

**Research Review
Eindhoven School of
Education**

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

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1. The review committee and the review procedures

Scope of the assessment

The Review Committee was asked to perform an assessment of the research programme of Eindhoven School of Education (EsoE) of Eindhoven University of Technology. This assessment covers the research in the period 2007-2012. 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 Eindhoven School of education and its research programme on the basis of the information provided by the Eindhoven School of Education 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. J.J.H. (Jan) van den Akker, Director General of SLO (Netherlands Institute for Curriculum Development) and professor emeritus of Curriculum Design and Implementation, University of Twente, the Netherlands, Chair;
- Prof. dr. C. (Christopher) Day, professor Emeritus of Education, University of Nottingham, UK;
- Prof. dr. E. (Elke) Sumfleth, professor of Chemistry Education, Duisburg-Essen University, Germany.

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

Drs. G.M. (Mariëlle) Klerks 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 Eindhoven School of Education and its research programme in an unbiased and independent way. Any existing personal or professional relationships between Committee members and the programme 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 of the research programme.

Procedures followed by the Committee

The Committee proceeded according to the Standard Evaluation Protocol 2009-2015 (SEP). Prior to the first Committee meeting, all Committee members independently formulated a preliminary assessment of the programme. The final assessments are based on the documentation provided by Eindhoven School of Education, the key publications and the interviews with the management and with the leaders and researchers of the programmes. The interviews took place on 19 June 2013 (see the schedule in Appendix C) in Eindhoven.

Preceding the interviews, the Committee was briefed by QANU about research assessment according to SEP, and the Committee discussed the preliminary assessments and decided upon a number of comments and questions. 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 Eindhoven School of Education for factual corrections and comments. The comments were discussed in the Committee. The final report was printed after formal acceptance.

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. Research review Eindhoven School of Education

Programme: **Professional Learning**

Programme leaders: Prof. Dr. P. den Brok (research director), Prof. Dr. D. Beijaard (dean)

Research staff 2012: 1.76 fte tenured, 5.78 total fte

Assessments:	Quality:	4
	Productivity:	4
	Relevance:	4
	Viability:	3

Since at Eindhoven University of Technology (TU/e) all educational research is conducted within an institute with one single programme, the Committee decided to integrate the assessment at the institute and programme level. Accordingly, the following assessment covers both levels.

1A. The institute

Eindhoven School of Education (ESoE) is a centre of expertise that links educational research with practice. Its mission is ‘to contribute to both the education and professional development of (in-service) teachers and the support of educational innovation(s), by providing empirically supported knowledge and expertise’. The mission builds on the central idea that the teacher is a determining factor for the quality of education.

ESoE distinguishes three core tasks, which follow directly from its mission: (i) Research, (ii) Teacher education, and (iii) Educational innovation (both within the TU/e as well as for external partners).

Within teacher expertise, ESoE focuses on the professional development of teachers in general and in the domain of Science, Technology, Engineering, and Mathematics education (STEM) in particular. The institute’s mission has been translated in its research programme *Professional Learning* (cf. section 1B).

ESoE was established in May 2006 as a joint institute of both TU/e and Fontys University of Applied Science and operated as such until December 2010. The collaboration was a result of the decision of Fontys to invest in PhD students in order to strengthen its research profile and the quality of its personnel. During this period, ESoE supervised Fontys PhD students and provided for both PhD training in education and the training of upper secondary education teachers in science and mathematics.

In January 2011, Fontys ended its participation in ESoE. As a result, ESoE became a full part of TU/e, operating as a semi-independent unit of the university. Another consequence was a significant loss of resources. Currently, the institute resides under the Department of Mathematics and Computer Science. Head of ESoE is the dean, who is responsible for all ESoE staff and activities. The dean is advised and guided by a governing board, consisting of the rector magnificus of TU/e, the dean of the Department of Mathematics and Computer Science, one other TU/e professor from one of the four school subject domains in which ESoE trains teachers and two representatives from secondary education institutes. The daily administration of ESoE is coordinated by a management team, consisting of the dean, the financial director and the directors of education and research. The research programme and research staff are coordinated by the research director.

Assessment

The institute (and the research programme) seems to be in a transitional stage, facing several challenges. The Committee learned that after the termination of collaborating with Fontys, the funding of the institute became very modest, resulting in a small sized tenured staff. Also, not too long ago, there was a change of leadership after the retirement of two full professors, who had been leading the programme from its start in 2007 until 2010. It is clear to the Committee that the new leaders (since 2011) are searching for a new balance that combines the interests of the various staff members with the various expectations of different external stakeholders. The Committee also noted that the institute intends to maintain a rather broad scope in view of different, much needed, funding options. So far, the leaders seem rather cautious in making restricting decisions. At the same time, the Board of TU/e, through its Rector Magnificus, underlines the relevance of ESoE's mission to innovate and improve education in secondary schools, but also wishes ESoE to become more involved in the improvement of teaching and learning within the university itself. This would also imply additional funding for a joint Center of Excellence through the 3TU partnership (with Delft and Twente).

The Committee concludes that it will be challenging to strike a proper balance between the different options for mission, tasks, organization and adequate funding to build the necessary human resource capacities. Obviously, deliberations on how to reach this balance have not yet been finalized within ESoE. However, for the focus, coherence and viability of the research programme, the Committee advises to accelerate this decision making, as choices seem urgently needed.

1B. The programme

ESoE's research programme *Professional Learning* claims to focus on teachers' professional learning and innovation, specifically paying attention to the domain of STEM education. The guiding concept is that of the teacher as a professional. The central aim of the programme is 'to understand and promote teacher learning and professional development as well as to understand the roles that teachers play in educational innovations, and the effects that such learning and roles have on their competencies and the ways they implement innovations'.

Assessment

The Committee has noted that the programme is quite ambitious in its broad range of research themes and approaches, which is partly inevitable due to the tendency to be responsive to the many claims of various stakeholders. However, the Committee is of the opinion that the rather wide scope makes the research profile also somewhat diffuse and vulnerable, as it makes it rather difficult to develop a clear core. To contribute to effective professional development or support programmes of teachers, the programme claims to study teacher (professional) learning during the entire career from both a general educational perspective as well as a more specific STEM-based perspective. The evidence in support of this is, however, not conclusive. The majority of research is with less experienced teachers. Moreover, although the specific focus is in line with TU/e's domain (science and engineering) and responds to the high demand for STEM teachers and STEM educated people in the region, there is a need for greater effort and more focus in this respect.

The programme does not yet fulfil its claim to focus on professional learning over a career. The variation is quite broad in that respect. More coherence across different types of research would be helpful. This research pattern is also related to the transitional stage of the institute as a whole, with various strategic issues to be resolved.

2. Quality and academic reputation

The institute strives after quality improvement through several measures:

- Regular meetings organised at the different levels of organisation;
- Four meetings each year ('kwartaaloverleg') to discuss current developments in all core tasks of the institute;
- Four meetings per year with the senior research staff of ESoE to discuss PhD supervision and PhD output, research grant applications and research policy;
- Monthly meetings in which staff and PhD students discuss their research together and/or receive researchers from other universities or countries ('ESoE colloquia');
- Finally, at the level of the PhD students, meetings are organised in which PhD students discuss specific issues concerning their PhD trajectory ('promovendi overleg').

The self-evaluation report provides several indicators of the academic reputation of the research staff. A small number of ESoE staff members fulfil(led) several leadership positions in both national and international organisations, contribute(d) to the organisation of several national and international meetings and symposia in the domain of teaching, teacher education and science education, perform(ed) reviewer roles and serve in the editorial boards of several scientific journals and/or book series in their fields, present(ed) their research in several national and international organisations and are regularly invited to speak at national and international meetings, both aimed at audiences of scholars as well as practitioners. Moreover, ESoE staff members and PhD's have received several awards during the review period. Finally, there have been regular staff exchanges between ESoE and other international institutes, with ESoE PhD students paying work visits to foreign institutes and ESoE receiving visiting scholars from foreign institutes.

Assessment

Overall, the general academic quality is (very) good and the commitment of staff and students is impressive. The size and composition of the research group, together with a diversity of interests, does, however, mean that there is considerable variation within the levels of quality. Output, for example, ranges from papers published in highly ranked international journals (e.g. International Journal of Science Education, Teaching and Teacher Education, Teachers and Teaching: Theory and Practice) to those in less well ranked and Dutch language journals. Although all key publications are published in respected journals, the significance of the contribution to knowledge of the field varies considerably.

The Committee feels that it is important that this variation is acknowledged, since it relates to the tensions in the current programme between diversity of individuals' research interests and the need for a clearer collective focus. The presentation of the research citations (citation analysis by Google scholar) in the ESoE self-evaluation documents illustrates the variation in focus and quality well. Of eight 'key findings' from the programme few would be recognised by the international community as contributing new knowledge.

It is clear to the Committee that the programme as a whole has established a strong (inter)national reputation in research into professional learning, but not yet convincingly or comprehensively in STEM. Relatively few individuals currently active within the programme can claim to have an established reputation in the STEM domain. This can be concluded from the rather limited number of invitations to provide keynotes at international conferences, chapters for research handbooks, service on editorial boards of ranked journals or international scholarly bodies. This last observation might be seen as surprising in university

which specialises in science and technology, but it probably has to do with the relatively modest and late investments in senior staff with specific STEM expertise.

On the theme of teachers' lives and work, there is clear evidence of international standing in relation to research on teacher identity and early career professional development. Individuals in these areas have received recognition from the American Educational Research Association and other prestigious prizes. It is the publications of these same individuals which are regularly well cited.

In summary, the Committee recognises that the research of ESoE is in a phase of transition. At present, although some do, not all researchers in ESoE operate at an international level or publish in high ranking journals. Despite this, it is clear that, as a whole, ESoE is 'punching above its weight', given the loss of the Fontys connection, the small size of the research and teaching team and the range of its research (and development) activities, including service work with local schools, emerging partnerships with other universities in The Netherlands and abroad and the development of research within the university into teaching and learning in higher education. The Committee commends the leadership of ESoE for this. However, the Committee believes that the portfolio is too broad and varied as it stands, given the size of the unit. If it is to develop the quality of its programme over the next period, it needs to:

- i) Create more coherence across the twin themes of professional learning and STEM education. This requires an increased and more proactive steer from ESoE's leadership;
- ii) Align itself more closely, within the university, to professional learning, training and development in higher education, with particular reference to STEM education and, within this, engineering education, and including investments in related research;
- iii) Continue to provide a service to local schools, preferably in relation to research on (i).

If these developments are to be achieved, further investment by the university will be required. Also, timely recruitment of a new full professor (in view of the future retirement of one of the programme leaders), preferably with a strong STEM expertise, is recommended.

3. Resources

The development of research staff numbers and total funding rates over the review period 2007-2012 is reflected in the tables presented in the self-evaluation report. The tables provided the necessary information and enabled the committee to come to conclusions.

Table 1. ESoE research staff in number of people per category 2007-2012

	2007	2008	2009	2010	2011	2012
Full professor	4	4	4	4	4	3
Associate professor	1	1	1	1	2	2
Assistant professor	3	3	3	2	2	0
Postdoc	0	0	1	2	2	2
PhD	3	4	5	7	7	7
Grand total	11	12	14	16	17	14
<i>PhD external</i>	<i>19</i>	<i>29</i>	<i>32</i>	<i>29</i>	<i>24</i>	<i>21</i>

Table 2. ESoE research staff in fte 2007-2012

	2007	2008	2009	2010	2011	2012	Total 2007-2012
Tenured staff	1,73	2,70	2,67	2,60	2,20	1,76	13,66
Non-tenured staff	0,00	0,00	0,10	0,40	0,60	0,80	1,90
PhD	0,67	2,28	3,05	4,82	5,08	3,22	19,12
Total staff	2,40	4,98	5,82	7,82	7,88	5,78	34,68

Over the review period staff numbers at ESoE's research programme have increased from 11 persons in 2007 to 17 persons in 2011. From 2011 onwards, staff numbers decreased to 14 persons in 2012. This pattern is reflected in the number of research staff fte's, which increased from 2.40 fte in 2007 to 7,88 fte in 2011 and then decreased to 5,78 fte in 2012. While the increase in research fte numbers concerns all types of staff, the drop in research fte numbers from 2011 onwards only concerns the tenured and PhD staff. Non-tenured staff fte numbers have slightly increased from 2011 onwards from 0,60 fte to 0,80 fte in 2012. The decrease in staff, PhD numbers and research fte is a direct consequence of Fontys' decision to end the collaboration with ESoE.

Table 3. ESoE research funding 2007-2012 in percentages of total funding

Funding	2007	2008	2009	2010	2011	2012	Average
Direct funding	91%	72%	62%	57%	56%	63%	67%
Research grants	6%	9%	12%	16%	25%	34%	17%
Contract research	3%	19%	26%	27%	19%	3%	16%
Total funding	149,8 k€	339,6 k€	398,7 k€	473,9 k€	438,9 k€	354,1 k€	359,2 k€

The increase/decrease pattern shown by the staff numbers, is paralleled by a similar pattern in the total funding rates. Total funding increased to € 473.900,00 in 2010. From 2010 onwards total funding decreased to € 354.100,00 in 2012. The ratio between direct funding, research grants and contract research also shifted during the review period. While the share of direct university funding in the programme's annual budget has declined from 91% in 2007 to 63% in 2012, the share of research grants within the annual budget increased: from 6% in 2007 to 34% in 2012. The share of contract research in the annual budget, on the other hand, first increased from 3% in 2007 to 27% in 2010 and then declined dramatically to 3% in 2012. This decline has had a significant impact on the total funding rates since 2010. The Committee learned that the decline was due to the ending in 2010 of the temporary funding of the KWITZ (Kenniscentrum Wetenschap en Techniek Zuid), a centre of expertise for innovation and research in the domain of science and technology in primary education in which ESoE participated with research. Over the review period, funding of the programme was on average 67% via direct university funding, 17% via external research grants and 16% via contract research.

Assessment

From the information presented in the self-evaluation report and the interviews during the site visit, the Committee learned that ESoE's financial resources have become unduly limited. This has resulted, among other things, in tenured and non-tenured research staff which, in the view of the committee, is too small to sustain the contributions demanded by the university and the professional learning knowledge community more generally. The Committee considers the size of the staff critical, especially in relation to ESoE's many and quite varied assignments. PhD student numbers, for instance, have been and still are high: there were only 7 tenured and non-tenured research staff members (2,56 fte) for the supervision of 28 PhD students (internal and external together) in 2012. It seems obvious, that only limited time remains available for conducting own research and writing grant proposals. In fact, the

Committee noted that the programme has indeed obtained a relatively limited number of grants. At the same time, the Committee took note of the fact that both leadership and staff are very conscious of the importance of obtaining grants in order to increase the institute's financial resources, although the non-commercial context in which the programme operates, brings limited opportunities to obtain grants or sponsorships from business and industry. The perceived pressure for the need to bring in money seems to make the researchers involve themselves in projects which are more, but also less, in line with the programme's objectives but are attractive from a financial point of view. Although this may not be the major reason for the lack of coherence in the programme's research activities, the Committee is convinced that it certainly contributes to it.

The Committee praises the programme leaders and other staff for their efforts in making the best of the situation. However, it recommends that investments in quantity and quality of the research staff are made so that the programme can meet more effectively the various existing and new expectations. The Committee therefore advises ESoE's leaders and the TU/e Board to search together for more realistic financial arrangements.

4. Productivity

The self-evaluation report provides information on the number and type of output of the programme's researchers.

Table 4. ESoE research output in publications 2007-2012

	2007	2008	2009	2010	2011	2012	Totals
Refereed articles total	18	18	16	22	33	21	128
Other scientific articles	5	1	4	2	3	1	16
Scientific book chapters	6 (2 ico)	4	1	7 (1 ico)	3	5 (5 ico)	26
Monographs	-	2	-	1	1	2	6
PhD-theses	1	2	3	7 (1 duo)	3	7	23
Professional & other publications	11	16	21	16	13	5	82
Total publications	41	43	45	55	56	41	281

During the review period the research staff of the programme produced 170 academic publications (i.e. refereed articles, other scientific articles and scientific book chapters). The total academic output per year shows a rather versatile image, numbers oscillating between 21 and 39 academic publications yearly, which is rather consistent with the fluctuations over the years in fte's total research staff. Over the review period the programme produced on average 4.9 academic publications per fte total research staff per year.

The programme has produced 128 refereed articles over the review period, which equals an average of 3.7 refereed articles per fte total research staff yearly. Furthermore, the programme has produced 82 professional and other publications in total over the review period, which equals a yearly average of 2.4 professional and other publications per fte total research staff. A total of 23 PhD-theses was produced over the review period. This means that there was an average of 1,7 PhD-theses per fte tenured staff.

Assessment

Although there are some (understandable) fluctuations over the years, the Committee assesses the productivity of the group as high, especially in comparison to other research programmes in the field of teacher education. The Committee is impressed by the relatively many publications that appeared in international journals, produced by this small sized programme. In addition, during the entire period, the number of PhD-theses is high, especially in view of the limited supervision capacity (currently two full professors and two to three associate/assistant- professors). In relation to this positive judgment on productivity, it

should also be noted that the wide variety of research topics (partly due to the many PhD-trajectories of Fontys) may have prevented even higher levels of productivity because it is easier to accumulate publications with a more focused programme. In summary, the view of the Committee is consistent with the self-evaluation evidence that the existing staff have been relatively productive, but that such productivity has been diverse. The Committee believes that the level of the programme would be raised, especially in relation to STEM, with the appointment of additional staff matched to a plan for strategic development agreed with the TU/e board.

5. Societal relevance

The focus of the programme on development and learning of teachers, especially in the STEM domain, connects well to both the Dutch and European policy agendas, in which raising the number of teachers in the STEM domain as well as raising the quality and innovative capacity of teachers are core priorities.

More specifically, the societal relevance of the programme is claimed to be illustrated by several factors. Firstly, the programme's research findings are incorporated in the curriculum of the (3TU) Master of Science Education and Communication and the minor Communication and Education coordinated by ESoE. Reportedly, they are also used in the teacher education programme and in professional development activities.

The involvement of the programme in innovation projects and contract research conducted for schools as well as for the TU/e (e.g. research on ICT in education (Kennisset), evaluation of school curricula and innovations of school (OMO schools), etc.) also illustrates its impact on society.

The societal relevance of the programme is also expressed through participation in several policy advisory boards and educational task-forces, evaluation or accreditation committees and research evaluation panels.

Finally, the programme's research results are disseminated at scientific and professional conferences, during lectures or presentations or in workshops with teachers and through scientific and professional journals, books or brochures for practitioners and university or local newspapers.

Assessment

At one level, there is an impressive dissemination of the work carried out by ESoE. However, it is not immediately apparent to the Committee whether it is the result of a co-ordinated policy or of a number of individual efforts. Whilst it is clear that there is on-going and productive interaction with both academic and user groups in schools, there is yet modest evidence available of the impact of the interaction upon these groups, for example in terms of ESoE's influence on understandings of science education, teachers' knowledge, professional learning or classroom practices. In reaching this conclusion, the Committee again highlights the wide diversity of activity which may detract from efforts to provide significant influence for change and improvement in the understandings and work of users from outside the university. The Committee also notes that there is little evidence at this point of the influence of ESoE within the university community of staff and students. The Committee recommends that urgent attention is given by the leadership of the programme both to the development of more explicit, focussed strategies for societal influence and contributions to the university. These may include developing leadership of other existing university units.

6. Strategy for the future

One important factor contributing to the viability of the research programme, is the fact that ESoE is often approached as research partner by expertise centres of universities of applied science or by teachers aiming for a PhD, given its experience with external PhD trajectories. ESoE's long-term partnerships with schools and school networks makes large and long-term projects possible, providing opportunities for PhD studies. It is expected that this asset will keep on attracting external PhD students in the future.

Other strengths identified in the programme's SWOT-analysis comprise the programme's profile combining both general educational studies and more subject-specific studies and covering the whole education domain from primary education to higher education, its reportedly promising research results, its national and international research network, the strong connection between the research programme and the teacher education programme, its innovation activities, the reportedly high number of PhD graduations and few discontinuations of PhD projects and the satisfaction rate of its PhD students with the quality of the supervision and the facilities.

On the other hand, there are also some weaknesses. Firstly, there are the programme's small staff and the staff's limited time to spend on conducting research and writing grant proposals. This has resulted in a limited number of grants obtained from NWO and the EU. At the same time external research funding by the Dutch government, EU and international organisations is decreasing and becoming more competitive due to the financial crisis. Moreover, the non-commercial context in which the programme operates and the TU/e atypical domains on which it focuses, limit the possibilities for obtaining grants from TU/e and sponsorships from companies. In general, there is little funding available for research on teaching and teacher education, in particular science education, anyways. These factors make the programme highly dependent on the continued recruitment of external PhD students. Normally, it might be expected that the pressure on the staff's supervisory capacities would decrease with the decline of the number of PhD students, as a result of the discontinuation of the collaboration with Fontys. However, given existing time pressures, this is unlikely to be the case in this instance. It is unlikely, therefore, in the view of the committee, that there will be more time to spend, for example, on writing grant applications. Increased support is, we believe, necessary for the staff to be explicitly stimulated. Within this, if strategies of ESoE to obtain more grants are to meet with more success, the current programme needs to be adjusted, tuning it in more to contemporary themes in the domain of STEM teaching and teacher education (e.g. curriculum development, ICT in education, excellence in learning/teaching, new teaching and learning environments, and effective professional development programmes) and strengthening its science education component. It is expected that this will make it easier to connect with (inter)national partners, as well as with TU/e departments. The recent appointments of two associate professors in the field of science education aim at bringing more continuity in the expertise in this domain.

Moreover, ESoE plans to make its strengths and expertise more visible within the context of TU/e, in order to generate more work within the university (advisory work or conducting research for departments and policy makers for instance). Furthermore, next to advisory work, ESoE attempts to do research, including PhD research, in several expertise centres of primary teacher education institutes regarding professional learning of student teachers, in which it participates.

A specific opportunity identified in the SWOT-analysis, is the fact that the Dutch government invests extra funding in the quality of teaching and teacher education, especially within the domain of STEM, which is in line with ESoE's profile. This may result in new research opportunities.

Assessment

The Committee appreciates the SWOT-analysis of ESoE and generally agrees with it. However, the Committee thinks that to become really successful in realising the potential opportunities, the research programme would need to be larger in size, with a sharper profile, more robust funding and a more pro-active strategy in making clear choices for relevant audiences in policy and practice. The Committee believes that, in its current shape, the programme may not be competitive enough to acquire new funding from outside. The profile needs especially sharpening in the aforementioned "contemporary themes" that are seen as promising by the Committee. Throughout the report arguments and recommendations are provided that make a case for this conclusion.

A timely succession of the dean (within a few years) might be seen as an opportunity to strengthen the STEM part of the research programme

7. PhD-training and supervision

ESoE has developed a set of procedures, regulations, duties and rights regarding PhD-training and supervision. Next to their research plan, all ESoE PhD-students need to write a supervision and education plan. The core training of ESoE's PhD-students is constituted by the close supervision by staff members and sometimes external supervisors. Also, the institute has the policy that PhD-students with more than 0,4 fte research time become a member of the research school ICO, which offers domain specific PhD-courses, summer schools and other activities. Students who do not meet the ICO criteria (often contract students) can still participate in methodological ICO courses and thematic "master classes". Furthermore, PhD-students can follow the general skills programme PROOF offered by TU/e's Graduate School. Apart from ICO and PROOF, all PhD-students can take other relevant courses after approval of their supervisors and the ESoE research director. In addition, each year a summer and a winter school are organized within the context of the "Joint Researcher Training". The "Joint Researcher Training" initiative is a collaboration of ESoE with colleagues of the University of Duisburg-Essen, the University of Helsinki, the University of Northwestern Switzerland and FontD (the Swedish Research School on Science, Mathematics and Technology Education), which aims at intensifying and enhancing education of graduate students with respect to international standards in the field of science education. PhD-students visit the summer and winter school twice during their PhD-trajectory and are stimulated to present and discuss their work during these meetings and to participate in workshops on various relevant topics. Apart from the summer and winter school, PhD-students also have the opportunity to visit the annual conference of the Netherlands Educational Research Association, as well as two international conferences, during their PhD-trajectory. Finally, ESoE occasionally organizes in-house sessions on various relevant topics.

Out of the 34 PhD-students that enrolled between 2004 and 2008, 15% had graduated after four years. After five years another 29% had graduated, and another 18% after six years. 29% have not yet finished their projects, while 6% of the total of 34 PhD-students dropped out.

According to the self-evaluation report, all PhD-students found a job after graduation with various employers, also including ESoE and Fontys, or remained with their current employer in case of contract PhD-students.

As a consequence of the discontinuation since 2011 of the collaboration between ESoE and Fontys, PhD numbers are expected to decrease as the PhD-student influx from Fontys will cease.

ESoE monitors the quality of its PhD-supervision in various ways. In yearly performance evaluations ('Resultaat en ontwikkelingsgesprekken'), PhD-students and staff are asked to give their opinion on the quality of the supervision and to provide suggestions for further improvement. The results are discussed in management and research staff meetings. Furthermore, every few years a survey is held in which PhD-students are asked to comment on the supervision process in a more anonymous fashion. Finally, progression of PhD-students and issues concerning supervision are discussed four times a year by the senior research staff. The self-evaluation report includes a table presenting the satisfaction rates on various supervision elements. The table shows that on all criteria the satisfaction of PhD-students with the supervision has increased from 2009 to 2012. On a scale from 1-10 the overall satisfaction grade increased from 7.43 in 2009 to 8.08 in 2012.

Assessment

The Committee assesses the PhD-training and supervision as excellent. The success rate is very good, the doctoral students have the possibility to participate in different courses and summer schools, as well as in national and international conferences. The full professors are very much involved in supervision and their work is very much appreciated by the doctoral students. This was clearly underlined by the doctoral students. The doctoral students finish their theses in a reasonable amount of years and they get jobs in different fields. Altogether, this is a very strong component of ESoE.

8. Conclusion

Overall, the Committee appraises the research programme as solid, and the research team as capable and very dedicated. Besides, throughout this report, the remarks of the Committee address some persistent issues. They can be summarised in the following recommendations:

- create more focus in research themes (and perhaps also approaches);
- invest in developing a few, rather than many, themes that really distinguish the programme from others;
- increase the number of staff to reach sufficient "critical mass";
- strengthen the STEM component.

These developments are urgent if ESoE is to build on its strengths and remedy its existing limitations. The Committee recommends, therefore, that ESoE's leaders develop a clear strategy which identifies priorities in mission, tasks and funding of the research programme.

Appendices

Appendix A: Curricula vitae of the committee members

Jan van den Akker is Director General of SLO (Netherlands Institute for Curriculum Development). Also, he is Professor emeritus at the University of Twente, where he served for many years as Chair at the domain of Curriculum Design and Implementation. Some other roles include: Chairman of the Scientific Advisory Board of ICO (the Netherlands Interuniversity School for Educational Research); Member of the Dutch National Unesco Commission; Board Member (Past President) of CIDREE (Consortium of Institutions for Research and Development in Education in Europe). He has a broad international orientation, including supervision and consultancy for many R&D projects in various continents (Europe, sub-Saharan Africa, Asia, Latin America). His main areas of expertise in teaching, research, publications and consultancy are: curriculum policy making; curriculum development in interaction with teacher learning and school development; design and evaluation of curriculum materials; and methodology of design research in education.

Elke Sumfleth is full professor of Chemistry Education at the University of Duisburg-Essen, Germany. After gaining her doctoral degree in Organic Chemistry at the University of Hamburg she started her research in chemistry education with a strong focus on empirical research in the field of teaching and learning of chemistry, from the very beginning. After her habilitation she got a professorship in Chemistry Education at the University of Essen. In 2004 she got the full professorship at the University of Duisburg-Essen. During the last ten years she got two further offers, a professorship in Science Education at the Stockholm Institute of Education and a second one at the University of Hamburg which she declined. She led several research projects and was for ten years the chair of the DFG research training group “Teaching and Learning of Science”. She is author of many papers and articles, member of several editorial boards and of different national and international scientific review or advisory boards. In 2010 she got the honorary medal of the *Gesellschaft für Didaktik der Chemie und Physik* awarding her contributions to research in chemistry education.

Christopher Day is Professor of Education at the School of Education, University of Nottingham. His particular concerns centre upon the continuing development of teachers, teacher effectiveness, teachers' lives and work, successful school leadership, and the management of change. He leads the Teachers' Work and Lives and School Leadership Research groups in the Centre for Research in Schools and Communities. He has worked, as a schoolteacher, teacher educator and local authority schools adviser. He has extensive research and consultancy experience in England, Europe, Australia, South East Asia, North America and with the OECD in the fields of teachers' continuing professional development, school leadership and change. He is the Editor of ‘Teachers and Teaching: Theory and Practice’; and founding Director of the 20 country longitudinal research project, ‘Successful School Principalship’ (<http://www.ils.uio.no/english/research/project/isspp/>). Recent publications include *The International Handbook on Continuing Professional Development* (co-editor and contributor, Open University Press, 2004); *A Passion for Teaching* (Routledge-Falmer, 2004); *Teachers Matter: connecting work, lives and effectiveness* (lead author, Open University Press, 2007); *Successful Principalship in Times of Change: International Perspectives* (lead-editor and contributor, Springer, 2007); *The New Lives of Teachers* (Routledge, 2010); *School Leadership and Pupil Outcomes: Linking Learning and Achievement* (Open University Press, 2011); *The International Handbook on Teacher and School Development* (Routledge, 2012); and *Resilient Teachers, Resilient Schools: Building and sustaining quality in testing times* (Routledge, 2014).

Appendix B: Explanation of the SEP scores

<i>Excellent (5)</i>	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.
<i>Very Good (4)</i>	Research is nationally leading. Research is internationally competitive and makes a significant contribution to the field.
<i>Good (3)</i>	Research is internationally visible. Work is competitive at the national level and makes a valuable contribution in the international field.
<i>Satisfactory (2)</i>	Research is nationally visible. Work adds to our understanding and is solid, but not exciting.
<i>Unsatisfactory (1)</i>	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

Wednesday, 19 June, 2013

Time	Topic/committee	Members (tentative)
8.30 – 9.00	Reception of committee members (and getting them installed)	Prof. dr. Perry den Brok, prof. dr. Douwe Beijaard, administration office
9.00 – 10.00	Preparation committee, study of materials and documents, internal discussion of committee	
10.00 – 10.30	Embedding of ESoE and its research within TU/e; Start, evolution and future of the research of ESoE; ESoE research in relation to teacher education and innovation	Prof. dr. Hans van Duijn (rector Magnificus TU/e & chair of advisory board of ESoE)
10.30 – 10.45	Coffee Break / internal discussion panel	
10.45 – 11.30	Research management and programme leaders	Prof. dr. Douwe Beijaard (dean) Prof. dr. Perry den Brok (research director)
11.30 – 11.45	Coffee Break / internal discussion panel	
11.45 – 12.30	Research Staff & Postdocs	Dr. Ruurd Taconis (associate professor) Dr. Maaïke Koopman (postdoc / assistant professor) Dr. Ellen Rohaan (post doc)
12.30 – 13.30	Lunch Break and discussion panel	
13.30 – 14.15	(Ex) PhD students	Drs. Anna van der Want (internal) Dr. Migchiël van Diggelen (internal) Dr. Evelien Ketelaar (Fontys) Drs. Monique van der Heijden (external) Dr. Ton Marée (external)
14.15 – 15.30	Coffee Break; Opportunity to ask (clarifying) questions to management/programme leaders; Drawing conclusions by committee	Prof. dr. Douwe Beijaard (dean) Prof. dr. Perry den Brok (research director)
15.30 – 16.00	Report of preliminary findings to staff, management and PhD students	
16.00 – 16.30	Drinks and snacks	