked to research activities or active teacher supervision. Also, short-term mobility is far easier to achieve in terms of student recruitment, and may be a good way to start an educational cooperation. On the other hand, one may assume that long-term mobility stays are important to develop both the partnership and the networks that the programme sets out to establish. The question is whether the requirements/framework of financing short-term mobility could be further developed to ensure that short-term mobility is reserved for the most teaching-intensive forms, such as the HVL teacher-supervised fieldwork in Chinese kindergartens (Textbox 1).

The implicit assumption of the UTFORSK programme has been that educational quality is improved by simply linking education to research activities. However, findings in this report suggest that the organisational and pedagogical framework relating to student mobility plays an important role in both developing educational quality and in increasing student mobility. The translation of research to high quality educational frameworks requires systematic attention.

Many of the challenges highlighted by the project coordinators are common, and several could have been solved by better planning. For instance, the partnerships in China and Japan faced the same challenges in terms of staff mobility from these countries. Developing a check list of important dimensions to consider when developing a collaboration could be a way of strengthening the advisory capacity of SIU and making the knowledge and experience of the organisation more available to applicants in an early phase of planning.

Finally, we see that most of the projects do not include administrative staff when travelling to partner institutions. At the same time, the programme administrators at SIU have observed that the project coordinator tends to underestimate the administration's workload and its importance in institutionalising the partnership. Including a representative of the HEI's administration in a delegation may be one way of using and developing the project's administrative capacity.

Appendix 1. Academic disciplines in the UTFORSK project portfolio

Academic disciplines	2013	2014	Total
Arts and Humanities	-	1	1
Economics and Business studies	-	1	1
Health and Care	2	1	3
Law and Social Sciences	2	-	2
Natural Sciences, Technology and Engineering	3	4	7
Pedagogy and Teaching	1	1	2
Total projects			**16**

Appendix 2. Overview of courses developed in the UTFORSK partnerships

Overview of courses developed in the UTFORSK partnerships

Number	Course title	Educational level	ECTS
1	Beyond Income: Social Dimensions of Poverty and Participatory Methodologies of Investigation	Master	10
2	Beyond Income: Social dimensions of poverty in international perspective	PhD	10
3	Beyond Income: Social dimensions of poverty in international perspective	Master	10
4	Summer School on Sustainable Energy in Cities	Master	7
5	Plant Functional Traits course	Master/PhD	10
6	3-day intensive course on modern scientific computing	Master	1
7	Intercultural pedagogy and global practices	Master	15
8	Soil and Soil Pollution	Master	10
9	FY8203 at NTNU: Soft Matter Physics	PhD	3
10	Geilo School	PhD	3
11	Series of International Workshops on Complex Physical Phenomena in Materials	PhD	3
12	4DSpace Numerical Workshop on Space Simulations.	Master	3
13	3-day intensive course entitled "A brief introduction to computational physics"	Bachelor	1

Appendix 3. Overview of publication and dissemination

Form of publication	Number of publications
Articles published in scientific journal	58
Books	5
Chapter in edited volume	5
Master thesis	4
PhD thesis	6
Refereed conference paper	27
Scientific report or working paper	12
Total number	**117**

Form of dissemination	Number
Conference/seminar presentation without refereed paper	75
Leaflet	2
Media coverage	13
Non-scientific report	6
Other	19
Policy briefs	2
Website	27
Total number	**144**

Appendix 4. Programme goal assessment

The scale of the fixed questions below is 1–5, where 1 is "to a small extent" and 5 is "to a great extent.

Assessment of contribution to programme goals, to what extent has the project contributed to:

1) Increased collaboration involving both research and higher education activities
2) Increased higher education collaboration involving enterprises in the public and private sectors
3) Increased mobility of students and academic staff between the partner countries
4) Increased number of students involved in international research projects
5) Improved quality of education offered at the institution in Norway
6) Strengthened institutional cooperation between Norwegian institutions and institutions in the partner countries
7) Sustainable partnerships that will last beyond the project period

Question	Assessment of contribution to programme goals	Average score	Answers (N)
1	Research/education	4,7	16
2	Enterprises	3,3	9
3	Mobility	4,6	16
4	Involvement	4,5	16
5	Improved quality	4,0	16
6	Stronger cooperation	4,3	16
7	Sustainability	4,4	15

Synergies between research and education, to what extent has the project contributed to the:

1) Development of joint courses
2) Revised curricula based on ongoing research
3) Student participation in data collection
4) Joint supervision of students by staff from two or more partner institutions
5) Student participation in research workshops / seminars
6) Development of teaching tools and/or digital resources for education based on research collaboration between the partner institutions

Question	Synergies between research and education	Average score	Answers (N)
1	Joint Courses	4,5	12
2	Curriculum	4,5	14
3	Data collection	4,3	13
4	Supervision	4,3	16
5	Workshop	4,4	15
6	Teaching tools	3,4	15

Collaboration between HEIs and private and public sectors

Increased collaboration involving enterprises in public and private sector:

1) Student internships
2) Master and PhD theses addressing specific needs in the public and private sectors
3) Guest lectures/presentations
4) Innovation – the development of new products, ways in which work is organised, new teaching tools
5) Collaboration in research and education

Question	Collaboration between HEIs and private and public sectors	Average score	Answers (N)
1	Internships	3,3	3
2	Master/PhD thesis	4,2	5
3	Guest lectures	4,4	5
4	Innovation	4,0	5
5	Research and education	4,7	4