

Research Review
Centre for Learning Sciences and
Technologies (CELSTEC)
Open University of the Netherlands

Quality Assurance Netherlands Universities (QANU)
Catharijnesingel 56
PO Box 8035
3503 RA Utrecht
The Netherlands

Phone: +31 (0) 30 230 3100
Telefax: +31 (0) 30 230 3129
E-mail: info@qanu.nl
Internet: www.qanu.nl

© 2014 QANU Q 0403

Text and numerical material from this publication may be reproduced in print, by photocopying or by any other means with the permission of QANU if the source is mentioned.

CONTENTS

- Preface..... 5
- 1. The review committee and the review procedures..... 7
- 2. General remarks 9
- Part 1: Review of the institute 11
- Part 2: Assessments per research cluster..... 17
 - Programme Learning Sciences..... 19
 - Programme Technology Enhanced Learning..... 23

- Appendix A: Curricula vitae of the committee members..... 29
- Appendix B: Explanation of the SEP scores 31
- Appendix C: Programme of the site visit..... 33

Preface

This report describes the independent external quality assessment of research at the Centre for Learning Sciences and Technologies (CELSTEC), Open University of the Netherlands (OUNL). The assessment covers the period 2006-2011 and was conducted according to the Standard Evaluation Protocol 2009-2015 for Public Research Organisations (SEP).

The quality assessment was carried out by a review committee consisting of one chair and four members with expertise in the two areas of research: learning sciences and technologies.

As chair of the Committee, I greatly appreciate the commitment, the expertise and the excellent cooperation of my colleagues. The Committee wants to thank CELSTEC for both the quality of the documents which allowed thorough preparation and the loyal cooperation during the whole evaluation process.

Joost Lowyck
Chairman of the Committee

1. The review committee and the review procedures

Scope of the assessment

The Review Committee was asked to perform an assessment of the Centre for Learning Sciences and Technologies (CELSTEC) of the Open University of the Netherlands (OUNL). This assessment covers the research in the period 2006-2011. In accordance with the Standard Evaluation Protocol 2009-2015 for Research Assessment in the Netherlands (SEP), the Committee's tasks were to assess the quality of the institute and the research programmes on the basis of the information provided by the institute and through interviews with the management, the research leaders, researchers and PhD students, and to advise how this quality might be improved.

Composition of the Committee

The composition of the Committee was as follows:

- Prof. dr. Joost Lowyck, emeritus professor of the Centre for Instructional Psychology and Technology at the University of Leuven (Belgium);
- Prof. dr. Frank Fischer, professor of Education and Educational Psychology, Ludwig-Maximilians-University (Germany);
- Prof. dr. Matthias Jarke, professor of Information Systems at RWTH Aachen University (Germany);
- Prof. dr. Hans Gruber, professor of Educational Science, Institute of Educational Science at the University of Regensburg (Germany);
- Prof. dr. Hugh Davis, professor of Learning Technologies, Director of education, and Director of the Centre for Innovation in Technologies and Education at the University of Southampton (UK).

A profile of the Committee members is included in Appendix A.

Dr. Meg Van Bogaert was appointed secretary to the Committee by QANU (Quality Assurance Netherlands Universities).

Independence

All members of the Committee signed a statement of independence to safeguard that they would assess the quality of the Institute and research programmes in an unbiased and independent way. Any existing personal or professional relationships between Committee members and programmes under review were reported and discussed in the Committee meeting. The Committee concluded that there were no unacceptable relations or dependencies and that there was no specific risk in terms of bias or undue influence.

Data provided to the Committee

The Committee has received detailed documentation consisting of the following parts:

1. Self-evaluation report of the unit under review, including all the information required by the Standard Evaluation Protocol (SEP), with appendices.
2. Copies of five key publications per research programme.

Procedures followed by the Committee

The Committee proceeded according to the Standard Evaluation Protocol 2009-2015 (SEP). Prior to the Committee meeting, each programme was assigned to two reviewers, who independently formulated a preliminary assessment. The final assessments are based on the documentation provided by the institute, the key publications and the interviews with the rector magnificus, the management of the institute and with the leaders and researchers of the programmes. The interviews took place on 15 and 16 October 2013 (see the schedule in Appendix C) in Heerlen.

Preceding the interviews, the Committee was briefed by QANU about research assessments according to SEP, and the Committee discussed the preliminary assessments. For each programme a number of comments and questions were decided upon. The Committee also agreed upon procedural matters and aspects of the assessment. After the interviews the Committee discussed the scores and comments. The texts for the Committee report were finalised through email exchanges. The final version was presented to the institute for factual corrections and comments. The comments were discussed in the Committee. The final report was printed after formal acceptance by the Board of the University.

The Committee used the rating system of the Standard Evaluation Protocol 2009-2015 (SEP). The meaning of the scores is described in Appendix B.

2 General remarks

CELSTEC, as the research centre of the Open University in the Netherlands, is part of the research programmes in the field of educational sciences, aiming at increasing scientific knowledge and contributing to the problems related to educational theory and practice. The specificity of CELSTEC within educational sciences is its focus on technology-enhanced distance learning and the interlinking fields of learning sciences and technologies.

The Committee based its evaluation on all documents presented in the Self-Evaluation Report 2006-2011 and on information gathered during the interviews as well. The Committee was impressed by the way CELSTEC carefully and efficiently managed the 2008 transition between OTEC and CELSTEC. Evolution was not experienced by the Committee in terms of a break but of growth and accumulation.

Despite continuous evolutions and reorganisations due to political and university decisions, CELSTEC maintained high level output of research that was organised in an interdisciplinary approach between learning sciences and technologies.

CELSTEC's multidisciplinary perspectives within Learning Sciences (LS) and Technology Enhanced Learning (TEL) allowed research on learning, instructional design, engineering and media to meet in joint projects with a high productivity level of both processes and products.

The internal organisation of CELSTEC with adequate processes is transparent and holds a well-balanced relationship between top-down and bottom-up developments.

CELSTEC has a visible position in national and international research and the academic staff is in a leading position in Dutch research schools and European networks. CELSTEC has a clear view on competence development with emphasis on intensive supervision of PhD candidates.

In general, the Committee evaluates the quality, productivity and societal relevance as very high for both clusters, be it in different contexts. Viability is, given the very recent political evolutions, object of concern.

Based on the current assessment, the Committee is very positive about the results of CELSTEC with regard to research, innovation and validation. Both clusters clearly reach the level of international excellence.

It is the hope of the Committee that CELSTEC, even in a new constellation, will continue its excellence. This will depend on important decisions at the university and research centre level.

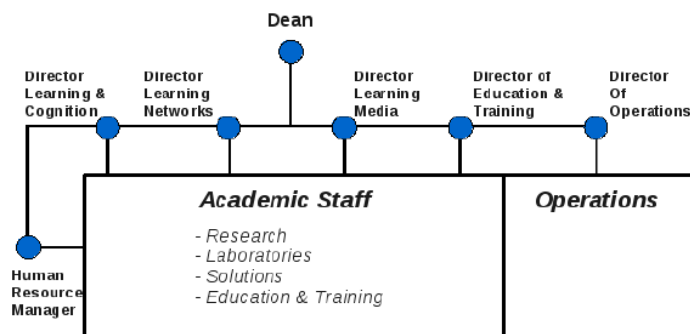
Part 1: Review of the Institute

1. The Institute

The Centre for Learning Sciences and Technologies (CELSTEC) is a Centre of Excellence in the fields of learning sciences and technologies which aims to improve learning and knowledge handling at work, school, and home and on the move by combining state-of-the-art knowledge in the learning sciences with the innovative powers of new information and communication technologies.

Over the period of the review (2006-2011) CELSTEC concentrated its activities on two clusters, namely Learning Sciences (LS) and Technology Enhanced Learning (TEL). Both clusters were assessed by the committee as reported in the programme assessment part. CELSTEC claims to be a multidisciplinary institute uniting the LS and TEL perspectives in joint projects in the Learning Media Lab, which forms the frame for joint Topic Groups bringing together expertise from theory, instructional design, engineering and media. New technologies are tested in the laboratory and in practice.

Figure 1 provides an overview of the CELSTEC management structure. Table 1 provides an overview on the research staff for the CELSTEC institute.



According to the self-evaluation report, CELSTEC actively collaborates in both national and international projects. Nationally, researchers are active in a number of scientific organisations. Internationally, CELSTEC has formal partner institutes in a number of countries, among which the USA, Asian countries, Australia and European countries.

Since 2000 CELSTEC maintains a Learning Media Lab as a research and development environment to conduct empirical research and test learning technologies. According to the self-evaluation report, the Lab supports:

- Incubation;
- Research and technology development;
- Media technology scouting;
- Sensibilisation / dissemination;
- Open innovation workspace.

Together with external partners and OUNL faculty staff, CELSTEC staff explores, co-develops, and tests innovation in – amongst others – the following areas:

- Instruments, tools and techniques to facilitate learning;
- Modern learning environments to personalise learning material to the needs of learners;
- Usability.

Assessment

In 2005 OTEC, the predecessor of CELSTEC took part in its first research evaluation of two clusters: ‘Instructional design for open tasks, Environments and Communities’, the predecessor of LS, and ‘Learning Networks for Lifelong Competence’, the predecessor of TEL. The mix of theory- and applications-oriented research represented an excellent success story on all criteria. CELSTEC in the period 2006-2011 was able to maintain and even to slightly further the Centre’s achievements from its previous research assessment. The choice for the two clusters in the institute is very valid.

With respect to the past period, the committee concluded that both programmes and the institute as a whole showed strong intellectual and organisational leadership. LS as well as TEL have good managers, who are reflective and put their fields in context of internal and external developments. Staff and researchers have a high level of motivation and expertise working in a positive interdisciplinary climate. CELSTEC is internationally well known and the committee was unanimous in its conclusion that CELSTEC as a research centre is internationally leading.

In the months prior to the site visit, major changes in the funding of another OUNL expertise centre, LOOK (Scientific Centre for Teacher Research), were faced with. On July 5th, the Parliament of the Netherlands approved a severe austerity measure. One of the cuts made was the complete budget of LOOK. The decision was taken by the Board of the OUNL to merge CELSTEC and (selected parts of) LOOK into one, new research institute. It was considered that Learning Sciences and Technology Enhanced Learning could share topics with Teaching and Teacher Professionalization. At the moment of the site visit (October 2013), only the general outlines of this new institute were available. In part 6 of this Chapter, *strategy for the future*, the committee will provide some feedback regarding the changes that are ahead.

2. Quality and academic reputation

The self-evaluation report describes a number of noteworthy accomplishments of the institute as a whole. These include memberships in boards and societies, acquisition of research grants and professorships.

For more examples that show quality and academic reputation of the institute, the self-evaluation report refers to the individual research programmes.

Assessment

The committee is overall impressed by the scientific quality delivered by CELSTEC. The assessment of the individual clusters (LS and TEL) will be provided in the programme assessment part of this report. The collaboration between the two research clusters is in practice much closer than was concluded from the self-evaluation report during the preparation of the assessment. It seems to the committee that the clusters know when and how to find each other in order to improve the quality of their research.

3. Resources

The self-evaluation report provides the following data on staff and funding:

Table 1. Research staff

	2006	2007	2008	2009	2010	2011
Tenured staff LS*	5.64	5.84	6.72	6.28	6.04	6.00
Tenured staff TEL*	9.60	8.76	8.28	7.28	7.60	8.00
Tenured staff total*	15.25	14.60	15.00	13.36	13.64	14.00
Non-tenured staff LS*	0.9	0.9	0.9	1.7	1.44	0.72
Non-tenured staff TEL*	0.9	0.0	1.98	6.48	5.31	6.21
Non-tenured staff total*	1.8	0.9	2.88	8.18	6.75	6.93
PhD-students LS**	8.08	6.02	9.1	5.88	7.28	10.78
PhD-students TEL**	3.5	5.60	5.46	3.92	3.92	6.02
PhD-students total**	11.58	11.62	14.56	9.80	11.20	16.80
total research staff LS	14.62	12.76	16.72	13.86	14.76	17.50
total research staff TEL	14.00	14.36	15.72	17.68	16.83	20.23
total research staff total	28.62	27.12	32.44	31.34	31.59	37.73
Support staff	6.00	6.00	6.00	6.00	6.00	6.00
Visiting fellows	0 pers.	0 pers.	2 pers.	0 pers.	0 pers.	2 pers.
Total staff	34.62	33.12	38.44	37.34	37.59	43.73

* research component

** research component is 70%fte

Table 2. Funding of the research staff

Funding	2006		2007		2008		2009		2010		2011	
	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%
Direct funding	2,209	62	2,200 7	56	1,895	50	1,954	43	2,249	61	2,208	66
Research grants	1,109	31	1,283	36	1,772	47	2,232	49	1,128	30	923	28
Contract research	230	6	286	8	96	3	410	9	330	9	199	6
Total funding	3,548		3,576		3,762		4,595		3,708		3,330	
Expenditure												
Personnel	3,406	96	3,433	96	3,574	95	4,366	95	3,485	94	3,130	94
Other costs	142	4	143	4	188	5	230	5	222	6	200	6
Total expenditure	3,548		3,576		3,762		4,595		3,708		3,330	
Research clusters												
LS	1,251	35	1,358	38	1,144	30	1,241	27	1,112	30	1,306	39
TEL	2,297	65	2,218	62	2,618	70	3,355	73	2,596	70	2,024	61

Assessment

The committee noticed that the clusters show differences in amount of non-tenured staff members, which most likely has to do with the third stream funding of a large project of the TEL cluster. This is elaborated on in the assessment of TEL.

According to the committee, it is inevitable to look for funding sources beyond direct funding. Multiple sources of funding provide security of total funding. The increase of third stream funding has had some effects though. For example, the fundamental research topics need to be more explicitly guarded since contract funding is often more applied in character. Furthermore,

applying for numerous second and third stream funding projects harbours the risk of loss of focus within the institute.

4. Productivity

The self-evaluation report provides the following data on research output:

Table 3. Main categories of research output

	2006	2007	2008	2009	2010	2011
Refereed articles	53	57	57	53	60	70
Non-refereed articles						
Books	2	5	9	10	5	6
Book Chapters	5	13	30	41	11	36
PhD-theses	2	2	7	7	2	4
Scientific conference papers	40	40	28	42	43	22
Total Scientific publications	102	117	131	153	121	138
Other research output						
Awards		1	1	1	5	1
Inaugural addresses	1	3	1	1		1
Contributions to conferences and congresses	109	139	135	202	203	260
(technical) Reports	81	91	55	90	69	26
Software	15	14	25	26	5	8
Total publications aimed at the general public	206	248	217	320	282	301
Total publications	320	389	363	490	431	461

Assessment

The committee assesses the output of the institute for the two clusters in the second part of this report.

5. Societal relevance

The organisational strategy in 2008 was predicated on the increased relevance of valorisation, making participation in external research and professional networks an integral part of CELSTEC's mission. Examples are given in the self-evaluation report with which the institute subscribes the active attitude towards societal relevance. Research and related outcomes and valorisation activities in the fields of the two programmes are grouped in themes that periodically are revised and, when needed, changed.

Examples of societal impact like training of teachers, education of professionals and advisory and consultancy services are given in the self-evaluation report. Furthermore, innovation of the educational programmes of OUNL is organised in a university-wide programme, called IPO. Staff of IPO was almost entirely seconded from CELSTEC, which subsequently led to a number of projects and implementation projects.

Assessment

During the site visit, the committee extensively discussed demand driven research versus theory driven research. With respect to valorisation and societal relevance, the impact of a paper based on-demand driven research might be extensive. On the contrary, research on questions from the field might lead to good, but not world leading papers.

The OUNL is currently setting up a new, merged institute, with more and easier contact with schools. This could lead to an increase in societal relevance. However, the committee strongly recommends the Board of the university as well as the management of the new institute, to carefully consider the balance between demand driven and theory driven research.

6. Strategy for the future

As mentioned earlier in this report, at the moment of the site visit it was recently decided that CELSTEC would merge with another OUNL institute, LOOK. The outlines for a new institute were discussed with the committee, but no formalized plans were available yet. Therefore, the committee has decided on two issues. First is not to give scores to the individual clusters (LS and TEL) for Vitality and Feasibility. It is unclear what effects the current situation might have on the future of the programmes. On the one hand, the committee does not consider it fair to make the two clusters accountable for the present situation. On the other hand, the committee would not like to approve currently unclear plans for a new institute.

Second, the committee will provide some feedback with respect to the future of the institute, but will not comment on the initial plans of the OUNL, since these are not yet in a phase in which founded feedback can be given. The committee strongly emphasizes to consider the current, very good status of the two programmes in CELSTEC when the merger is executed. There are many very good aspects, some even excellent in the institute and in both programmes, that should be maintained.

From the interviews the committee concluded that the programme leaders of the new management team for the new institute seem to have accepted the fact that a merger is inevitable. They are making the best of a situation forced upon them and even see opportunities rather than problems ahead. It seems that the atmosphere between the 6 new management members is open and constructive. However, at CELSTEC there is a lot of commotion among staff members. This is partly due to uncertainty, but staff also knows that some will be fired and will not have a position in the new institute. According to the committee this is understandable and should be carefully attended to by the new management as well as the Board of the university.

The committee was told, on multiple occasions during the site visit, that the merger with LOOK would lead to an increase in societal relevant research, since LOOK has close connections to schools. However, without the funding provided by LOOK it is not clear that schools will continue to collaborate as enthusiastically as they have in the past if they are actually required to fund the research. At the same time, the committee learned that staff without a PhD that is now often involved in outreach activities, would not get a position in the new institute. Implementing of research findings would be done from a department within the faculty. However, the committee warns for the risk that researchers within the new institute will have to spend more time on outreach after the merger. This will have a direct effect on the quality and productivity of the research.

7. PhD training and supervision

The primary objectives of and expected outcomes for PhD-graduates are to:

- become competent researcher who can pursue an academic and/or scientific career;
- do high quality research;

- make results known through publishing in high quality journals and presenting at high impact conferences;
- make results known and usable through publishing in professional journals and presenting at professional conferences;
- develop a national and international network within the chosen field;
- enjoy the experience.

PhD candidates working in CELSTEC and their supervisors participate in national research schools: the Interuniversity Centre for Educational Research (ICO, for LS cluster) and the School for Information and Knowledge Systems (SIKS, for TEL cluster). All PhD students carry out research based on an approved PhD project proposal and are schooled and supervised according to a required Education and Supervision plan.

Assessment

The committee concluded that for PhD training, CELSTEC has implemented state-of-the-art processes and uses state-of-the-art instruments for supervision and support. Based on the information provided, alumni find good positions in research. Also, many of the publications by the institute were written together with PhD candidates. The quality of supervision is also evidenced by a national award for best PhD supervisor to one of the full professors of CELSTEC.

The committee did notice several differences between the LS and TEL cluster. This is founded in participation in different research schools. These research schools have different requirements for PhD students. For example, PhD students from the TEL cluster have to write their own research proposal in the first year, while LS students most often are recruited once a research proposal is approved. This has advantages for the TEL students, e.g. they have more input into their own research project, but also has the major disadvantage of possible delays. Other differences are given in the assessment of the clusters and include additional requirements for programming/creating a computational model, interdisciplinarity of the research and publication strategy.

For the LS cluster a total of 15 PhD students were successful in the period of assessment, with a high proportion of female candidates and zero dropouts. TEL had some difficulties with PhD students dropping out. It was explained during the site visit that on two points action was taken. First, a lot of PhD students had to be recruited after receiving a major European grant. Not enough excellent PhD candidates could be found at the time, leading to a considerable number of dropouts. At the moment of the site visit, the TEL cluster was much better able to recruit excellent, often Dutch, candidates. The committee expects that dropout rates therefore will reduce. Second, many PhD students struggled with the interdisciplinary aspects of the TEL field, leading to dropout or delays. The committee concluded that the TEL management is well aware of this latter issue and uses this as a criterion for recruitment. Although the TEL cluster has dealt with the major problems concerning PhD delays and dropout, the committee remains of opinion that PhD students, especially those of the TEL cluster, should be supported and considered in the attainment of requirements.

Part 2: Assessments per programme

The committee assessed the following research programmes:

		Quality	Productivity	Relevance	Viability
1	Learning Sciences	5	5	4	NA
2	Technology Enhanced Learning	4.5	4	4.5	NA

The detailed assessment per research cluster follows in the next section of this report.

2.1. Learning Sciences

Coordinator: Prof. dr. Paul A. Kirschner
Research staff 2011: 17,50 fte

Assessments: Quality: 5
 Productivity: 5
 Relevance: 4
 Viability: NA

Short description

The mission of the Learning Sciences (LS) programme is to support learners in (1) acquiring skills, knowledge and attitudes; (2) transferring those competencies to a variety of settings; and (3) planning, regulating and maintaining their own learning. The programme explicitly encourages and requires a multidisciplinary and interdisciplinary approach to studying educational questions, building on state-of-the-art knowledge in education, psychology, cognitive science, computer science and neuroscience. The cluster concentrates on five themes:

1. Effective Learning Strategies
2. Information Literacy
3. Expertise Development
4. Brain and Learning
5. Assessment

Quality

By all measures, the quality of the programme is excellent. The leading senior researchers have an excellent reputation in the areas of effective learning strategies, design of complex learning environments, information literacy, information problem solving, and the development of expertise in different domains. In addition, the composition of the research areas is excellent. The areas complement each other, but are convincingly related to each other. There are few, if any, other groups world-wide in which such a composition is found and is substantiated by excellent research and publications. The manager of the programme is very frequently cited; his citation count exceeds 10,000, which is outstanding in the research field considered.

The programme is remarkable in many respects. It is in particular impressive how quickly the programme recovered and further developed after the change in leadership. Very appropriate decisions were made on how to redesign the overall research perspective. The analysis of cognitive processes in a large variety of human performance tasks guarantees coherence of the programme, but offers a wide variety of research areas. This supports the multi-and interdisciplinary goals, but also makes the programme attractive and provides broad attention in a number of research communities. There is considerable collaboration within the programme, but also more broadly within OUNL, and particularly with the most relevant international communities like the EARLI and the International Society of the Learning Sciences.

Not yet are all of the main LS focus areas equally developed. This is not a weakness, but rather it indicates that the programme is continuing to develop innovations and new research agendas which extend the field and guarantee the scientific strength of the programme. The emerging line of research on physiological and brain processes in relation to learning and its assessment clearly strengthens the overall approach of the programme and in addition creates new interfaces for collaboration with general psychology, biology and neurosciences.

It is noteworthy that the programme's work is based on the contribution of a relatively small number of tenured and (in particular) non-tenured staff members. This work is completed by the outstanding number and quality of PhD-student work.

Productivity

Considering all measures of productivity along with the productivity strategy, this programme is excellent. The productivity goals are set on a very high level with three publications per researcher per year and one publication per year for the PhD candidates. According to the statistics provided in the self-evaluation report, these goals are fully reached for the period under evaluation. The publication strategy is impact-driven, with clear priority to ISI/Thompson Reuters listed journals, complemented by other ICO-listed journals and then other types of publications. The productivity strategy has been successfully implemented. The productivity targets are ambitious, but are even exceeded in practice. Both quantity and quality are excellent and meet an international competitive level.

Although the programme puts considerable effort into its academic reputation, other outcomes (valorisation, viability and further education) are remarkable as well. The output for the wider audience is of high quantity and addresses quite diverse target groups.

It is remarkable that the programme strongly ensures good academic practice, although the productivity strategy puts high publication pressure on the researchers, in particular on the side of PhD candidates. The integration of PhD candidates in networks of scientific activity, in particular publishing, is outstanding. The PhD candidates thus are both strongly supported and clearly challenged, a combination which renders excellent output within a positive working climate.

Relevance

The programme is actively contributing to dissemination of research results outside the scientific community. It shows considerable activity in discussions with practitioners, mainly teachers and employees in the higher education sector. As innovations in higher education are part of the CELSTEC mission, the activities seem fully appropriate. It is an indicator of the very good reputation of CELSTEC, that many of these activities have been requested by other institutions.

The committee considers the aspect of relevance being more difficult to assess, as very different perspectives can be taken on the definition of relevance. The decisions expressed in the programme's strategy are convincing. The programme is very active in following this strategy and communicating its research outputs to the wider public, to provide processes, products and services.

The impressively long list of relevance items in the appendix of the Self-Evaluation Report carries one potential drawback in itself. To the committee it was not fully clear which parts or members of the programmes made which contributions, hence the strategic aspect behind activities and the expected performance of the researchers could be made more explicit in the future. It is advised to develop a more focused agenda how to define and reaching specific relevance goals.

Viability and feasibility

The strategic plan of the programme includes a re-focusing of research on five societally relevant areas. This plan considers forthcoming changes in the personnel due to retirement. The committee considers that the programme can do this successfully, as it has been addressing important aspects of these five areas successfully in the past period. Hence, important aspects of

these five areas can be addressed with a high potential of success with the expertise brought together and further developed in this programme. However, the committee recommends that the future strategy of the programme should also be built on its major strengths: to conduct and publish excellent research on learning and instruction, with other researchers being the direct target group, and continue to provide an excellent training environment for young researchers.

Although the committee is confident that the strategy promises an excellent viability of the programme, it feels unable to assess this category. This decision exclusively results from political budgeting decisions concerning the OUNL. Although these decisions do not address the programme directly, they may have unforeseeable consequences. The Rectorate of the university has to reorganise the resources within the university, and there is some probability that CELSTEC in general and thus also the LS programme will be affected.

Conclusion

There is evidence of a strong intellectual and organisational leadership within the different lines of research. The programme staff is highly visible on an international level with respect to their topic areas. The conceptual consistency and persistence with respect to the core questions clearly show up in the publications and ensure high standards.

Overall the programme showed excellent research performance and is widely recognised as one of the international top research groups in the Learning Sciences. This is an emerging field with dozens of new programmes being developed around the globe. The programme clearly has a leading role world-wide. The committee thus strongly recommends retaining the general orientation of the programme in the future.

2.2. Technology Enhanced Learning

Coordinator: Prof. dr. Marcus Specht
Research staff 2011: 20.2 fte

Assessments: Quality: 4,5
 Productivity: 4
 Relevance: 4,5
 Viability: NA

Short description

Within CELSTEC, the research cluster on Technology-Enhanced Learning (TEL) sees itself as an essentially interdisciplinary field between Computer Science and the Learning Sciences. It focuses on all aspects of ICT support for learning situations, with an emphasis on tertiary education and lifelong learning, but also addressing some aspects of primary and secondary education. Contributions include needs analysis, design, prototypical implementation, and systematic technology evaluation. From these experiences, it is the strategy of the cluster to derive generalized frameworks, reusable methods and software components for TEL. These are, then, disseminated to a wide range of developers and users nationally and internationally. World-leading successes with excellent scientific quality as well as high practical impact include, for example, the IMS Learning Design Framework.

Quality

Whereas many TEL research groups are grounded in either computer science or the learning sciences discipline, the CELSTEC group is one of the very few that takes a truly transdisciplinary approach to the field. Given the mutual influence among the involved fields, such a view is highly relevant for research and practice. The quality of publications is very good, with regular presence in the strictly refereed top international TEL conferences and in very good journals.

The TEL cluster has successfully managed the transition from one very strong leader to another. The committee was highly impressed with his strong strategic perspective of the field and of his group, including a careful balance of young promising researchers from different background disciplines. However, much of this success depends on this key leader; a strengthening of the group also at the senior level seems advisable for risk management.

The excellent academic reputation of the group is evidenced by general ranking exercises in the field, but also by invitations to outstanding international partners such as Stanford and elections to chair the most important international conferences in the TEL sector.

The organization of the TEL group itself as well as the strategy to involve the LS group in many externally funded TEL projects has already been very strong in the first evaluation and improved further during the evaluation period.

In the first half of the evaluation period, the TEL group enjoyed an outstanding success in third-party funding from a huge EU project they coordinated. In the past two years, the group has still been very successful, but was nevertheless forced to downsize its personnel because of the end of this project, and some cuts in base funding. This situation and the shortage of national technically qualified PhD candidates over several years have led to a temporary reduction in PhD success and similar factors, as some research could not be funded to the end. In addition, the demands on TEL students in the programme are somewhat harder than in LS, as thesis work is required to include a design and software prototyping component in addition to literature and empirical

work; this unusually strict demand has led to a few outstanding theses, but also to some early dropouts. It might be better to give students a sound grounding in the range of research approaches at an early stage in their studies to get them to the stage that they can deal with all appropriate disciplines.

In the very recent past, however, these temporary problems seem to have been overcome such that much better success of the – in its design very impressive – PhD training can be expected.

Productivity

The publication strategy is guided by carefully designed journal lists from the TEL field and its immediately surrounding areas with learning sciences and computer science. The productivity goals are ambitious but are being achieved in an impressive manner. Given the strong standing of the group within the TEL field, the committee sees an additional opportunity to reach out to high-impact general journals in computer science such as CACM or IEEE Computer, in order to broaden the interest for the TEL field itself.

The productivity in scientific publications is very good. An at least equally strong impact is reached by open source software components offered by the group and widely used internationally. Very recently, there has also started an additional outreach into national professional publications in order to have more impact e.g. in the primary education.

Relevance

The TEL group has had a very strong impact on international research through prototype dissemination and methodological innovation. There is also a strong direct influence on TEL practice within OUNL and thus the distance learning sector of the Netherlands, and some such influence on university-wide practice elsewhere. This is expected to grow through the ‘frameworks and reusable components’ strategy pursued by the group to make these results more directly accessible to non-specialists. While the traditional emphasis of the group was on the tertiary sector, recent initiatives are significantly increasing the outreach to primary and secondary education. In this regard, the growing cooperation with LS and potentially with the former LOOK group could be very fruitful. However, these attractive possibilities need to be balanced with the need to maintain the focus on quality of TEL research as the long-term source for international leadership in research, and the opportunities for top-quality ‘products’ in valorisation.

Vitality and Feasibility

An overall score for the vitality and feasibility of the TEL group cannot be given at present, given the complete re-organization of the CELSTEC institute where many details are still open. Nevertheless, the reviewers would like to mention several important cornerstones required to maintain the excellent standing the group has achieved in its first ten years of existence.

The TEL group has impressively managed two difficult transitions during the reporting period: the transfer in leadership and the normalization in the level of third-party EU funding after the end of the huge TENcompetence project. Nevertheless, some promising young leaders had to leave the group such that a gap in second-level leadership has emerged which could not yet be filled by the very recent assistant professor-level additions. Additional funding reductions could be quite dangerous in this situation, also because the strength of TEL in acquiring third-party funding has enabled some excellent research in the LS group as well.

The committee was happy to see the optimism and enthusiasm by which the leaders of LS and TEL are addressing the synergy chances of the planned merger with the former LOOK group

while maintaining research quality. However, they also noticed the growing tension in the triangle between continued demand for world class research, reduced share of base funding, and real-life valorisation. The risks of extreme dependence on third-party funding, and the resulting variance in overall funding levels, were illustrated in TEL itself by the TENcompetence project. Thus, it will be important to find a sustainable balance in the above triangle.

There is a major tension between the need to produce world-leading research and to have immediate impact on society (valorisation). To produce world class research the advice would be to specialise and concentrate on a single unsolved issue, whereas to maximise impact one needs interdisciplinary teams with the ability to work in any part of the domain that is required to solve real problems. To deploy and embed innovations successfully in schools and higher education requires skilled practitioners who work across the research/teaching boundary, and this is not often a task that is well performed by leading researchers.

In addition, it must also be noticed that much of the success of the TEL group in valorising research through reusable software/method components and frameworks depends on the technical support they have had in the group; it will be quite critical for the vitality and feasibility of the group to maintain an adequate level of this kind of support in addition to the “pure” researchers.

Conclusion

The TEL cluster has a strong international reputation due to its high standards in research and publications as well as influential software prototypes. As one of the strongest European players in this highly interdisciplinary field, it has gained visibility in the TEL community and is a sought-after partner for European projects and networks of excellence. The TEL group has a clear strategic view for the future in cooperation with the new partners in the new institute. However, the degree to which this combined strategy of continued scientific quality and further increased joint valorization can be implemented depends to a significant share on resource decisions at the university level that were not yet known at the time of the evaluation.

Appendices

Appendix A: Curricula vitae of the committee members

Joost Lowyck (emeritus) studied Educational Sciences at KU Leuven, after which he specialised in teacher training and technology in Heidelberg. He was co-founder of the Centre for Instructional Psychology and Technology (CIP & T). Since 1979 until 2006 he was professor at KU Leuven in the domains of educational technology, instructional design and teacher education. He was Chairman of the Department of Educational Sciences and the “Teacher Education Institute at KU Leuven. From 2008-2011 he was Dean of the Faculty of Psychology at Uninettuno, Rome He is member of the ICO Advisory board and participated as member and chair in a substantial number of educational and research assessments in the Netherlands.

Matthias Jarke is head of the Fraunhofer-Institut für Angewandte Informationstechnik (FIT) and professor and head of Computer Science 5 (Information Systems) at RWTH Aachen University. He is founding director of the Bonn-Aachen International Center for Information Technology (B-IT). He was President of the German Informatics Society (GI) from 2004-2007. He is coordinator of several European projects on Information System Engineering and co-founder of DFG-funded Collaborative Research Centers on Computers and Chemical Engineering and on Media and Cultural Communications. Since 2006 he is Area Coordinator “Mobile Applications and Services” of the DFG-Exzellenzcluster UMIC at RWTH Aachen University.

Hans Gruber studied psychology at the University of Munich. Since 1998 he is full professor for Educational Science at the University of Regensburg. Since 2013 he is also Senior Fellow of the Faculty of Education, University of Turku, Finland. Gruber’s main research topics are professional learning, expertise, workplace learning, social network analysis and higher education. Gruber is president-elect of the European Association for Research on Learning and Instruction (EARLI), member of the Review Board “Educational Science” of the German Research Foundation and member of the Accreditation Commission of ACQUIN. He is member of number of boards and reviewer of many international journals and research organisations.

Frank Fisher is full professor of Educational Science and Educational Psychology at Ludwig-Maximilians University Munich. From 2008-2010 Fisher was director of the Department of Psychology at this university and from 2011-2013 he was Dean of the Faculty of Psychology and Educational Sciences. His research interests are in the fields of psychology of learning and instruction, collaborative learning, inquiry learning and scientific reasoning, and technology enhanced learning.

Hugh Davis is Professor of Learning Technologies in the Web and Internet Science Research Group (WAIS) at the University of Southampton. He is also one of the University Directors of Education (with responsibility for TEL) and he is the Director of the Centre for Innovation in Technologies and Education (CITE) which is a cross university collaboration between faculties and professional services to research and enhance the student and staff experience in education. His current research interests are all concerned with how technologies can change our perception and experience of learning (which is a branch of Web Science), and include personal learning environments (PLEs), educational repositories (EdShare) and semantic applications in education. He has considerable experience of applying the outputs of research to create real change in educational practice. He is a passionate believer in the importance of sharing and open data. He has led many projects focusing on both the technology and application of technology in education.

Appendix B: Explanation of the SEP scores

Excellent (5)	Research is world leading. Researchers are working at the forefront of their field internationally and their research has an important and substantial impact in the field.
Very Good (4)	Research is nationally leading. Research is internationally competitive and makes a significant contribution to the field.
Good (3)	Research is internationally visible. Work is competitive at the national level and makes a valuable contribution in the international field.
Satisfactory (2)	Research is nationally visible. Work adds to our understanding and is solid, but not exciting.
Unsatisfactory (1)	Work is neither solid nor exciting, flawed in the scientific and/or technical approach, repetitions of other work, etc.

Quality is to be seen as a measure of excellence and excitement. It refers to the eminence of a group's research activities, its abilities to perform at the highest level and its achievements in the international scientific community. It rests on the proficiency and rigour of research concepts and conduct; it shows in the success of the group at the forefront of scientific development.

Productivity refers to the total output of the group; that is, the variegated ways in which results of research and knowledge development are publicised. The output needs to be reviewed in relation to the input in terms of human resources.

Societal relevance covers the social, economic and cultural relevance of the research. Aspects are:

- societal quality of the work. Efforts to interact in a productive way with stakeholders in society who are interested in input from scientific research, and contributions to important issues and debates in society.
- societal impact of the work. Research affects specific stakeholders or procedures in society.
- valorisation of the work. Activities aimed at making research results available and suitable for application in products, processes and services. This includes interaction with public and private organisations, as well as commercial or non-profit use of research results and expertise.

Vitality and feasibility. This dual criterion regards the institute's ability to react adequately to important changes in the environment. It refers to both internal (personnel, research themes) and external (developments in the field, in society) dynamics of the group. On the one hand, this criterion measures the flexibility of a group, which appears in its ability to close research lines that have no future and to initiate new venture projects. On the other hand, it measures the capacity of the management to run projects in a professional way. Policy decisions and project management are assessed, including cost-benefit analysis.

Appendix C: Programme of the site visit

15 October 2013

Time slot	What / Whom	Participants
12:00	Committee arrives	
13:00-16:00	Committee begins preparation	
16:00-16:45	Introduction Rector	Prof. dr. mr. Anja Oskamp
17:00	Committee goes to the hotel	

16 October 2013

Time slot	What / Whom	Participants
8:30-9:30	CELSTEC Management Team	Prof. dr. Rob Koper Drs. Jos van den Broek Dr. Jo Boon
9:45-10:45	LS cluster	Prof. dr. Paul A. Kirschner
11:00-12:00	TEL cluster	Prof. dr. Marcus Specht
12:15: 13:15	PhD-candidates and graduates	Dr. M. van Bommel Dr. K. Könings Drs. D. Boerner Dr. H. Drachsler J. Frerejean MSc Dr. M. Kalz
13:15-15:00	Lunch / Deliberation	Committee
15:00-15:30	CELSTEC Management Team	Prof. dr. Rob Koper Drs. Jos van den Broek Dr. Jo Boon
15:30-16:00	Discretion of Committee ¹	
16:00-16:30	Plenary feedback / report	All participants
16:30-	Social gathering with drinks	All participants

¹ This time is reserved for the discretion of the Commission (e.g., a final discussion with one or both Cluster, the Dean or the Rector, reflection on the plenary feedback, et cetera).