



Transferring transport research results into university education

Report on the results of a user survey, a workshop in Rome,
and a roadmap for future improvements

Directorate-General
for Energy
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Transport Research



Knowledge Centre



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Transferring transport research results into university education - Report on the results of a user survey, a workshop in Rome, and a roadmap for future improvements

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Executive Summary

The deliverable reports on the workshop which took place in Rome on the 28 September 2007. The workshop was part of the activities of workpackage 5.1 “Linkage to the education and training systems”. This workpackage was aimed at offering an insight into the use of the research results in education. This is a complement of the dissemination activities on research programmes and projects in the European Research Area which is the primary aim of the TRKC project.

The aim of the workshop was to discuss the knowledge which is available to date on the processes of transfer of research results into education programmes at university levels. Ultimately the aim was to assess the potential for exploitation of the results from research in education and to provide recommendations, suggesting a roadmap, to enhance such exploitation.

The workshop was structured into two sessions, the first with presentations to report on the knowledge available, the second to discuss it and derive recommendations. The workshop was attended by 10 persons, six from university institutions, and four from research and consultancy organisations.

Insights on the transfer processes between research and education were provided based on two sources.

- The lessons learnt from the PORTAL project which, within FP5, had produced education material from EU research projects and had tested it in university courses.
- A survey on the experiences and attitudes of lecturers in the European universities towards the use of research results in education; the survey was carried out as part of the activities of the same workpackage within the TRKC project; the deliverable includes an extensive overview of the results of this survey.

Main lessons learnt from PORTAL were identified in the following.

- Reported barriers for taking up EU research results include lack of time for lecturers to prepare new material, shortage of relevant courses, and lack of awareness.
- Additional barriers are scepticism about positive results of projects as everything is “sugar-coated”, scepticism about findings of projects where the lecturer has not personally participated, no acceptance of material that has been prepared by non-lecturers.
- It is not possible to develop standard material suitable for the needs and preferences of every lecturer, therefore material that the lecturers would find useful must be easily modifiable so that it can be adapted; links to sources for further information must be included.

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- The EU as research funding entity should request that a specific part of the dissemination plan focuses on the educational market; each research project should provide the main achievements in the format of few slides; guest lecturing and lecturers' exchange programmes should be supported.

The TRKC survey within the lecturers' community was carried out in the summer 2007 using different tools:

- the principal tool for collection of knowledge was a questionnaire, available for on-line compilation (<http://www.ctl.uniroma1.it/TRKCProject/home.htm>); some 1050 lecturers from EU universities were contacted, responses came from 129 of them (12%);
- additional tools were face-to-face interviews with four lecturers from two universities in Italy and an email inquiry among nine lecturers in one university in the UK.

Main results from the TRKC survey regarding the experiences of transfer were:

- EU-funded research is relatively less used in university education than other research; the use of EU research has significantly increased compared to the survey carried out by PORTAL in 2001; EU research does not produce in a significant quantity papers in scientific journals in the area of supply chain management and logistics.
- Research results are frequently used as sources for seminars, assignments and thesis work within university courses; in a few cases where the course addresses a new priority (e.g. road safety, freight modelling) education material is almost entirely based on research.
- Papers in scientific journals are the most used source of information from non-EU research projects: on the other hand the primary sources from EU research projects used by lecturers are personal experience and deliverables.
- Preference as information source from research projects is given to papers in scientific journals.
- Main barriers to the transfer were identified in: lack of awareness; results not in the right format for education purposes; results too fragmented and lack of overall synthesis; information overload.

Main results from the TRKC survey regarding recommendations were:

- Traditional university education starts from theory and moves to application. It is suggested that in order for research results to be "sold" to the education market each project produces a form to frame research activities within consolidated theories. This provides the information basis for subsequent assessment of which research fits which course.
- Research results need an assimilation period before the transfer can take place; the assimilation is essentially an activity of pooling and comparing results on the same topic from different projects and sources. Thematic networks and coordination actions are important for the transfer into education.

- Project documentation is sometimes lost as web sites are dismissed while research results are of interest for a long period after they have been released. This holds in particular for the use of research results by industry. All documentation from projects, not only summary forms, should be stored and made accessible for several years.
- Presentations which were projected during conferences should be given the same priority of other project documentation as far as storage and accessibility are concerned, this relates in particular to the project final conference.
- The problem is that there are many information sources available and the user (lecturer) needs guidance on what is available where. A facility linking different databases and information sources would be of value.
- An alerting system, in the same vein of some scientific journals and publishers, should be put in place for research projects informing when a particular product (e.g. survey results, handbook, recommendations) from a project has been released. The alerting system should be organised on a thematic basis.

After the presentation of the above results a discussion took place which tackled two issues. One issue is the provision of information according to the users' needs, in particular the needs of the teaching community. Another issue is the active participation of users within networking opportunities, possibly offered by TRKC.

From the results of the discussion, taken into account also all the knowledge pooled from the PORTAL experience and the TRKC survey, it was possible to outline a mini-roadmap for the linkages between research and university education. The mini-roadmap is structured according to concerns. For each concern, one or more "Propositions" (PR) and consequent "Recommendations" (RE) are formulated.

First concern. Research for targeted action.

PR1. A period where results from research are assimilated before the transfer into education takes place is commonly seen as necessary. The assimilation is essentially an activity of pooling and comparing results from different sources and projects.

RE1. Thematic networks and coordination actions appear as the first candidate for putting in place a dissemination activity specifically targeted to the education community.

Second concern. Awareness problems.

PR2. Although the surveys show an increased use in university education of research results from EU projects (comparison between the TRKC survey in 2007 and the PORTAL survey in 2001), there still persists a problem of lack of awareness of research results.

RE2. An alerting system targeting specific users like lecturers could be put in place imitating the well-functioning and appreciated alerting systems of scientific publishers. The alerting system could be organised with a thematic structure with keyword specified by the user. The system could inform when a product has been released by a project (e.g. a

handbook, the results of a survey, the results of a demonstration, and a set of recommendations) or when a paper about an EU project has been published in a scientific journal. The alerting system could take the form of a newsletters providing blurbs similar to the one issued by TRB in the United States.

Third concern. What the research projects should provide.

PR3. It is unlikely that material produced by research projects can be directly transferred to students of university courses as course notes because each lecturer has his own style and preferences. Also, researchers might not be the best persons to produce education material, those who teach are in a better position to do that.

RE3. In order to make the lecturer quickly aware of the relevance of research results for his courses an activity of “marketing” of research in the education community might be put in place with each research project producing a summary, prepared by someone belonging to the lecturers’ community, of the relevance to education of the results achieved. This should help identify which results fit which course. Also, presentations given in conferences, especially the final project conference, should be given the same priority of final reports as far as storage and public accessibility are concerned.

Fourth concern. Meeting lecturers’ preferences.

PR4. Lecturers tend to prefer personal experience rather than relying on research made by others.

RE4. Support should be provided for programmes where lecturers are exchanged among universities as well as for direct participation of lecturers in research projects, as ways to facilitate the exchange and transfer of research results.

PR5. Lecturers show a marked preference for papers in scientific journals as source of information from research projects. This is obviously the standard communication means in the scientific community, with the virtues of peer review and concise and stylised formats.

RE5. To enhance the transfer of results from EU projects into education any action able to increase the production of scientific papers and to increase the awareness of these publications should be put in place.

PR6. For some EU projects the production of scientific papers is low, due among the others to the multidisciplinary character of the projects.

RE6. Incentives for the production of papers from EU projects might take the form of bonuses in the evaluation of research proposals, the higher the number of papers originating from EU-funded projects published in scientific journals by the participants in the proposal, the better the evaluation. In addition, the European Commission might sponsor the publication of a new web-based journal specifically devoted to results from EU-funded research projects.

PR7. The information on scientific publications originating from EU-funded projects is not

collected. One reason for this is the deferred time of publication compared with the project duration. It is unlikely that persons external to the TRKC consortium provide voluntarily inputs which can be exploited in the transfer into education.

RE7. Monitoring of scientific papers originating from EU-funded research could be put in place. As incentives are needed, a viable strategy within TRKC could be to get from those participating in research projects the information on the publications that originated from the projects. In particular, for purposes of transfer into education, papers in scientific journals are particularly valuable (more than proceedings). Making this information public has the benefit for the author to increase the probability of citation which is an evaluation factor of the CV.

Fifth concern. Communication problems.

PR8. There is a problem of overload of information coming from research. The users have manifested a need for being helped in knowing “what is available where” about transport research in the internet.

RE8. The TRKC project which is dissemination-focused and has put in place a web portal might usefully integrate its activities by providing an internet facility (linking different links together) which allows the user to navigate and find desired information in various databases and websites. This might include databases providing documentation from research projects as well as databases providing access to papers in scientific journals and proceedings.

PR9. Another perceived problem which remains open is the loss of documentation from projects due to discontinued project web site. Research results remain of interest for several years after their release.

RE9. The problem of archiving full documentation from publicly-funded research projects and making it publicly available permanently should be tackled. A dedicated server might fulfil requirements of availability with search functionality according to time periods (e.g. all research items dated from year YYYY).

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1. Introduction

1.1 Rationale, aims and approach of the workpackage

The EU spends a considerable amount of resources in R&D. The Treaty of the EU states that the results of R&D activities need to be properly disseminated. Research results are an important input of education programmes as knowledge, at both theoretical and empirical levels, need to be up-to-date and in line with societal and market needs. The vital importance of the link between research and education was recognised in the past: the university institutions pursue both streams of activities, research and education.

Within the activities of TRKC, Workpackage 5 moves one step beyond pure dissemination and tackles the exploitation of research results. Workpackage 5.1, “Linkage to the education and training systems”, aims at shedding light on the processes of transfer of research results into education programmes. The task aims at deepening the understanding of the potential for exploitation in education and training of the results from EU research. The ultimate aim is to help the providers of education and training to reflect the results of the latest research.

The levels addressed include undergraduate and postgraduate university education as well as continued professional education for practitioners, managers, and researchers. The issue of the transfer of research results into education was tackled by the Fifth Framework Programme project PORTAL (“Promotion Of Results In Transport Research And Learning” of the Key Action “Sustainable Mobility and Intermodality”), although limited to regional transport. The aim is to follow up this as well as to extend insight into other sectors of transport.

The aims of the activities of WP5.1 include:

- to select focus areas reflecting both core subjects in education programmes at undergraduate, postgraduate and professional training levels concerned with transport and key topics in research for transport policy funded at EU level,
- to investigate the practice of transfer of research results into education,
- to highlight existing barriers to this transfer as well as key positive factors,
- to assess awareness of EU research within the teaching community,
- to identify topics with particular needs for transfer,
- to prioritise dissemination tools of research results to facilitate transfer,
- to end up with recommendations for European dissemination activities of research results to facilitate transfer into education at two levels: recommendations for steering

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the subsequent activities of the TRKC, and recommendations for actions that can be pursued by the EU as research funding entity.

The focus areas have been preliminarily selected as: 1. logistics and freight transport, 2. transport engineering and transport planning, 3. transport economics and policy, 4. ITS Intelligent Transport Systems (particularly traffic management in all modes). There is no prioritisation in the order of the list.

The approach of the workpackage is based on the direct involvement of those carrying out education and training activities, by tools such as questionnaire surveys, face-to-face interviews and workshops. These tools will give the opportunity to investigate and simulate the process of transfer of the research results. This will in turn make it possible to assess the potential for transfer of the research results from EU-funded research and at the same time will provide recommendations on how best dissemination activities have to be performed in this respect.

1.2 Aims and structure of the deliverable

The deliverable reports on the workshop which took place in Rome on the 28 September 2007 within the activities of WP5.1. The workshop was scheduled at the end of the first phase of activities of the workpackage. It was meant for pooling and discussing the knowledge which could be collected in the workpackage up to that point.

The workshop aimed first at presenting and discussing the knowledge which is available to date on the processes of transfer of research results into education programmes at university levels. Second, the aim was to assess the potential for exploitation of the results from EU research in education and to provide recommendations, suggesting a roadmap, to enhance such exploitation.

The workshop was structured into two sessions, the first with presentations to report on the knowledge available, the second to discuss it and derive recommendations. The workshop was attended by 10 persons, six from university institutions, and four from research and consultancy organisations. The workshop agenda and participants are in Annex 1.

The first session of the workshop presented the insights which are provided by the following two sources.

- The first source is the PORTAL project which, within the Fifth Framework Programme (FP5), had produced education material from EU research projects and had tested it in university courses. The insights focus on the lessons learnt from this project.
- The second source is the TRKC survey which was carried out in the summer 2007 as part of the activities of WP5.1. The survey investigated the experiences and attitudes

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of lecturers in European universities towards the use of research results in education. The survey was conducted using three tools: a questionnaire available on-line (universities EU-wide), face-to-face interviews (two Italian universities), and an email inquiry (one UK university).

The deliverable reports on the workshop and, as part of this reporting, it includes an extensive overview of the insights which were provided by the PORTAL project and by the TRKC survey. Therefore the deliverable provides a synthesis of the whole set of activities which were carried out within WP5.1 up to the time the workshop took place.

The structure of the deliverable reflects the agenda of the workshop. The following two sections present the insights from the PORTAL project and the TRKC survey. The subsequent section reports on the discussion held in the second session of the workshop and concludes with a set of recommendations, which represent the TRKC mini-roadmap for the linkages between research and university education.

The deliverable was written by Paolo Delle Site (DITS). Written contributions were also provided by Marco Valerio Salucci (DITS) for section 2 and Frank Montgomery (ITS Leeds) for section 3.3.

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2. The experience of the PORTAL project

2.1 Overview

PORTAL (**P**romotion **O**f **R**esults in **T**ransport **R**ese**A**rch and **L**earning) was a three year project (June 2000 - May 2003) co-funded by the European Commission (DG TREN) within the specific programme “Competitive and Sustainable Growth” of the FP5.

The overall objective was to accelerate the take up of EU research project results pertaining to the local and regional transport sectors by giving lecturers quick and easy access to the most important results as well as an overview of the individual projects¹.

PORTAL targeted educational institutions and organisations providing professional training as well as students and individual professionals interested in enhancing their knowledge and skills on these topics. The PORTAL consortium involved the active participation of 14 Member States, 8 access countries (from 2004 Member States), Switzerland and Norway. In each of these 24 countries PORTAL had a contractor/partner acting as National Focus Point (NFP) responsible for co-ordinating and managing between 1 and 4 Educational Test Sites (ETSI), which are among the leading educational establishments in Europe.

2.2 Activities

First of all, PORTAL carried out at European level two surveys (education demand survey and providers of educational activities survey), which involved students, organisations employing transport professionals, individual professionals and providers of educational activities (Universities) in order to have a clearer picture of:

- courses (modules and units) already available in the field of local and regional transport across Europe;
- skill gaps and educational needs in the above-mentioned field;
- the preferred format, style, length and focus of educational programmes;
- priority areas and key topics for education;
- the extent to which the results of EU funded transport research projects have been incorporated into higher education.

¹ Lecturers can integrate didactic materials created by PORTAL into their own (scripts or slides and presentations). PORTAL has also provided tools enabling further study of the topics or individual projects without spending a lot of time (The most important of such tools are databases built by means of the “Design Your Unit” menu option on the website <http://eu-portal.net/>).

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Among other things, a detailed analysis of the results of the education demand survey led to the identification of a number of key topic areas, which the categories targeted by the survey indicated as the most important².

Secondly, PORTAL made an analysis of a number of EU funded transport research projects in order to identify those (or parts of them) that could be used for educational purposes and allocate them to the different key topics (the EC supported the process of allocation giving its approval for a number of projects). A comprehensive analysis of intellectual property rights and copyright of project deliverables and materials (e.g. photos, video clips and tapes, charts, etc.) was carried out to permit their use and exploitation.

Thirdly, PORTAL arranged one workshop for each of the 12 key topic areas, involving the representatives and lecturers of the Educational Test Sites and key topic experts to discuss and decide which written materials, slides and other didactic tools to develop in order to successfully incorporate EU funded research project findings into higher education teaching modules.

Fourthly, PORTAL, on the base of the results of the workshops, developed written materials, transparencies, electronic presentations, glossaries, audio CD, distance learning materials, photos and photo CD. All materials were tested in order to:

- prove the appropriateness of “standard” teaching materials;
- detect gaps in the materials and methods, developed within PORTAL, and show a way forward for their improvement;
- evaluate the PORTAL approach as an effective method for the dissemination of research results.

PORTAL has also established a series of electronic databases to allow everybody to have access to materials, information and specifically developed tools (e.g. “Design Your Unit” tool), as well as a network for communication and dissemination of information (the PORTAL User Forum, links to other networks, meetings and conferences, etc.).

Finally, the PORTAL experience was evaluated not only from a product perspective (written materials, course modules, data bases...) but also from the perspective of the processes involved, trying to identify important mechanisms affecting the relation between research results, university teaching and student learning in general. As a result a number of existing barriers in the interaction between research and student learning were identified, and a number of recommendations were made for ensuring a more effective

² All the categories surveyed were asked to indicate the most important areas of local and regional transport where they would like to see the resources of PORTAL directed so that teaching materials could then be developed. This part of the questionnaire asked for a free text reply which encouraged respondents to think about the problems and identify, for themselves, the main areas of need rather than simply applying their votes to a pre-determined list. These free text responses were then analysed and coded within a range of some 50 topic areas or fields.

transfer and integration of EU funded research project results into education.

2.3 Products and findings

In order to actually contribute to the integration of EU funded transport research projects into educational and training courses, PORTAL has produced and tested in the Educational Test Sites³:

- written materials for 12 topics in up to 16 languages;
- transparencies and electronic presentations for 12 topics in up to 16 languages;
- glossaries for 12 topics in up to 16 languages;
- audio-CD for 2 topics (“Quality and benchmarking in public transport” and “Mobility management”) in 5 languages;
- photos (6000 pictures) and photo-CD (200 pictures) free of copyright;
- distance learning material for 2 topics (Mobility Management” and Urban Freight Transport) and pedagogical guidelines.

The two surveys produced interesting findings. The education demand survey identified key topics areas for education and training:

1. Public Transport Planning and Operation:
 - 1a. Quality and Benchmarking in Public Transport;
 - 1b. Regulatory Framework of Public Transport;
 - 1c. Integrated Transport Chains.
2. Urban Traffic Management;
3. Safety and Accident Reduction;
4. Modelling and Data-analysis;
5. Environment, Energy & Transport;
6. Pricing;
7. Mobility Management;
8. Urban Freight Transport;
9. Transport Planning, Land Use and Implementation and Policy Formulation:
 - 9a. Transport Planning and Land Use;
 - 9b. Implementation and Policy Formulation and Implementation.

It also pointed out the need for a very practical education and training, focusing on proven techniques, concrete applications and case studies, as well as examples of best practice. The overall picture emerging from the providers of educational activities survey showed that provision of education across Europe depends on the different educational systems in each country and the fragmented nature of transport studies.

³ All the material (with the exception of the photos) is downloadable from the PORTAL website.

The biggest constraints on imparting new knowledge and skills is lack of time for attending courses for what concerns the recipients and their employers, and lack of time for developing new course materials for what concerns the lecturers⁴. The surveys also found out that few educational programmes currently include the results of EU Transport Research and there is a very clear gap in the dissemination process. Persons involved in education are either unaware of EU projects and their results or find the information indigestible and unwieldy.

The key topic experts encountered the following problems in finding the information they needed to make an analysis of the EU funded transport research projects that could be used for educational purposes:

- The CORDIS website, EXTRA databases (Transport Research Programme Knowledge Centre), ELTIS website, which were used as source of information, were not always updated, at least for the identified projects, nor was the information fully exhaustive (e.g. in some cases status, content, contacts etc. were missing from the websites);
- information about project managers and participants was out of date in many cases, and it was not possible to contact co-ordinators of projects which ended a number of years ago;
- project websites are launched throughout the lifetime of the project, after which they are discontinued;
- some projects are very well disseminated, while others lack appropriate dissemination;
- in some cases project results are not disseminated in English (which should be regarded as the common European language).

The process for making knowledge created in PORTAL and information on selected EU research projects exploitable and accessible to anyone interested required a lot of work and time because of Intellectual Property Rights issues⁵. The testing of the didactic tools has shown that the assimilation of the materials significantly depends on lecturers' attitudes towards PORTAL and EU research in general, their habits and professional background, as well as the actual content of the materials⁶. A difficulty for PORTAL was to generate materials for general purpose and to try to find a manner of developing materials that fits all different possible expectations.

Dissemination of EU research was criticised for being too slow. It often takes up to two years until the outcomes of research projects are fully published and available for third

⁴ Lecturers welcomed assistance in the preparation of new material, which is time consuming, because they find it difficult to access information, case studies and examples of good practice, especially from outside their own country.

⁵ Massive amounts of correspondence and e-mails were sent and received to request and receive permission from former EU programme projects and their contact persons.

⁶ Detailed information has to be provided, especially for those lecturers, whose main field of activity is not the key topic they presented to the students.

persons to view and utilise. Often results are only available at the very end of the contract period for research projects and so there is not much time available for effective dissemination to take place.

Finally for what concerns the identification of existing barriers for taking up EU research results, PORTAL found out that:

- there is sometimes a lack of time for teachers to prepare new material;
- lack of flexibility (curricula, literature list) is an important barrier to take-up;
- it is important to understand that almost all teachers are researchers, but not in the whole area in which they teach;
- language problems may be a barrier that is difficult to overcome;
- EU research is not too theoretical for teaching, on the contrary, one of the barriers to take-up may be the lack of theoretical content in typical dissemination products and final reports⁷.
- scepticism against positive results of projects is an additional barrier as everything from research appears “sugar-coated”.
- teachers tend to be sceptical about research findings of other researchers, they are much more willing to use research results from projects where they were personally involved.
- there is little acceptance of material prepared by anyone than a professor.

Regarding the interaction between research and student learning PORTAL found also the following.

- “Improved take up of research results at educational institutions” can not be achieved by merely “transfer” of information, but only through interaction between researchers, teachers and students and a common information base.
- A common information base should not be restricted to the final “outcome” of projects, but also comprise aspects such as the research issues considered, the methods applied, the case-studies conducted and the general approaches taken.
- Generally, topics covered in research are also relevant to teaching.
- Research organisations will adapt dissemination to the education market when (and only when) funding organisations require them to.
- Teachers are the primary target for activities to promote take up.

2.4 Recommendations

As to the development of written materials and other didactic tools, the PORTAL educational test sites made several recommendations:

⁷ This is emphasised by the requirements of funding organisations to focus on practitioners as a target group.

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- To outline a clear background and “guidelines for the use” that explain the purpose of the material.
- To produce easy modifiable material, which works best, because it can be easily adapted to specific needs and kept up to date; it is not possible to develop standard material that fits everybody’s needs and preferences.
- To translate the materials in different languages (but it is necessary to have the original text in English).
- To use an extended glossary which can help understanding specific terms in different languages.
- To quote sources of information and include any link to further information.
- To include diagrams, pictures and photos because are highly welcome.

PORTAL recommended that the EU as a research funding and policy-making entity:

- requests that each project reports about educational relevance in a fixed 2 page format⁸;
- requests the main project outcomes in 5 slides.
- promotes guest lecturing as an important part of dissemination;
- continues the support of teacher exchange programmes;
- obtains non-exclusive rights for all knowledge generated in projects in order to grant future licenses for use and exploitation in subsequent EU projects⁹;
- finds forms to stimulate, support and assure the future quality of the PORTAL user forum;
- supports a development towards more active approaches to learning.

Finally PORTAL recommended that individual teachers and educational institutions:

- develop methods for continuous evaluation of publicly available teaching materials;
- incorporate more active approaches to learning, and individualised teaching formats;
- open traditional channels such as scientific journals and conferences to didactic and pedagogic discussion;
- request that teaching related activities are accepted into sabbatical programmes.

2.5 News

The PORTAL website is now a sub-site of ELTIS (www.eltis.org). ELTIS (European Local Transport Information Service) provides a portal on urban transport and mobility with case studies from EU countries. The former website (www.eu-portal.net) still exists. New

⁸ It is necessary to pay more attention to the dissemination of results of EU projects to be able to use the outcomes for educational purposes. Since funding organisations have major influence on researchers’ priorities, it seems reasonable to suggest that the funding organisation (EU) requests that a part of the dissemination plan of every project is specifically directed to educational institutions.

⁹ This should improve the management of Intellectual Property Rights.

updated materials (2007) are now available in 8 languages.

3. The TRKC survey in the lecturers' community

3.1 Aims and tools used

The TRKC survey aimed at collecting experiences and attitudes among the teaching community towards the transfer of research results into education programmes. This survey targeted the community of lecturers in university institutions in Europe and has as core topic of investigation the education programmes at university (undergraduate and graduate) levels.

The TRKC survey was carried out in the summer 2007 using different tools:

- the principal tool for collection of knowledge was a questionnaire, available for on-line compilation (<http://www.ctl.uniroma1.it/TRKCCProject/home.htm>); some 1050 lecturers were contacted from universities in EU countries, responses came from 129 of them (12%);
- additional tools were face-to-face interviews with four lecturers from two universities in Italy and an email inquiry among nine lecturers in one university in the UK.

The on-line questionnaire (in Annex 2) consists of 23 questions grouped under the following sections:

- section I: general information;
- section II: use of results from EU FP (Framework Programme) research;
- section III: use of results from research other than EU FP;
- section IV: integration of results from research into courses;
- section V: training courses.

Two distinct sections, sections II and III, were used to spot differences between the use of EU-funded research and the use of non-EU funded research. The section on training courses inquired about training courses held by the respondent and was included to provide inputs to subsequent activities according to the original plan of the workpackage. At the end of each section space was left for respondents wishing to make comments.

The face-to-face interviews carried out in two Italian universities used the questions in the first 4 sections of the on-line questionnaire. The email inquiry carried out in one UK university was restricted to the experiences of use of research in university courses.

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3.2 Respondents

On-line questionnaire

The on-line questionnaire obtained responses from 129 lecturers from universities in EU countries. These represent 12% of lecturers initially contacted by email and invited to participate in the survey. The list of contacts was developed as follows:

- university institutions participating in EU research projects were identified based on a search on the CORDIS database with “transport” as keyword;
- the list of staff in the university was found in the internet in cases where an institute or department dedicated to transport disciplines existed;
- it was possible to have the full list of members of the Italian Society of Lecturers in Transport disciplines (SIDT, Società Italiana Docenti di Trasporto).

The distribution of respondents by country is in Figure 1. Countries with higher representation are UK, Italy, Austria and Sweden.

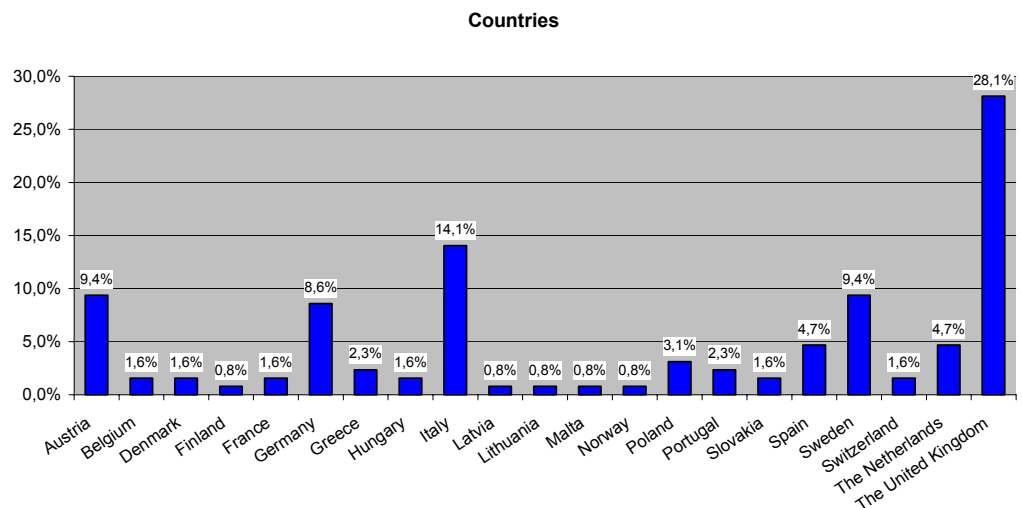


Figure 1. Respondents by country

The distribution of respondents by teaching area is in Figure 2. The assignment of the teaching area was made based on the course taught stated by the respondent. The following areas have been considered:

1. Logistics and freight transport.
2. Transport engineering and transport planning; this area deals traditionally with transport systems and includes a multiplicity of perspectives: analysis and design, operations and control, planning and forecasting.
3. Transport economics and policy.

4. ITS Intelligent Transport Systems (particularly traffic management in all modes).
5. Other, including physical infrastructure design, propulsion systems, ergonomics.

The majority of respondents are from the transport engineering and transport planning area. This is not surprising as the database of contacts for the survey included members of institutes or departments of transport studies. The discipline of transport studies originally sprang from engineering. Traditional subjects have been traffic engineering and transport planning. Usually the engineering education in transport is integrated with subjects from civil engineering (road infrastructure design) and industrial/mechanical engineering (propulsion systems). Where the institute or department has acquired an interdisciplinary character the set of subjects has been enriched with transport economics and transport policy. Recently a new trend has been the introduction of specific subjects in logistics and freight transport.

Obviously the structure of the supply of education and the background of lecturers engaged in transport disciplines vary significantly across countries and local situations. Its investigation is out of the scope of the TRKC project.

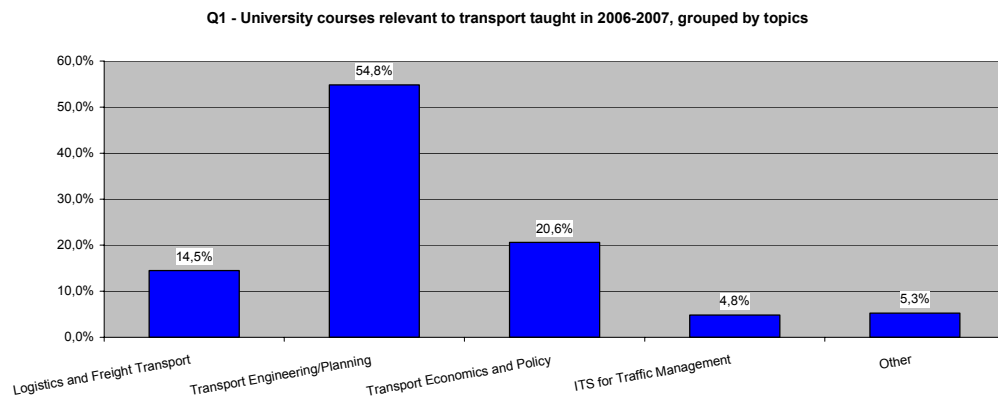


Figure 2. Respondents by teaching area

Face-to-face interviews

Four lecturers from Italian universities were interviewed in September 2007. One teaches a course in logistics and freight transport, one teaches a course in road safety, one teaches in the area of railway engineering (railway traffic management and traction systems), one teaches a course in the economics of transport and logistics. The first three are from the University of Rome “La Sapienza”, the fourth from the University of Urbino.

Email inquiry

All teaching staff at ITS Leeds, the Institute of Transport Studies of the University of Leeds,

were emailed on 18 Sept, asking them for examples (from PG, postgraduate, or UG, undergraduate, modules) of how they had used the results of research (not necessarily their own) in their teaching. Nine replies were obtained (from two professors, one reader, one senior lecturer, three lecturers, one research fellow and one visiting senior research fellow).

3.3 Use of research in education

On-line questionnaire

One question asked whether papers or reports on research results are included in the reading list of the courses taught. The answer was positive in an overwhelming majority of the cases (82%), negative in 15%.

It was then asked whether research results from EU-funded research and from non-EU funded research were used in the courses. As shown in Figure 3 non-EU research is transferred into courses more than EU-funded research (non-EU funded 88% of respondents against EU-funded 62% of respondents).

One respondent commented that it was difficult for him to ascertain whether research used was EU-funded or not as he used publications without paying too much attention to the origin of the research. For this reason use of EU research might be slightly underestimated.

Comparisons with the PORTAL survey in 2001 show an increase of the use of EU-funded research in education. The PORTAL survey showed that the take up of EU-funded research was only 20% of leading educational institutions.

The respondents show an interest in EU research as 33% of them said they don't use EU research but would be willing to do it. The percentage of those not at all interested in the transfer of research into courses is very low in both cases (EU and non EU research).

The use of research is shown by area of courses in Figure 4. While non-EU research tends to be used evenly across areas, EU-research shows some differences. In the areas of logistics and freight transport and ITS for traffic management the use of EU research is lower than the other areas. This result must be seen with caution as far as the areas of ITS and "other" (including infrastructure design, propulsion systems and ergonomics) are concerned due to the low number of respondents in these two segments. The low use of EU-funded research in the area of logistics and supply chain management was stressed in a comment provided by one respondent. He remarked that he uses papers in scientific journals as sources but few papers relating to EU-funded research can be found in this

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area.

Q6 Vs Q12 - Have you ever used results from research in your courses?

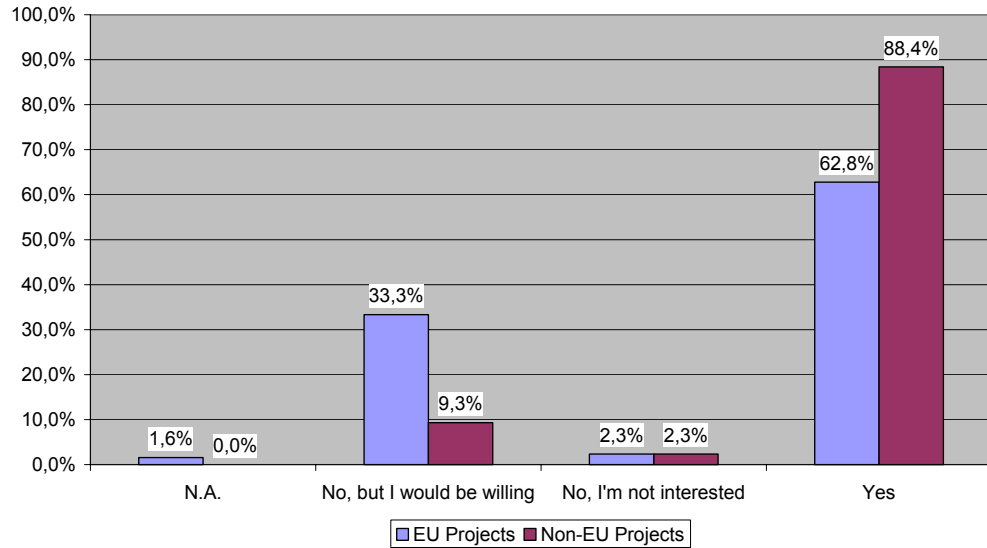


Figure 3. Use in courses of EU-funded research and non EU-funded research

Q6 Vs Q12 - Have you ever used results from research in your courses (Percentage of "Yes" for each teaching area)?

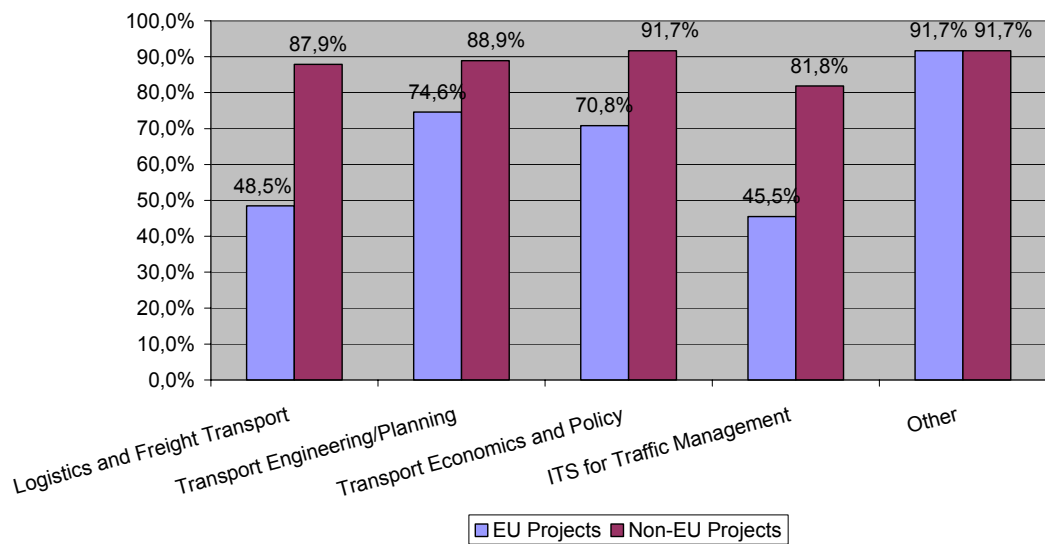


Figure 4. Use in courses of EU-funded research and non EU-funded research by teaching area

The respondents were asked to identify which topics the transfer from research into

education related to. Table 1 and Table 2 list by teaching area the topics object of the transfer, respectively from EU-funded research and from non EU-funded research. The topics have been assigned to teaching areas according to the courses, taught by the respondents, where the transfer took place. For teaching area 2 (transport engineering and transport planning) and area 5 (other) topics have been grouped within each area for better readability of the tables.

Table 1. Topics transferred from EU research into education by teaching area

Area 1. Logistics and freight transport

Decoupling of traffic from GDP
 Freight modelling
 Information communication technology in freight
 Methodology from the REDEFINE project
 Logistics and supply chain trends
 Maritime logistics
 The effects of e-commerce on logistics

Area 2. Transport engineering and transport planning

Impacts

Environment, emissions and fuel consumption, models for estimating environmental effects
 Relation between driving speed and safety (MASTER project)
 Road safety
 Safety assessment

Planning

Barrier free planning
 Land use and transport interaction
 Mobility management
 Planning models developed in STEMM project
 Participative methods of planning
 Planning of fluvial areas
 Principles of sustainable urban transport
 Spatial development theory and practice
 Sustainability indicators and sustainability impact assessment
 Travel awareness
 Urban structure and transport needs

Railways

Asset management
 Incident and delay cause identification
 Interoperability
 Railway operational rules/regulation
 Railway signalling
 Safety management systems

Traffic engineering and psychology

Effects of information technology on road user behaviour
 Microscopic modelling of traffic

Transport systems' design and management

Alternative modes of transport (new vehicles CLEVER)
 Demand responsive transport
 Design of stations for public transport systems
 Forces behind the use of walking and cycling (WALCYNG project)
 Parking design and management
 Performance of public transport systems
 Public transport in cities (TRANSECON project) and rural areas (ARTS project)

Area 3. Transport economics and policy

Business administration and management in transport industry
 Cost-benefit analysis
 Economic impacts of road investments
 Evaluation of environmental externalities and impact pathway approach
 Evaluation of policy effects on transport systems
 External costs of transport
 General policy in EU
 Infrastructure charges
 Investment appraisal
 Marginal costs calculation
 Marine regulations
 Multi-criteria analysis
 Pricing, pricing reform in transport sector
 Public-private partnerships
 Rail liberalisation and regulation
 Railway asset monitoring
 Regional economic development, sustainable regional development
 Road pricing (PROGRESS project), urban road pricing
 Social compatibility analysis
 Transport costs
 Transport in integration (TENS)

Area 4. ITS Intelligent Transport Systems

ITS applications and their evaluation
 Transport modelling and ITS

Other

Automotive and railway vehicle design

Aerodynamics of high-speed trains
 Tunnel aerodynamics

Ergonomics

MM interfaces

Infrastructure design

Characterisation of pavement materials
 Noise reducing pavements
 Pavement design and evaluation methods
 Pavement maintenance and management systems
 Skid resistance

Instrumentation

Fault tolerance
 Wireless application in cabin environment

Marine engineering and ship design
 Marine environment protection
 Maritime efficiency
 Maritime environmental impact
 Maritime safety
 Optimisation of ships and maritime systems
 Use of fuel cells for power supply on-board ships

Table 2. Topics transferred from non-EU research into education by teaching area

Area 1. Logistics and freight transport

Analytical CRM
 Business logistics
 Distribution
 Information technology
 Intermodal transport
 International logistics
 Production scheduling
 Operations research applications in logistics
 Port and shipping
 Procurement and purchasing
 Terminal design
 Third party logistics

Area 2. Transport engineering and transport planning

Crisis management
 Crisis management

Impacts
 Accident prediction models
 Road safety

Planning
 Assignment models, static and dynamic
 Benchmarking
 Children travel behaviour
 Demand modelling
 Demand for public transport
 Discrete choice models
 High-speed train spatial consequences
 Judgment and decision making by individuals and organisations
 Land use and transport interaction
 Land use and transport modelling
 Marketing issues
 Mobility management
 Network design for road and public transport
 Origin-destination matrix estimation
 Planning of fluvial areas
 Planning theory
 Social exclusion and transport

Spatial development theory and practice
 Spatial interaction modelling
 Stated preference surveys
 Survey methods
 Sustainable transport
 Travel awareness
 Urban planning

Railways

Asset management
 Capacity models for railway lines/stations
 Incident and delay cause identification
 Safety management systems

Traffic engineering

Traffic flow modelling
 Traffic flow monitoring

Transport systems' design and management

Accessibility issues, accessible design
 Air transport system
 Alternative modes of transport
 Intermodal transport
 Non-motorised modes
 Parking design
 Parking management
 Special event traffic management
 Timetabling, delay propagation modelling in public transport

Area 3. Transport economics and policy

Accounting policies in railways
 Cost modelling in public transport
 Economic transformation in transport sector in Central and Eastern Europe
 Evaluation of environmental externalities
 Fares in railways
 Funding and financing in railways
 Investment approaches in railways
 Policy analysis
 Road pricing, urban road pricing
 Public-private partnerships
 Railway asset monitoring
 Risk and uncertainty in evaluation
 Users' benefits assessment
 Valuation of safety
 Valuation of time

Area 4. ITS Intelligent Transport Systems

Positioning and navigation systems

Other

Ergonomics

MM interfaces
 Occupational health and safety

Infrastructure design

Design, construction, maintenance and management of airports
 Design, construction, maintenance and management of highways
 Design, construction, maintenance and management of railways
 Noise reducing surface layers
 Pavement materials characterisation
 Pavements, design, evaluation methods, maintenance
 Pavement and road asset management systems
 Track maintenance
 Tunnelling
 Use of waste and by-products in pavement construction

Marine engineering and ship design

Engine emission control
 Stability of ships in wave

Traction systems

Emissions during parking phases

Ways in which research is included in the courses were investigated. Figure 5 shows that the majority of respondents have used research “As case study for illustration of theory”. The second most used option is “As additional reading”. The results do not differ significantly between EU-funded and non-EU funded research.

Analysis of the results by teaching area show that “As case study for illustration of theory” is the most used option in all teaching areas with the exception of the ITS area where the most used option is “As additional reading”.

The products from research which were used in the courses were asked. Figure 6 shows that the first most used product from EU research is “Results of demonstrations of new technologies/systems/policies”, followed by “surveys”. The first two most used products from non EU-funded research (same percentage of use) is “Results of demonstrations of new technologies/systems/policies” and “policy recommendations”, followed by “Mathematical modelling and decision support tools”.

The products used by teaching area are as follows. “Results of demonstrations of new technologies/systems/policies” was the most used product in the areas of logistics and freight transport and of transport engineering and transport planning. “Policy recommendations” was the most used product in the area of transport economics and policy. In the ITS area the most used products are “Mathematical modelling and decision support tools” and “Results of demonstrations of new technologies/systems/policies”. There is no difference in this respect between EU-funded and non EU-funded research.

The dissemination tool used by the lecturers for their courses was the last question in the

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sections about the use of research results. Figure 7 shows that for EU-funded research the dissemination tools most used by lecturers are “Personal experience” and “Deliverables and reports from projects”. The importance of personal experience as tool for taking results from EU projects was also stressed by one respondent who provided a written comment on that. A different result is found for non EU-funded research. The most used tool is “Papers in scientific journals”. Second is “Personal experience”.

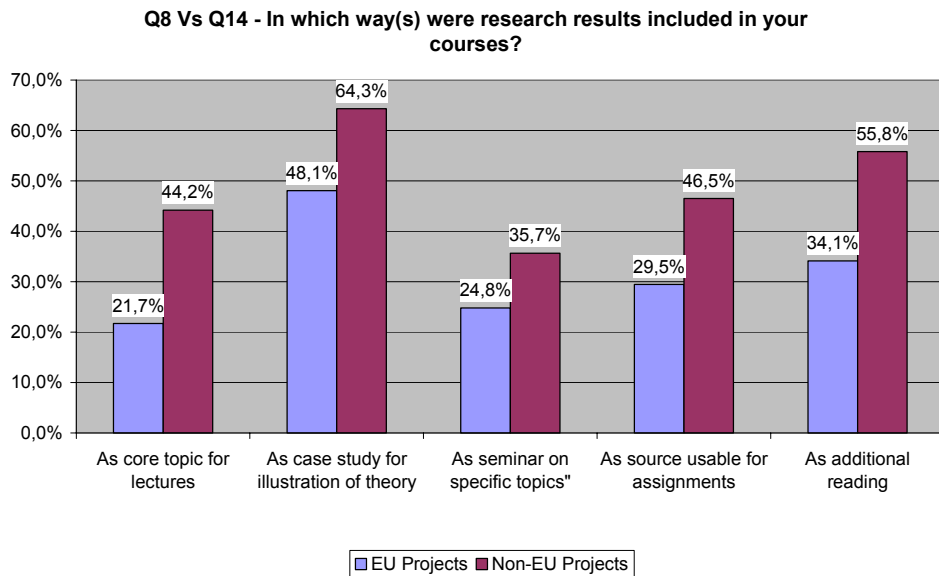


Figure 5. Ways of use of EU-funded and non-EU funded research

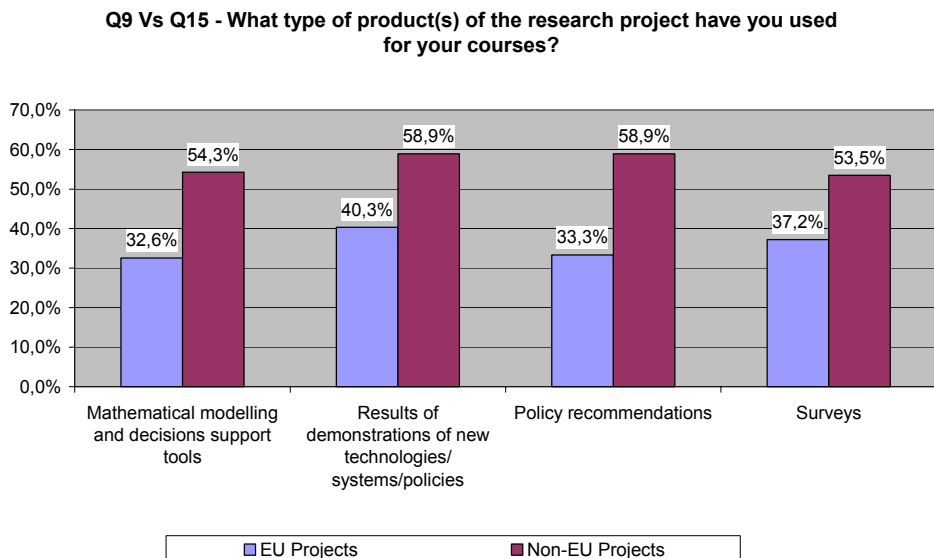


Figure 6. Products used from EU-funded and non-EU funded research

Q10 Vs Q16 - Which research dissemination tool(s) have you used for your courses?

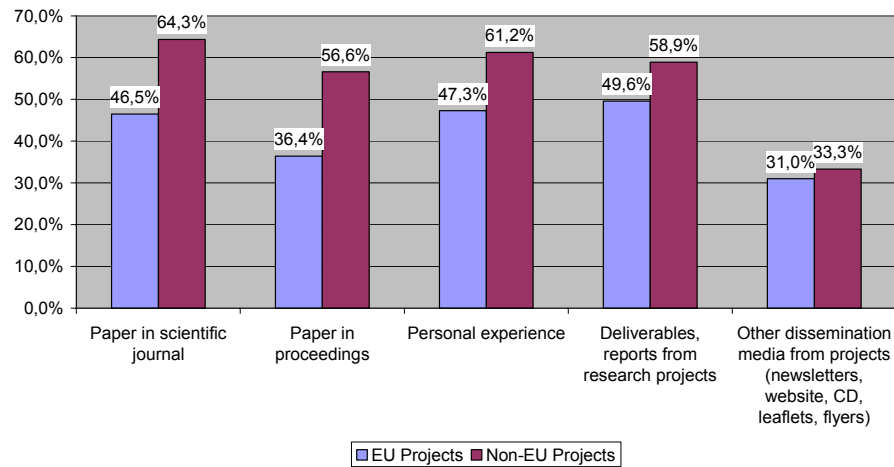


Figure 7. Dissemination tool used from EU-funded and non-EU funded research

A few comments were made at the end of the sections of the questionnaire that investigated the use of research. One respondent commented that non EU-funded research is irreplaceable due to the generally different nature compared with EU-funded research. Another respondent stressed the more applied character of the EU-funded research.

Another respondent remarked that use of research is vital for his course (about stated preferences) due to the innovative character of the subject which makes it necessary to rely on research papers. Another respondent teaching a course in transport economics remarked that results from studies are essential his course being in applied economics.

Face-to-face interviews

One interviewee teaches a course on logistics and freight transport and makes significant use of studies and research, in particular EU research, for a range of topics including technologies for intermodality, best practice in intermodality, trends in supply chain management and logistics, surveys on costs of different modes of transport. He remarked that results from research tend to be used increasingly as courses become more specialised (post graduate level more than undergraduate level) and are used especially in work for the development of the thesis.

Another is a lecturer in road safety. This is a recently introduced course which deals with statistical analysis of road accident data. The course was suggested as road safety has become a priority for transport policy nowadays. The course is almost entirely built on the knowledge from EU projects. This relates in particular to accident data and cost-benefit

methodology for the assessment of safety-relevant measures and policies. The lecturer stressed the importance of his personal experience and involvement in the relevant EU projects (ROSEBUD, SAFETYNET).

The lecturer in railway engineering teaches a course on the management of railway traffic. He sees research from EU projects of little use for this course as EU research is mainly concerned with international comparisons of practice in railway operations and harmonisation issues. He sees it as research useful for commercial enterprises in the railway service market. He considers that university education in railway engineering needs to have primarily the aim of skill formation, and only secondarily that of information provision.

The lecturer in transport economics remarked the usefulness of EU-funded research for the collection of data on and estimation of transport external costs. He tends to use results from research where he has had a personal involvement. This relates for example to the investigation of the configuration of the supply chains in the distribution of goods and to the elicitation of the preferences of actors for the evaluation of innovative policies like “park-and-buy” (where consumers leave their car in a parking area, move to the shops by public transport, and the goods purchased are transported by the retailers to the parking area).

Email inquiry

The use of research in education was the object of an email inquiry which was carried out among lecturers in the Institute of Transport Studies in the University of Leeds. The following is a summary of the replies (UG stands for undergraduate, PG for postgraduate). Hyperlinks are included.

Respondent 1

ISA ([Intelligent Speed Adaptation](#)) features in the lectures, as does the [HASTE](#) work on driver distraction.

Respondent 2

In teaching public transport planning & management at UG and PG level, a research study of the consequences of rail passenger franchising (for ECMT) was used as the basis of lectures on the subject.

Research on the impact of rail reforms (for DGTREN, CER, ECMT) was used as the basis of seminar presentations by students comparing the experience of different countries.

Also, research undertaken for DGTREN ([UNITE](#), [IMPRINT-EUROPE](#)) on the environmental costs of transport and on the results of its internalization, were used in seminars for undergraduate students taking environmental economics.

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Respondent 3

On the UG & PG freight modules the lecturers use monetary valuations obtained from their [LASP](#) (Leeds Adaptive Stated Preference) surveys to indicate the range of these amongst freight users. The lecture material on freight modeling comes directly from their research work on freight modeling. Involvement in projects with other institutions throws up examples lecturers use in lectures.

Respondent 4

Case studies from research projects will be used in planned stakeholder workshops. Essays and seminar topics derive from research projects.

Respondent 5

On the level 3 UG module '[Transport Engineering](#)', AIMSUN NG (see www.aimsun.com) which lecturers have used in research projects, is used to demonstrate traffic microsimulation software. Also real (tracked) vehicle trajectories obtained from the '[Instrumented City](#)' research project are compared with those produced by the model to demonstrate the mismatch and to warn of the dangers of accepting model results without question.

On the PG module '[Monitoring Traffic Pollution](#)' there are numerous examples of synergy between the '[Instrumented City](#)' research facilities and this course. Moreover there is a specific lecture devoted to the research findings of the Instrumented City.

On the PG module '[Modeling Traffic Pollution](#)', a strong message to the students (which derives from lecturers' research) is the need to Integrate Traffic-Emission-Air Pollution models.

Respondent 6

On the UG module '[Transport and the Environment](#)' reference is made to some of the research work on environmental justice carried out by a colleague.

This same module is also informed by the [Instrumented City](#) work on air quality monitoring and modelling

The UG module '[Introduction to Transport Policy](#)' still makes use of work on the taxonomy of problems/objectives in transport planning produced by the PROSPECTS project of the FP5 and included in its Decision Makers' Handbook (this is now part of the KonSULT website at www.konsult.leeds.ac.uk).

The [PLUTO](#) software (developed in-house) is used on the UG module '[Instruments of Transport Policy](#)' and the PG module '[Fundamentals of Transport Planning](#)'.

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Respondent 7

The findings from several previous Masters students' dissertation projects have been used to update the PG module '[Traffic Management](#)'. Examples of projects used in this way are: The effectiveness of speed cameras; Tele-parking; Satnav & route choice behaviour; Traffic management for special events; Pedestrian modelling; In addition, research findings from EPSRC and EU projects (e.g. [CLEOPATRA](#)) have been incorporated into the module.

Respondent 8

Using the results of in-house research projects and the experience of other researchers (e.g. Carey, Daganzo, Astarita, etc) the principles of dynamic traffic assignment have been introduced to the PG module '[Network Analysis Models](#)',

A number of MSc students' dissertations have benefited from supervision by researchers at the cutting edge of their field. For example, a dissertation on modelling of queue spillbacks, which focussed on computing the path travel time and the outflows when the road links were congested.

Respondent 9

The Functional Safety part of the PG module '[Safety of Transportation](#)' comes almost exclusively from the EU funded R&D projects of the early 1990's, in particular DRIVE Safety (DRIVE I), [PASSPORT](#) (DRIVE II), [MISRA](#) (UK DTI) and [UTMC22](#) (UK DfT).

It might be thought that these projects are too old to count, but at a recent talk in Cambridge (UK), the Managing Director of the Microsoft Research Centre said that the typical time delay for a research result to be applied by industry was about 15 years.

3.4 Preferences in the transfer of research into education

On-line questionnaire

The first question was about the interest on the themes according to the thematic structure adopted in the TRKC project. The question was justified to investigate the interest in the thematic reports which have been produced in the EXTR@Web project and will be updated in the TRKC project. The thematic structure has five dimensions: sector, geographic, mode, sustainability policy objective, policy tools.

Figure 8, Figure 9, Figure 10, and Figure 11 show the percentage of respondents which have manifested interest in the individual themes in the various dimensions. The highest interest is in passenger (sector), urban (geographic), road (mode), environmental aspects (sustainability policy objectives) and transport management (policy tools).

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Q18 - In order to update the content of your courses by taking results from research, which themes are most important?

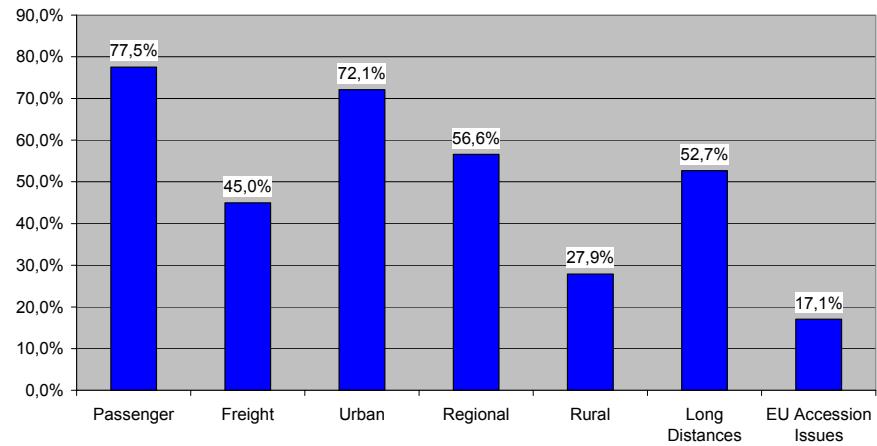


Figure 8. Interest in themes according to TRKC thematic structure: sectors and geographic

Q18 - In order to update the content of your courses by taking results from research, which themes are most important?

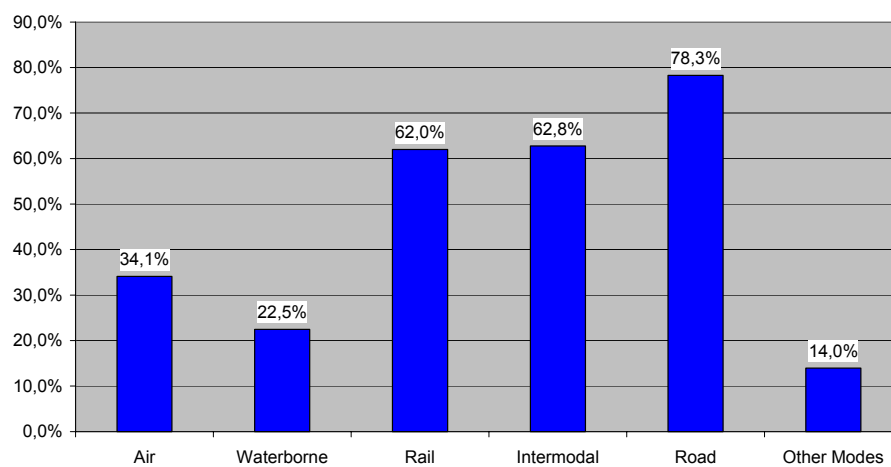


Figure 9. Interest in themes according to TRKC thematic structure: modes

Q18 - In order to update the content of your courses by taking results from research, which themes are most important?

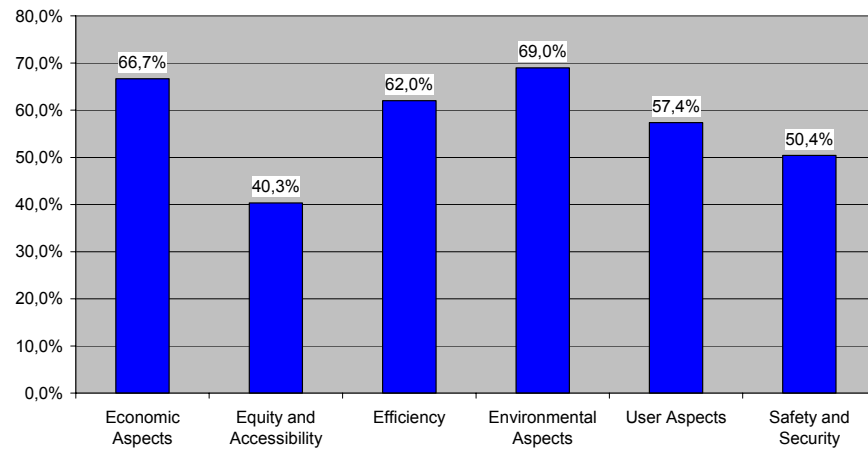


Figure 10. Interest in themes according to TRKC thematic structure: sustainability policy objectives

Q18 - In order to update the content of your courses by taking results from research, which themes are most important?

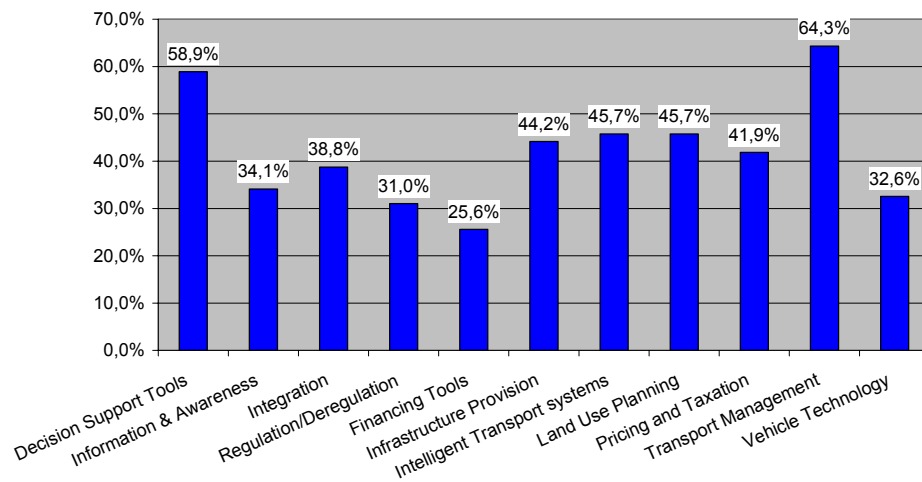


Figure 11. Interest in themes according to TRKC thematic structure: policy tools

The respondents gave information on which topics they would be willing to get from research projects in order to update the contents of the courses. The topics of interest stated by the respondents are listed in Table 3.

Table 3. Topics of interest for transfer from research into education by teaching area

<i>Area 1. Logistics and freight transport</i>	
Green logistics	
Supply chain management issues	
Intermodal transport	
<i>Area 2. Transport engineering and transport planning</i>	
Demand responsive transport DRT systems: when they are convenient compared to conventional public transport	
Driving behaviour	
Dynamic assignment models	
Dynamic OD estimation	
Effects of pricing on mode choice	
Environmental impacts of transport	
Impacts of measures	
Interaction between signal settings and traffic flow patterns	
Land use and transport system interaction	
Land use impacts	
Land use and transport interaction modelling	
Land use and public transport system relationships	
Mobility management tools: implementation	
Network design	
Public space	
Regeneration impacts	
Social impacts	
Spatial development theories and practice	
Stated preference methods: applications and technical issues	
Traffic generation: general information and models	
Traffic flow theory: models	
Traffic safety: general information and models	
Transit network planning	
<i>Area 3. Transport economics and policy</i>	
CBA reports on urban infrastructure	
Evidence on impacts of measures	
Social costs derived from transport externalities	
<i>Area 4. ITS Intelligent Transport Systems</i>	
Geographical information systems used for route optimising, route navigation	
Implementation issues of telecoms infrastructure	
'Road user charging (RUC) policy, RUC requirements and technologies	
Positioning and navigation system integrity (vital for liability and safety critical services),	
Impact of advanced technologies on the environment	
Telecommunication systems in transport and logistics	
Traffic identification systems (RFID, location based services etc)	
<i>Other</i>	
Innovative tools and methods to design MMIs (ergonomics)	

One respondent added in a comment that products from EU-funded research projects on modelling should be made available for all. He mentioned the case of the TRANSTOOLS project which dealt with European-level simulation modelling of networks: data are not available and methodologies and models are not well documented.

The tool for dissemination of research results preferred by the lecturer was investigated. Preferences are shown in Figure 12. Lecturers in the majority prefer papers in scientific journals. The second preferred tool is project reports/deliverables.

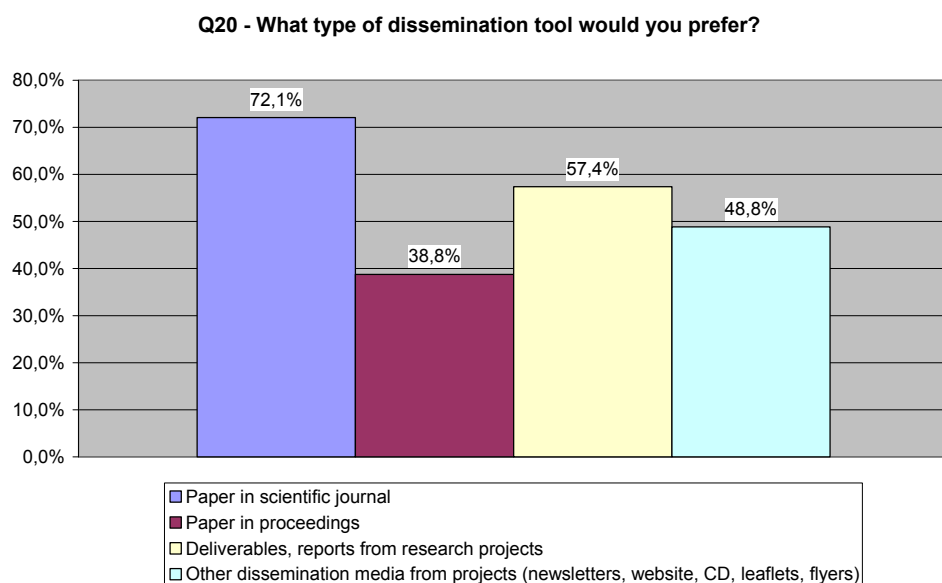


Figure 12. Preference for dissemination tools

Face-to-face interviews

One lecturer teaching a course in logistics and freight transport said he is interested to have more in his course from research about the evaluation of new technological solutions from the point of view of the firms. He said he is comfortable with project reports and deliverables as source of information and added he would like to have available presentations of project results in the form of slides.

One lecturer teaching a course in road safety remarked that as far as the specific contents of his course is concerned there is a need to pool and organise systematically the knowledge which has been collected to date in research projects. He sees as questionable the direct use in the courses of slides produced by research projects. Any documentation

from projects is considered of value.

One lecturer in railway engineering said he is interested for his course in results from research on the relationship between capacity and safety. He has a marked preference for papers in scientific journals as source of information.

One lecturer in transport economics sees service contracts and quality measurement in public transport as priority topics for the integration of the contents of his course (and possibly for training courses for officers in public administrations). Results from research on these topics would be of high value, especially collection of experiences and practices from all over Europe. He has a preference for papers in scientific journals as source of information from research projects.

3.5 Barriers in the transfer of research into education

On-line questionnaire

Three barriers were mentioned in the questionnaire:

- lack of awareness,
- availability and updating and information,
- results are not in the right format and style deemed appropriate by the lecturers.

Respondents were asked to rate the seriousness of these barriers. The respondents manifested a “sitting on the fence” attitude and no barrier came out to be perceived as more serious than the others.

Respondents identified the following as additional barriers:

- too many EU activities make difficult to identify the important ones;
- lack of time to search for appropriate material;
- lack of time to read all material;
- research is too specialised and therefore of little relevance for basic education;
- research is focused on details and lacks the general overview necessary for the students;
- results from research are not in a comprehensive form of higher synthetic level, there is the problem of several projects dealing with the same topic without coordination or comparison of the results;
- lack of knowledge about the framework on which the research has been undertaken, lack of overall research framework for EU-funded projects showing how they interrelate/interface;
- quality of research, quality not sufficiently determined;

- mental barrier of university staff to trust results which have not been achieved by themselves;
- researchers don't know how to present the material in a way that lecturers/students would find it useful.

Ways to overcome the various barriers were suggested.

For the lack of awareness barrier suggestions include the following.

One proposed tool is an emailed newsletters like the one issued by the TRB (Transportation Research Board) in the United States. The TRB e-newsletter provides blurbs on recently released TRB publications and news on Federal, State, university and international research. It is worth noting that the TRB provides in addition a web facility (at <http://www.trb.org/news/default.asp>) where the user can search for blurbs by user-specified keyword or by pre-defined modes and themes. One respondent proposed even to translate and disseminate newsletters for academic persons in all EU official languages

Another proposed tool is an alerting system about research as some publishers (e.g. Elsevier through its "ScienceDirect" service at <http://www.sciencedirect.com/>) do already effectively. This alerting system should work on a thematic basis with keyword specified by user.

A periodical revision of journals is remarked as a useful practice. This is something lecturers do already by themselves, and is facilitated by the alerting system put in place by some publishers. A service extending to journals by different publishers could provide this electronically on a thematic basis.

As papers in scientific journals represent the preferred and most used means by lecturers it is suggested that publication in scientific journals of research results from EU-funded research should be supported in any way. It is also remarked that participation in scientific conferences and funded research projects should be supported as a way to facilitate the exchange and transfer of research results.

For the availability and updating of information barrier the following was suggested.

The frequency of updating of databases like CORDIS and ELTIS should be increased. Alerts when database are updated should be provided. Public funded research must not be confidential therefore all products of research projects should be online and accessible for all EU citizens. A dedicated server should be put in place with all reports.

Also there should be a server providing access to all proceedings. For proceedings access would not be free of charge, thus the server might give directions to sites where it is

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possible to purchase electronic versions of papers.

It was remarked that research results are of interest for a long time after they are released as research results often have solutions for problems, say, 10 years ahead. In this context it was remarked the importance of making usefulness of research results for companies more visible.

For the unsuitability of formats and styles barrier suggestions were as follows.

Alternative approaches, instead of the traditional academic format, such as problem based learning open up the use of research papers as (optional) course literature. Students should be taught content analysis.

Information should be made available in ways that are suitable for use as case studies, problem examples – academic journals are not good for this. Access to original data in spreadsheet form would be of value.

Research reports are less appropriate for academic programmes than scientific papers. Each research project should produce, in addition to the management summary, a summary relevant to teaching. Short summaries of long reports are needed which include comprehensive information about real know how in the research project.

Books that give a coherent perspective are needed, the example of the book by Marten Turró, “Going trans-European: planning and financing transport networks in Europe” was mentioned.

For the information overload barrier several suggestions were proposed.

As there are too many websites, a new facility should be put in place to help find “what is available where”. Easy electronic access to final reports and technical papers should be provided possibly by a new dedicated portal. The architecture of existing websites should be improved to make it easy to find the desired information, and easy/structured links to research reports should be provided.

The problem of volume of material can be overcome by more synthesis in review papers. Less but more reliable and valid information is felt needed. Summaries of research findings by topic, as already provided by EXTR@Web, are considered of value. Also, annual summary by DGTREN of key results is proposed.

Face-to-face interviews

One lecturer in logistics and freight transport remarked that results from research need a

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period of assimilation, i.e. pooling and comparison, before they can be properly transferred to education. He sees as a problem the fact that project websites are discontinued. Results from research are of interest for several years after they are released. It should be possible to have online access to all documentation from research projects, searchable by theme. Full reports and slides from conferences relating to a project or a theme should be made available for all.

One lecturer in railway engineering (railway traffic management and traction systems) remarked that for new technological solutions there must be a testing and validation phase. He sees also as a barrier to the transfer from research into education in his subjects the fact that most of research is applied research with emphasis on technologies while his courses are aimed at forming engineers able to recognise the functionalities rather than being expert in the technology per se. A key issue is identified in the fact that the transport engineer is concerned with systems, while technologies are subjects for industrial engineers.

One lecturer in transport economics remarked that dissemination products from research projects are not suitable for use in education and one of the reasons lies in the fact that the authors are researchers and not lecturers. He suggests an activity of “marketing” of research results in the education community with the aim of clarifying the relevance to education of the findings of a research project. Also he sees as necessary, given the fact that traditional academic education moves from theory to practice and application, that the research is framed within some theoretical context in order to be suitable for transfer into education.

4. Discussion and conclusions

4.1 Discussion

This section reports on the discussion which took place in the second session of the Rome workshop.

Two issues, to be kept conceptually distinct, are of relevance both to the priorities of the TRKC project and as an indicative roadmap for further EU-level activities. One issue is the provision of information according to the users' needs, in particular the needs of the teaching community. Another issue is the active participation of users within networking opportunities, possibly offered by TRKC. For this other issue it is of relevance to investigate whether there is a potential for actors to provide products from research projects which can be exploited in the transfer of research into education.

The problem with information provision as far as the teaching community is concerned is one of information overload as well as of information quality. There is plenty of documentation which comes from EU-funded research but it is scattered. An internet facility able to link to different information sources ("meta-search" with links to different databases) is an answer to this problem.

Documentation coming from research projects is not of the quality needed by lecturers who often prefer to rely on their own experience of research participation. The education community has a marked preference for papers in scientific journals as a source of knowledge about research results. Reasons are essentially peer review-guaranteed credibility, and concise and stylised format which is not found in research reports which are instead lengthy and sometimes patchy.

It is important to both raise awareness and encourage the production of papers in scientific journals as these represent the preferred transfer means of research into education.

Information on the papers that come from an EU research project and are published either in proceedings or scientific journals is not available. A reason for this is the deferred time of publication compared with the project duration. It is suggested that ways to monitor this type of outcome from the projects should be sought and put in place.

Another suggestion is to offer the authors of papers originating from EU research the possibility to post this information in an internet facility, possibly developed by TRKC. In

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this case there would be a clear incentive for participation from the authors as this would give visibility to their papers and consequently opportunity for citation which is an evaluation factor of their CVs (especially for academics).

The approach adopted within the ELTIS (European Local Transport Information Service) initiative to encourage participation of researchers could be of interest. A remuneration scheme was developed to motivate experts to submit case studies. Remuneration is foreseen for those submitting at least three case studies. The selection of the prizes is based on an established model which distinguishes three types of persons. The "red" persons are the ones who need competition and status symbols. The "blue" persons are the ones who need statistics and facts and figures. The "green" persons are mainly driven by an emotional and hedonistic lifestyle. The scheme foresees two alternatives: a conventional remuneration with certainty of getting the prize and a random winning scheme.

Papers in scientific journals are however a minor source of information for lecturers when certain EU-funded research is concerned. Low use of papers from EU research depends in some cases on a relatively low number of papers produced. EU-funded research that has a prominent policy-orientation is sometimes in a weaker position in this respect. Some EU projects on sustainable mobility have a multi-disciplinary character which does not fit well into either scientific journals or academic education which are both single-discipline structured. A shift of traditional academic education towards problem-based learning would be needed to enhance the use of research results from certain EU projects.

Also it is worth addressing the issue whether publications from EU research in the form of papers in scientific journals should be encouraged and supported by the funding institution itself. Incentives might take the form of bonuses in the evaluation of research proposals.

Another suggestion for EU action is the launch of an on-line journal specifically devoted to the publication of results from EU-funded transport research projects. The on-line, free of charge availability would enhance accessibility. An example of on-line journals in the transport sector is the European Journal of Transport and Infrastructure Research promoted by the University of Delft. Costs would be kept to a minimum as the work by reviewers could be done on a voluntarily basis because this would offer the incentive of enhancing their CV.

4.2 Conclusions: the TRKC mini-roadmap

The insights on the processes of transfer of knowledge from research to university education which were collected during the first activities of WP5.1 together with the discussion which took place in the Rome workshop lead to the following conclusions.

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These consist of recommendations which can be of relevance to the subsequent activities of the TRKC project as well as to the EU as research funding entity. The recommendations here represent the mini-roadmap of the TRKC project for the linkages between research and university education. The mini-roadmap is structured according to concerns. For each concern, one or more “Propositions” (PR) and consequent “Recommendations” (RE) are formulated.

First concern. Research for targeted action.

PR1. A period where results from research are assimilated before the transfer into education takes place is commonly seen as necessary. The assimilation is essentially an activity of pooling and comparing results from different sources and projects.

RE1. Thematic networks and coordination actions appear as the first candidate for putting in place a dissemination activity specifically targeted to the education community.

Second concern. Awareness problems.

PR2. Although the surveys show an increase use in university education of research results from EU projects (comparison between the TRKC survey in 2007 and the PORTAL survey in 2001), still persists a problem of lack of awareness of research results.

RE2. An alerting system targeting specific users like lecturers could be put in place imitating the well-functioning and appreciated alerting systems of scientific publishers. The alerting system could be organised with a thematic structure with keyword specified by the user. The system could inform when a product has been released by a project (e.g. a handbook, the results of a survey, the results of a demonstration, a set of recommendations) or when a paper about an EU project has been published in a scientific journal. The alerting system could take the form of a newsletters providing blurbs similar to the one issued by TRB in the United States.

Third concern. What the research projects should provide.

PR3. It is unlikely that material produced by research projects can be directly transferred to students of university courses as course notes because each lecturer has his own style and preferences. Also, researchers might not be the best persons to produce education material, those who teach are in a better position to do that.

RE3. In order to make the lecturer quickly aware of the relevance of research results for his courses an activity of “marketing” of research in the education community might be put in place with each research project producing a summary, prepared by someone belonging to the lecturers’ community, of the relevance to education of the results achieved. This should help identify which results fit which course. Also, presentations given in conferences, especially the final project conference, should be given the same priority of final reports as far as storage and public accessibility are concerned.

Fourth concern. Meeting lecturers’ preferences.

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PR4. Lecturers tend to prefer personal experience rather than relying on research made by others.

RE4. Support should be provided for programmes where lecturers are exchanged among universities as well as for direct participation of lecturers in research projects, as ways to facilitate the exchange and transfer of research results.

PR5. Lecturers show a marked preference for papers in scientific journals as source of information from research projects. This is obviously the standard communication means in the scientific community, with the virtues of peer review and concise and stylised formats.

RE5. To enhance the transfer of results from EU projects into education any action able to increase the production of scientific papers and to increase the awareness of these publications should be put in place.

PR6. For some EU projects the production of scientific papers is low, due among the others to the multidisciplinary character of the projects.

RE6. Incentives for the production of papers from EU projects might take the form of bonuses in the evaluation of research proposals, the higher the number of papers originating from EU-funded projects published in scientific journals by the participants in the proposal, the better the evaluation. In addition, the European Commission might sponsor the publication of a new web-based journal specifically devoted to results from EU-funded research projects.

PR7. The information on scientific publications originating from EU-funded projects is not collected. One reason for this is the deferred time of publication compared with the project duration. It is unlikely that persons external to the TRKC consortium provide voluntarily inputs which can be exploited in the transfer into education.

RE7. Monitoring of scientific papers originating from EU-funded research could be put in place. As incentives are needed, a viable strategy within TRKC could be to get from those participating in research projects the information on the publications that originated from the projects. In particular, for purposes of transfer into education, papers in scientific journals are particularly valuable (more than proceedings). Making this information public has the benefit for the author to increase the probability of citation which is an evaluation factor of the CV.

Fifth concern. Communication problems.

PR8. There is a problem of overload of information coming from research. The users have manifested a need for being helped in knowing “what is available where” about transport research in the internet.

RE8. The TRKC project which is dissemination-focused and has put in place a web portal might usefully integrate its activities by providing an internet facility (linking different links together) which allows the user to navigate and find desired information in various databases and websites. This might include databases providing documentation from research projects as well as databases providing access to papers in scientific journals

and proceedings.

PR9. Another perceived problem which remains open is the loss of documentation from projects due to discontinued project web site. Research results remain of interest for several years after their release.

RE9. The problem of archiving full documentation from publicly-funded research projects and making it publicly available permanently should be tackled. A dedicated server might fulfil requirements of availability with search functionality according to time periods (e.g. all research items dated from year YYYY).

ANNEX 1. Workshop agenda and participants

A1.1 Agenda

TRKC International Workshop “Transferring transport research results into university education”

28 September 2007

IASI – CNR, Institute of System Analysis and Informatics – National Research Council
Viale Manzoni, 30 – Rome

14:30 am First Session. Presentations

Opening by the Chair

Francesco Filippi, DITS, Italy

“The TRKC project”

Gaby Jauernig, GOPA-Cartermill; Ulrich Leiss, IABG

“Lessons learnt from the PORTAL project”

Robert Pressl, FGM

“Experiences in the transfer of research into education: results from the TRKC survey”

Paolo Delle Site and Marco Valerio Salucci, DITS

16:00 am Second Session. Discussions

Plenary discussion

Synthesis and way forward in TRKC

18.00 pm Close

A1.2 Participants

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ANNEX 2. TRKC survey in the lecturers' community: the questionnaire

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I. General information

<p>1. University courses relevant to transport taught in 2006-2007.</p>	<p>Title of the course</p>	<p>Title of the Programme (e.g Bachelor's degree in transport engineering)</p>
<p>2. Are papers/reports on research results included in the reading list of your courses?</p>	<p>Choose</p>	
<p>3. Do you carry out also research activity as part of your normal assignments?</p>	<p>Choose</p>	
<p>4. Have you been involved in EU FP (Framework Programme) research?</p>	<p>Choose</p>	
<p>5. Would you like to add any comments or additional information on "General Information"?</p>		

II. Use of results from EU FP research

<p>6. Have you ever used results from EU FP research in your courses?</p>	<p>Choose</p>	
<p>7. (If you did not answer yes to the previous question, please skip to question nr. 12). Which topics do the research results used relate to?</p>		

8. In which way(s) were research results included in your courses?	As core topic for lectures <input type="checkbox"/>	As source usable for assignments <input type="checkbox"/>
	As case study for illustration of theory <input type="checkbox"/>	As additional reading <input type="checkbox"/>
	As seminar on specific topics <input type="checkbox"/>	
	Other (Please specify)	
9. What type of product(s) of the research project have you used for your courses?	Mathematical modelling and decisions support tools <input type="checkbox"/>	Policy recommendations <input type="checkbox"/>
	Results of demonstrations of new technologies/systems/policies <input type="checkbox"/>	Surveys <input type="checkbox"/>
	Other (Please specify)	
10. Which research dissemination tool(s) have you used for your courses?	Paper in scientific journal <input type="checkbox"/>	Deliverables, reports from research projects <input type="checkbox"/>
	Paper in proceedings <input type="checkbox"/>	Other dissemination media from projects (newsletters, website, CD, leaflets, flyers) <input type="checkbox"/>
	Personal experience <input type="checkbox"/>	
	Other (Please specify)	
11. Would you like to add any comments or additional information on "Use of results from EU FP research"?		

III. Use of results from research other than EU FP

12. Have you ever used results from research other than EU FP in your courses?	Choose
--------------------------------------------------------------------------------	--------

<p>13. (If you did not answer yes to the previous question, please skip to question nr. 18). Which topics do the research results used relate to?</p>		
<p>14. In which way(s) were research results included in your courses?</p>	<p>As core topic for lectures <input type="checkbox"/></p>	<p>As source usable for assignments <input type="checkbox"/></p>
	<p>As case study for illustration of theory <input type="checkbox"/></p>	<p>As additional reading <input type="checkbox"/></p>
	<p>As seminar on specific topics <input type="checkbox"/></p>	
	<p>Other (Please specify)</p>	
<p>15. What type of product(s) of the research project have you used for your courses?</p>	<p>Mathematical modelling and decisions support tools <input type="checkbox"/></p>	<p>Policy recommendations <input type="checkbox"/></p>
	<p>Results of demonstrations of new technologies/systems/policies <input type="checkbox"/></p>	<p>Surveys <input type="checkbox"/></p>
	<p>Other (Please specify)</p>	
<p>16. Which research dissemination tool(s) have you used for your courses?</p>	<p>Paper in scientific journal <input type="checkbox"/></p>	<p>Deliverables, reports from research projects <input type="checkbox"/></p>
	<p>Paper in proceedings <input type="checkbox"/></p>	<p>Other dissemination media from projects (newsletters, website, CD, leaflets, flyers) <input type="checkbox"/></p>
	<p>Personal experience <input type="checkbox"/></p>	
	<p>Other (Please specify)</p>	
<p>17. Would you like to add any comments or additional information on "Use of results from research other than EU FP"?</p>		

IV. Integration of results from research into courses

18. In order to update the content of your courses by taking results from research, which themes are most important?

Sectors					
Passenger	<input type="checkbox"/>	Freight	<input type="checkbox"/>		
Geographic					
Urban	<input type="checkbox"/>	Rural	<input type="checkbox"/>	EU accession issues	<input type="checkbox"/>
Regional	<input type="checkbox"/>	Long distances	<input type="checkbox"/>		
Modes					
Air	<input type="checkbox"/>	Rail	<input type="checkbox"/>	Road	<input type="checkbox"/>
Waterborne	<input type="checkbox"/>	Intermodal	<input type="checkbox"/>	Other modes	<input type="checkbox"/>
Sustainability policy objectives					
Economic aspects	<input type="checkbox"/>	Efficiency	<input type="checkbox"/>	User aspects	<input type="checkbox"/>
Equity and accessibility	<input type="checkbox"/>	Environmental aspects	<input type="checkbox"/>	Safety and security	<input type="checkbox"/>
Tools					
Decision support tools	<input type="checkbox"/>	Financing tools	<input type="checkbox"/>	Pricing and taxation	<input type="checkbox"/>
Information & awareness	<input type="checkbox"/>	Infrastructure provision	<input type="checkbox"/>	Transport management	<input type="checkbox"/>
Integration	<input type="checkbox"/>	Intelligent transport Systems	<input type="checkbox"/>	Vehicle technology	<input type="checkbox"/>
Regulation/ Deregulation	<input type="checkbox"/>	Land use planning	<input type="checkbox"/>		

19. What type of information on these themes would you be willing to get from research projects? (please describe the topics of interest in the themes)

20. What type of dissemination tool would you prefer in order to get this information?

Paper in scientific journal	<input type="checkbox"/>	Deliverables, reports from research projects	<input type="checkbox"/>
Paper in proceedings	<input type="checkbox"/>	Other dissemination media from projects (newsletters, website, CD, leaflets, flyers)	<input type="checkbox"/>
Other (Please specify)			

21. Three barriers in transferring research results into education and ways to overcome them are given. How would you rate them on a scale from 1 (easy to overcome) to 5 (difficult to overcome)? Which do you think are other possible difficulties/barriers in transferring research results into education and how would you rate them?

Barrier	Barrier's seriousness					Ways of overcoming it
1. Lack of awareness	1	2	3	4	5	Improve the activities and ways of disseminating the EU research results.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Availability and updating of information	1	2	3	4	5	Periodically check the completeness of information in CORDIS database, ELTIS database, etc., and increase the frequency of its updating
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Research results are not in a format and style deemed appropriate by the lecturer	1	2	3	4	5	Alternative approaches (instead of the traditional academic format), such as Problem Based Learning, allow for more modular, and potentially variable, readings to be used. Such formats open up the use of research papers as (optional) course literature.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

4.	1	2	3	4	5
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	1	2	3	4	5
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	1	2	3	4	5
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>22. Would you like to add any comments or additional information on "Integration of results from research into courses"?</p>					

V. Training courses

23. Training courses relevant to transport taught in 2006-2007.

Title of the course	Title of the programme (e.g internal training by companies)

Please fill in this table.

Title	Mr
First name	
Last name	
Position	
Institution	
Department	
Address	
ZIP Code	
City	
Country	
Telephone	+ - -
Fax	+ - -
E-mail	@
Date	