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1. THE EINDHOVEN SCHOOL OF EDUCATION (ESOE) AS A RESEARCH CONTEXT

1.1 STRUCTURE AND MISSION OF ESOE

ESOE’S MISSION (SOURCE: SELF-STUDY ESOE 2013; ADAPTED TO THE NEW RESEARCH PROGRAM)

The Eindhoven School of Education (ESoE) is an institute of the Eindhoven University of Technology (TU/e). ESoE is a centre of expertise that links beta-didactical/educational research with practice. By providing empirically supported knowledge and expertise, it contributes to both the (in- and pre-service) education and professional development of teachers, and the support of educational innovation(s). ESoE contributes to national and international developments in the domain of STEM (Science Technology Engineering Mathematics) teaching and teacher education. Since the quality of the teaching is a determining factor for the quality of student education, ESoE focuses on the professional development of teachers. In the context of STEM education, ESoE creates synergy between its three core tasks: (1) teacher education, (2) research and (3) educational innovation (both within secondary schools as well as at TU/e). Improvement of the quality of education should not only be approached from the perspective of training, education and professional development of teachers, but also from the perspective of (applied) STEM educational research and educational innovation. As such, the research conducted by ESoE is relevant for practitioners and focuses on contemporary STEM education innovations within schools and at TU/e. ESoE has translated her mission into a research program, Preparing and supporting teachers for innovative STEM learning, that is inspired by educational practice, and in which ESoE collaborates with professors from the TU/e and other universities, including universities of applied science, such as Fontys Hogescholen and Hogeschool de Kempel. ESoE offers a minor and master program on Science Education and Communication accredited by the Dutch NVAO Accreditation Organization.

ESOE ORGANISATION AND POSITION OF DOCTORATE RESEARCH

ESoE is an institute of TU/e whereby the Faculty of Mathematics and Computer Science (W&I) of TU/e is in charge of administrative operations (financial administration, personnel). ESoE is governed by a board chaired by the rector magnificus of the TU/e. The Board of Governors has to approve the ESoE research program.

PhD projects within ESoE are part of the Graduate Program of Science Education and Communication, which is embedded in the TU/e Graduate School (see https://www.tue.nl/universiteit/over-de-universiteit/eindhoven-school-of-education/studeren/science-education-and-communication-graduate-program/phd-program-preparing-and-supporting-teachers-for-innovative-stem-learning/). Responsibility for the doctoral research lies with the promotor in close consultation with the daily supervisor. The research program, in which the doctoral projects are integrated, and the research management are the responsibility of the research director of ESoE and its content is determined by the senior researchers of ESoE (full, associate, and assistant professors).

ESoE’s senior research staff hold three-monthly meetings, where the following are discussed: (a) proposals and new plans for research projects, (b) progress and quality of PhD projects, (c) ESoE’s research policy, and (d) quality of supervision and PhD student satisfaction with supervision.
1.2 THE ESOE RESEARCH PROGRAM

The theme of the research program of ESoE is “Preparing and supporting teachers for innovative STEM learning”. In Appendix 1, the program can be found.

1.3 TYPES OF PHD STUDENTS AND DOCTORAL PROJECTS WITHIN ESOE

The following types of PhD students can be distinguished within ESoE:

- **Full-time, internally financed PhD students:** PhD students appointed at ESoE, who participate in TU/e-funded projects;
- **Full-time, externally financed PhD students:** PhD students appointed at ESoE, who are paid through external funding sources, such as NWO and other (international) funding organizations, or PhD students who have been appointed through other external subsidy schemes (e.g. school groups, Dudoc);
- **Part-time, external PhD students:** PhD students associated with ESoE, who have an appointment elsewhere (often ESoE’s partner institutes) but pursue a doctorate with ESoE and have a promotor (and/or daily supervisor) belonging to ESoE’s permanent staff (or: private funding).

Full-time, internally funded PhD students¹ at ESoE are given four days a week (or 80 percent of their appointment) to conduct their research and to train as researchers; a total of one day (20 percent) is assigned to teaching or innovation tasks and other activities at the institute. This division of research and teaching/innovation tasks also applies to externally funded PhD students that have a full-time appointment at ESoE. These are, among others, PhD students who have been appointed on the basis of NWO² (NRO³) funding, or (international) sources, schools and school groups, or funded by other financing institutions. Under particular circumstances, and in consultation with the promotor and the daily supervisor, it is possible to deviate from this schedule, for example, in the event of a limited appointment percentage (0.8 or less).

Part-time external PhD students, e.g. PhD students located at partner institutes (e.g at Fontys Hogescholen, Hogeschool de Kempel, Hogeschool Zuyd, Hogeschool Avans, and OMO) but who defend their dissertation at ESoE (TU/e)⁴, can make agreements (e.g. regarding their research time and time for other tasks) at their own institute or school, but always have to notify and obtain consent from their promotor and daily supervisor.

In principle, full-time PhD students appointed at TU/e should always be present at ESoE. For those PhD students to start their teaching/innovation tasks, the magnitude and content of their tasks need to be

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¹ Generally, NWO and TU/e PhD students can only opt for a 0.8 appointment (for 4.8 years) or a 1.0 appointment (for four years).

² Nederlandse Organisatie voor Wetenschappelijk Onderzoek, or NWO for short (Netherlands Organisation for Scientific Research).

³ The Nationaal Regieorgaan voor het onderwijsonderzoek, or NRO for short (National Council for Educational Research), was set up in September 1996 by the NWO Governing Board, under the auspices of the Board of NWO’s Social Sciences and is charged with drafting a research program for educational research.

⁴ For these PhD students and PhD students who are supervised by the ESoE but who obtain their doctorate from a different university, the partner institution is responsible for the PhD student.
approved by the promotor(s). External PhD students are not expected to be present on a daily basis at ESoE – unless agreed otherwise -, with the exception of supervision meetings, or to contribute to teaching tasks. However, the presence of external PhD students at research colloquia or lectures (e.g. by international guests) and/or institute-related social activities is strongly encouraged; they always receive invitations for these events.

1.4 ROLES AND DEFINITIONS

DEFENSE OF THE DOCTORAL THESIS

Obtaining a doctoral degree relates to one’s ability to conduct research on a particular theme/question independently (with the guidance of the supervisor/s). In accordance with Article 7.18 of the Dutch Higher Education and Research Act (Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek, or WHW for short), obtaining a doctorate degree (PhD) from a university is based on writing and subsequently defending a thesis. In this respect, ESoE assumes that the quality of the research and thesis not only reflect the PhD student’s research skills and input but also the effectiveness of the education and supervision provided to the student throughout the doctoral period.

DOCTORAL PLAN

The doctoral plan is the total program that covers the period leading up to the doctoral degree, and should include:

- the research proposal;
- the education and supervision plan;
- a timeline with milestones;
- (if applicable) a budget.

PHD STUDENT (M/F)

According to the university rules and regulations (see https://static.tue.nl/uploads/media/Promotiereglement_01-09-2015_NL.pdf), a PhD student is referred to as a person who undertakes academic training to become a researcher. The different types of PhD students within ESoE are defined in section 1.3.

SUPERVISOR(S)

Promotors as well as co-promotors may be involved in the supervision of a PhD student. The promotor is a full professor appointed by the Committee of Deans to act as the supervisor of the PhD student. The co-promotor is a member/seconded member of ESoE’s scientific staff\(^5\). Daily supervision may also be carried out by external senior researchers, such as lectors or assistant, associate or full professors, also from other universities, should this be deemed appropriate or relevant in terms of required expertise. In case of multiple supervisors, one (or two) of the supervisors will act as the daily supervisor(s). These details are laid down in the education,\(^5\)

\(^5\) These are senior researchers who have obtained a doctor’s degree and have scientific expertise with regard to the research concerned (content-related and/or methodological). The scientific staff are members of the national research school ICO as far as possible, on the basis of the prevailing criteria for admission.
supervision plan, and doctorate regulations. Several promoters and co-promotors may be involved in a doctoral research project, albeit ESoE seeks to involve, in principle, at least one promoter and one daily supervisor in one doctoral track.

### 1.5 TU/E GRADUATE SCHOOL & PROOF

Post-Bachelor education at TU/e is provided by the TU/e Graduate School: 15 graduate programs, each focusing on a specific field of research. A graduate program consists of one or more master’s programs with the possibility to continue with a Technological Designer (PDEng) or PhD program in the same field. ESoE provides the graduate program on ‘Professional learning’. PhD students of ESoE automatically participate in this program. The TU/e Graduate School offers ample opportunities for personal development with a series of courses that are part of the TU/e PROOF program (PROviding Opportunities For PhD students; see Section 2.3).

### 1.6 INTEGRATION INTO ICO

ESoE is affiliated with the ICO research school (Interuniversity Centre for Educational Research; refer to [http://www.ico-education.nl/](http://www.ico-education.nl/)) and seeks to accommodate its research activities within this school as far as possible. Incorporation of a doctoral project into the ICO needs to meet a number of criteria:

- At least one member of the supervising team (in particular the promotor) should be part of the ICO staff.
- An approved research proposal must have been submitted. Research proposals should be submitted for approval to the ICO’s Scientific Committee. This means that these should be drawn up in NWO/NRO format (in English), which is defined in Appendix 2. Proposals granted by NWO/NRO are automatically approved for admission in ICO.
- ICO-affiliated PhD students are expected to submit a detailed education and supervision plan that needs to be approved in order to become an ICO member (see Section 2.2 and Appendix 3);
- Upon approval, the PhD student needs to have registered with ICO. For this purpose, personal particulars will be requested, and the PhD student needs to submit information for the ICO web page.
2. THE DOCTORAL PROGRAM

In this chapter, information can be found regarding the content and course of the doctoral program at ESoE.

2.1 DEVELOPMENT AND APPROVAL OF A RESEARCH PLAN

All PhD projects within ESoE are started on the basis of a research plan. After the research plan has been approved, external and internal PhD projects formally become part of the ESoE research program and PhD students are entitled to make use of ESoE research facilities. Below, the general steps included in the development and approval process are described.

1. Ideas for internally funded TU/e projects or externally funded TU/e projects are usually generated by senior staff of ESoE, sometimes in collaboration with or after consultation of the anticipated PhD student. For external PhD projects, idea generation usually starts in the institution of the PhD student, either by the PhD student him/herself or by lectors or seniors related to the PhD student.

2. Generated ideas are described in an initial (short) outline and adopted by a promotor (one of the ESoE professors). The (anticipated) promotor checks whether the content of the ideas fit with the ESoE research program and whether the outline has the potential to become a high-quality elaborate proposal, taking into account the expertise of the PhD student.

3. The outline is elaborated into a full research proposal. In principle, all PhD proposals follow the ICO/NWO format (6-10 pages), and are written in English. For some external PhD projects an exception may apply to this rule. The proposal is elaborated by the promotor and/or the anticipated daily supervisors in the case of most internally or externally funded TU/e projects; in proposals by external PhD students, the student him/herself develops the proposal, under supervision of the promotor and/or daily supervisor(s).

4. After approval by the promoter, proposals for internally funded TU/e projects and external projects are externally assessed by a well-established researcher (preferably a professor), and are adjusted on the basis of formative comments.

5. After approval by the institute and, if applicable, the funding agency, the search for a suitable PhD student will commence in the case of internally or externally funded TU/e projects. The composition of the supervising team will also be finalized at this time. Recruitment for internal project positions occurs through TU/e's P&O department. The Appointment Committee will consist of at least one P&O staff member of the institution concerned, the promotor(s), and daily supervisor(s). In exceptional cases the committee is extended to include other parties involved, such as teaching staff or a peer PhD student.

6. As stated in Section 1.6, PhD students may subsequently register for ICO.

7. The project starts and is carried out by the appointed (or authoring) PhD student.

2.2 EDUCATIONAL PROGRAM/COURSES

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6 A more limited format is sometimes needed for submission to certain financiers. In such cases there may be an interim step by first drawing up a proposal in the format required by the financier and working out or adapting the proposal in ICO format in a second phase.
In order to finish the PhD project successfully, PhD student have to develop their competencies as a researcher by means of an educational program. After successfully obtaining their PhD, ESoE doctoral graduates should have acquired the following competences, and be able to:

1. conduct research independently (from reviewing literature to the analysis and interpretation of collected data).
2. communicate adequately about the research, both in terms of oral as well as written presentations (in peer-reviewed journals), in Dutch as well as in English.
3. participate actively in (international) scientific meetings.

In order to meet the criteria mentioned above, the PhD student needs to set out content and scope of his/her educational program in the education and supervision plan. The education and supervision plan consists of components:

- that substantiate the basic qualification of the candidate;
- are necessary given the research plan and the candidate’s profile;
- correlate with the candidate’s own interests and possibilities; and
- may increase the PhD student’s career opportunities after completion of the project.

The plan also includes the frequency of supervision and number of hours the PhD student is entitled to supervision as well as the courses the student wishes to follow.

All PhD students who defend their thesis at TU/e are part of the Graduate School of TU/e. PhD students who participate in the ESoE research program do their research in the domain “Science Education and Communication” of this Graduate School. Quality of the research training within TU/e-GS is the responsibility of the faculties (i.e. ESoE) and the research training often includes courses offered by accredited research schools (such as ICO). Below, several course options are described.

### ICO COURSES

PhD students admitted to ICO follow the education guidelines stipulated by ICO. Both full-time and part-time (≥ 0.4 FTE) PhD students are obliged to become a member of ICO (exceptions to this rule can be discussed with the promotor).

A full-time ICO PhD student with a regular master’s degree must spend at least 1,200 hours on training and supervision, of which 600 hours are with the ICO educational program. All full-time PhD students who started the ICO educational program after 2013, are required to participate in the following ICO modules:

- the ICO introduction course (time investment 140 hours);
- three thematic master classes (time investment 84 hours per master class), at least one of which should involve methodological analysis;
- the ICO national Fall School (time investment 28 hours)
- the ICO international Fall School (time investment 84 hours).

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7 Source: zelfstudies/promovendigidsen IVLOS en ICLON.

8 Different requirements are formulated for so-called irregular PhD members, such as external PhD students with less than 0.6 of their time dedicated to the PhD project or PhD students with a research master’s degree. See [http://www.ico-education.nl/education/structure-and-organisation/requirement-for-ico-phd-students/requirements-for-ico-phd-students-new](http://www.ico-education.nl/education/structure-and-organisation/requirement-for-ico-phd-students/requirements-for-ico-phd-students-new)
The number of ICO courses that full-time PhD students are willing to attend is not restricted to a maximum. In principle, exemption from ICO modules is possible, depending on prior training and experience⁹.

For part-time external PhD students only the Introduction course and the national or international fall school are obligatory. Other courses can be followed if this is deemed necessary or helpful by the promotor(s) and student.

**PROOF COURSES**

TU/e offers ample opportunities for personal development of PhD students. A series of courses is offered that are part of PROOF (PROviding Opportunities For PhD students). One course is obligatory for all PhD students: the one-afternoon session on scientific integrity. In practice, given the educational or social sciences background of many PhD students, most students will only opt for a few of the courses offered.

PROOF¹⁰ offers the following courses:

<table>
<thead>
<tr>
<th>1st year</th>
<th>2nd year</th>
<th>3rd year</th>
<th>4th year</th>
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<tr>
<td>• Skills Analysis</td>
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<td>• Taking Charge of your PhD Project</td>
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<td>• Scientific Integrity</td>
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<td>• Information Literacy and Research Data Management</td>
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<td>• Cultural Diversity at Work</td>
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<td>• Poster Pitch</td>
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<td>• Giving an Audience-Focused Presentation</td>
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<td>• Writing Articles and Abstracts</td>
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<td>• Supervising Master Students</td>
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<td>• Supervision on Supervising skills</td>
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<td>• Teaching Skills for PhD Students</td>
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<td>• Individual Personality Analysis</td>
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<td>• How to start your own business</td>
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<td>• Career Consult</td>
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**OTHER COURSES/ARRANGEMENTS**

All PhD students are allowed to follow courses other than those offered by ICO or PROOF, as long as these are approved by the supervisor(s), and consent is given by the research director of ESoE (given the costs involved). PhD students involved in the Dudoc programme are obliged to participate in the Dudoc training programme, which focusses on conducting research within the domain of science education.

**SUPERVISION**

⁹ The ICO’s Director of Education can grant an exemption after consultation with the coordinator of the module concerned and with the promotor or ESoE contact person in the ICO management team. PhD students who feel that they qualify for exemption from ICO requirements may submit a written request to the ICO’s Director of Education. Their request will then be discussed within ICO’s examination committee, who also handles exemptions and meets 6 times a year. See [http://www.ico-education.nl/education/exemption-regulation](http://www.ico-education.nl/education/exemption-regulation) for the exemption regulations.

A major part of the training consists of communication between the student and the supervisor(s) and other researchers within ESoE, and therefore takes place during supervising contact hours and research meetings.

Supervision of PhD students is essential for them to be successful. The basic premise is that a maximum of two hours per week is available for the daily supervision of a PhD student. This not only includes the actual time spent on supervision but also the preparation time needed by the supervisor (e.g. reading of documents, etc.). Moreover, criteria apply to the position of daily supervisor11.

Furthermore, PhD students will only be appointed if supervision has been formally arranged in advance. This means that a promotor and a co-promotor, or daily supervisor, have been appointed and that this has been approved by the research director of ESoE.

The promotor(s), co-promotor(s) and the PhD student lay down arrangements for the supervision in a plan which will include the following: (a) the manner and frequency of supervision; (b) the manner and frequency of reporting the research activities by the PhD student to the promotor(s) and daily supervisor(s); and (c) the manner and time how the PhD student’s progress will be evaluated (in accordance with the stipulated procedure). Typically, daily supervisor(s) and the PhD student meet once every two weeks, and the PhD student, daily supervisor(s) and promotor(s) meet once a month.

INTERNATIONAL EXCHANGE

Within the framework of the professional development of PhD students, ESoE seeks to create possibilities for internationalization and/or international exchange. For this purpose, ESoE has contacts with relevant institutes. One condition for an exchange or a longer visit abroad within the framework of internationalization is that the activity contributes directly to the doctoral research undertaken by the student; in any case, the research should not be affected or delayed by the visit abroad. Moreover, support and supervision should be guaranteed. The details and content of such a visit will be arranged in consultation with the supervising team and the institutes involved.

2.3 PARTICIPATION IN ACTIVITIES WITHIN ESOE

In addition to education and supervision, PhD students appointed full-time at TU/e are also expected to attend meetings that are (co-)organized by researchers, such as the ESoE colloquia, trial defences, consultations between PhD students, and teambuilding days. The arrangement of such meetings is decided upon at least once a year in consultation with the PhD students and ESoE’s permanent staff. In addition to content-related aspects, organizational and administrative aspects may also be discussed. Part-time, external PhD students are encouraged to visit these meetings, and they may discuss the need for attendance with their promotor/s. The number of hours to be spent on attending such meetings should be aligned with the percentage of the appointment spent on consultation, education, and supervision.

Full-time PhD students appointed at TU/e will make arrangements with their promotor and daily supervisors about their input relating to teaching and/or innovation tasks. In principle, it is assumed that PhD students are present at the institute as much as possible and spend no more than one day a week on teaching tasks.

11 Criteria may include that the supervisor must have a doctoral degree, have published several international scientific articles, is entirely familiar with the content of the issue, is methodologically skilled, is experienced/equipped, and is a (future) ICO member.
Arrangements concerning the composition of tasks other than teaching and/or innovation are made with the promotor(s) and daily supervisor(s).

### 2.4 EVALUATION OF FUNCTIONING IN THE FIRST YEAR AND FOLLOW-UP EVALUATIONS

The promotor(s) and co-promotor(s) are jointly responsible for daily monitoring of the progress of the doctoral research, as well as for the supervision. Progress on their work is a frequent subject for discussion during the PhD student’s supervision meetings with his/her supervisors and promotor(s). Furthermore, the promotor(s) and daily supervisors involved in ESoE also meet frequently to discuss the progress of research projects, as well as supervision experiences.

### FIRST-YEAR EVALUATION

The first year of a doctoral project is of utmost importance. For TU/e appointed PhD students, at the end of this period it will be decided whether the project is to be continued for the remaining period, or to be terminated (go/no-go decision). Of course, it is also the moment when the PhD student can decide whether to continue or to stop the research. This decision is made on the basis of the outcome of an R&D meeting/appraisal interview\(^{12}\), which takes place between the promotor(s), the daily supervisor(s), and the student. The outcome of the interview is submitted to the research director. For externally funded projects (NRO), a report usually needs to be drawn up and sent to the funding agency in the required format.

For external PhD students, evaluation procedures are determined at their own institute. Obviously, ESoE staff involved in their supervision will provide the required information to the external institutes and will cooperate in accordance with their procedures. In most cases, at the end of the first year, student and supervision team will evaluate the student’s progress, and subsequently decide whether to continue or not.

During the R&D meeting/appraisal interview, the supervisors strive to arrive at a conclusion involving the following questions:

1. has sufficient progress been made, so that the planned goal for the remaining period can be reached with confidence?
2. What is the scientific quality and clarity of the work, documents and articles submitted so far?
3. Have the approach and procedures been followed to date, and are the input and the cooperation with the supervisor(s) satisfactory?
4. To what extent is the planning for the remaining project period realistic and feasible?
5. What is the quality of the theoretical framework, research design, and (if applicable) construction of the substudies?
6. Which suggestions or recommendations can be provided to the PhD student or the promotor/supervisors, so that the remaining period can be concluded successfully?

The following documents can be used for this purpose:

1. A summary of the activities planned (in accordance with the research plan) and realized (report by PhD student) during the first year, including a reflection on their work (e.g. reasons for deviating

\(^{12}\) The ESoE and TU/e use the term Results and Development (R&D) meeting to evaluate the results and developments of staff and students.
from planned activities; goals that have not been achieved, or extra goals achieved). The report\textsuperscript{13} may include educational/supervising activities, documents written, research activities undertaken (e.g. interviews, tools used), articles, or proposals that were drawn up;

2. The research proposal including a timeline;
3. The education and supervision plan;
4. A (draft) theoretical framework/literature review/initial article;
5. A (draft) set-up of the initial/next sub-study and the steps realized.

**EVALUATION DURING SUBSEQUENT YEARS**

An R&D meeting (same composition as with the first year without the P&O consultant) takes place to discuss results and development with TU/e appointed PhD students at least once a year. During the R&D meeting/appraisal interview, arrangements are made about the activities to be carried out during the coming year, and the PhD student’s further development (including future career). These arrangements will be laid down in writing and be sent to the P&O department. The outcome of the interview is also sent to the research director.

Where externally funded projects (e.g. NRO) are concerned, the PhD student and his/her supervisors are often asked to produce an annual report (of required format) of the activities and the goals achieved. It is advisable to carry out the interview on the basis of the format required by the funding agency.

During the R&D meetings/performance interviews, aspects such as the research progress and training, supervision, facilities, and professionalization/career are discussed. The PhD student draws up a report on the work activities in preparation for the meeting. This involves a description and reflection on:

1. The activities undertaken over the course of the year (ratio of actual activities compared with the education and research plan);
2. The supervision (availability of supervisors, balance in steering and own input, work arrangements, working climate - limiting and stimulating factors);
3. The facilities available to the student (equipment, access to literature, secretarial support, research support, ESoE and Fontys work organization);
4. plans/tasks, and anticipated needs or problems for the coming year, and, if relevant, a basic time plan for the remaining part of the research;
5. plans relating to methodological/statistical professionalization, theoretical expertise, scientific communication (in articles/conferences), networks (national, international, strengths and weaknesses), and career development in general;
6. other points for discussion (e.g., relationship with superior, the way in which supervision takes place, cashing in leave days, cooperation with colleagues, handling work-related stress, absenteeism through sickness, involvement in the organization, matters concerning equal opportunities and women’s affairs such as the combination of work and care, quality of the rooms and facilities).

**CONFIDENTIAL COUNSELLOR**

Prof.dr. Jules Pieters has been assigned as ICO’s counsellor. ICO PhD students who encounter difficulties during their research project or with an ICO course can call upon him for advice. Also ICO postdoc members and ICO

\textsuperscript{13} NWO/NRO have fixed reporting formats that these organizations can send to the promotor.
staff members can contact the ICO counsellor for advice on ICO related matters (see [http://www.ico-education.nl/organization/counsellor](http://www.ico-education.nl/organization/counsellor) for contact information). Furthermore, the usual TU/e appeal procedures with regard to R&D meetings/appraisal interviews apply (see the TU/e website).

### 2.5 QUALITY ASSURANCE (OF SUPERVISION)

The quality of supervision of PhD-students by ESoE staff is evaluated in two ways. During yearly work evaluations (in Dutch: ‘Resultaat- en ontwikkelingsgesprekken; functioneringsgesprekken’) the (quality of) supervision of PhD students provided by staff members is evaluated and suggestions for further improvement are discussed. These suggestions and the results of conversations are regular topics for discussion in meetings of the management and research staff. In addition, a survey will be distributed bi-annually among PhD students of ESoE to allow them to comment on the supervision process in a more anonymous fashion. For this purpose, a survey has been created containing 60 items. The survey is provided by the promotion centre (cf. IVLOS, Utrecht University) and consists of 7 topics: content/domain, expertise, relationship, supervision method, integration, agreement between supervisors and supervision of process. The outcomes of this survey are also discussed in the ESoE management team and in senior staff research meetings.
3. WORKPLACE AND FACILITIES

ESoE provides several facilities for PhD students in order to support them in conducting their research, which are described below.

3.1 WORKPLACE

ESoE will provide an adequate workplace (e.g. desk, computer, access to materials and sources such as a library). Full-time PhD students appointed at TU/e are entitled to a desksharing workplace with a computer, internet and telephone facilities, and a pigeon hole.

For all PhD students (also external PhD students), ESoE will organize (and pay) a TU/e internet account, which ensures an email address as well as free access to the TU/e library and most scientific journals, access to printers, and to free software supported by TU/e ICT services (these can be downloaded from the TU/e webpages). This account also implies that people become visible on the TU/e and ESoE webpages and that their publications can be entered in PURE (and consequently show up in the institute’s publication output). ESoE will ensure that all PhD students have the software at their disposal that is needed for their research. Some software can be downloaded from the TU/e staff page, while specialist software (e.g., Atlas.ti, LISREL, Mplus, and so on) can be obtained in consultation with the promoter(s)/daily supervisors and after obtaining the research director’s approval, provided that the financial means allow this. An exception to this is if the software has already been purchased or if it can be purchased via the own institute.

3.2 CONFERENCE ATTENDANCE

During the doctoral period, PhD students appointed full-time at TU/e are entitled to get reimbursement for attendance at international scientific conferences (e.g. travel, entrance fee and accommodation), with a maximum of two conference attendances over the period of their PhD study. In addition to this, they can annually visit the Education Research Days (Onderwijs Research Dagen, or ORD for short). This policy may be deviated from, if it can be sufficiently substantiated that extra attendances are needed. Requirements for financing of conference visits are that a proposal has been submitted and accepted (except for the ORD), that the PhD student has an active role during the conference (e.g. as a presenter), and that the financial means allow this. In many cases, with regard to externally funded TU/e PhD students (e.g., NWO proposals) the financial scope relating to conference attendance has already been explicitly stated in the project plan. Arrangements for attendance and reimbursement regarding meetings or conferences, research-orientated or otherwise (e.g., the VELON conference of the Dutch Association for Teacher Educators), can be made in consultation with the supervisors and parties involved. ESoE will only pay these for TU/e appointed PhD students, after a request has been submitted and approved by ESoE’s management team, and if attendance is described in the research plan.

14 See https://pure.tue.nl/admin/login.xhtml and https://intranet.tue.nl/universiteit/diensten/informatie-expertise-centrum/producten-diensten-a-z/pure/
Part-time external PhD students are also advised to visit a similar number of national and international conferences. However, conference attendance (including traveling and accommodation costs) for these PhD students will not be paid by ESoE, but will have to be reimbursed via the own institute. Consequently, it is wise to include conference visits and their financial consequences in the proposal and to make sure there is consent from the management of the own institute.

### 3.3 Membership of Researcher Organizations

The ESoE’s PhD students are expected to join at least one relevant professional organization: in most cases this will be the Vereniging voor Onderwijsresearch (VOR). Other relevant organizations are the European Association for Research on Learning and Instruction (EARLI), the American Educational Research Association (AERA), the European Educational Research Association (EERA), the European Science Education Research Association (ESERA), the International Study Association on Teachers and Teaching (ISATT), the European Research in Mathematics Education (ERME), or the International Group for the Psychology of Mathematics Education (PME). The VOR membership fee will be reimbursed for full-time TU/e appointed PhD students, though individual subscriptions to other associations will not. It is expected that the VOR membership fees for external PhD students will be paid by themselves or their own institute.

### 3.4 Costs Related to PhD Project

#### Reimbursement of Material Costs

For PhD students appointed full-time at TU/e all costs involved in the implementation of the doctoral plan that have been included in the approved budget can be submitted to the budget controller (usually the promotor). In principle, materials, assistants, books and the like included in projects of part-time external PhD students are paid by the institute where the PhD student is located and have been included in the project plan (and thus received consent) as far as possible. Exceptions for both types of PhD students are possible in special occasions, but have to be requested and approved by the ESoE research director.

#### Costs of Courses

PhD students are encouraged to follow courses in order to professionalise themselves as researchers. Information about the reimbursement of costs of courses per type of course is presented below:

- **ICO**: For all ESoE PhD students that are a member of ICO (full-time and part-time), reimbursement of ICO courses takes place through TU/e. For non-ICO members, who do want to follow ICO-courses, no reimbursement of course costs is available at TU/e.

- **DUDOC**: Dudoc students are required to attend all Dudoc days (typically six per year). Other beta-didactic students can also join the Dudoc courses/days, but have to notify the Dudoc committee member at ESoE.

- **PROOF**: PhD students that are part of the new ESoE research program (approved February 2016) are allowed to follow PROOF courses and participation can be reimbursed via ESoE for both internal as well as external students.

- **Other courses**: For full-time PhD students appointed at ESoE will pay any costs involved with these courses (if not provided by ICO and if approved by the promotor & research director). For part-time, external PhD
students, ESoE will pay for the costs (for courses not provided by ICO and if approved by the promotor & research director), unless it appears that the institute in which the PhD student is located also profits from the content involved outside the project concerned.

**SUPPORT WITH WRITING IN ENGLISH**

Theses are written in the form of articles in the English language (plus “surrounding” chapters explaining the research as a whole). In addition to a basic English-language course, full-time TU/e appointed PhD students as well as all other staff can be given support - albeit limited - for the correction of their English publications. In principle, this possibility is reserved for the publication of articles in journals and books. Prior permission for this type of support should be requested from the ESoE research director.

**THESIS**

For full-time TU/e appointed PhD studenten, the printing costs involved in publishing the theses can be reimbursed via ESoE, unless other organizations finance this (e.g. NWO-funded PhD students use their personal bench fee for this). For part-time, external PhD students, in principle the institution they are appointed at will take care of the printing costs. ESoE reimburses the printing costs (real costs) for the theses up to a maximum of €1500, provided that the candidate agrees with the addition of his/her dissertation to the printed Library collection and to the digital TU/e Repository. The number of copies is discussed with the promotor. Theses are printed preferably by the TU/e printservice. Theses may be published as a hard copy on paper as well as electronically. Information about the distribution of the thesis can be found in the doctorate regulation document on page 15. ESoE will also contribute to the costs of the reception after the defence (up to a maximum of €1.000; “basis optie”; more luxurious choices are at the student's own expenses; https://www.tue.nl/universiteit/over-de-universiteit/organisatie/diensten/dienst-algemene-zaken/bureau-voor-promoties-en-plechtigheden/promoties/receptielocatie-reserveren/). Costs resulting from inviting external (international) members to the defence committee should be made in accordance with the promotor(s) and the research director.

3.5 CORF®

For the purpose of research, the Eindhoven School of Education maintains an electronic data gathering facility on the internet: namely, the collectieve onderwijs research faciliteit (CORF®, or collective educational research facility). The system comprises of a series of research tools in several languages and of various types, and research data can be gathered online. It is also possible to add one's own tools to CORF®, which can then be made available to other researchers if necessary. CORF® processes the collected data sets in such a way that they can easily be exported to SPSS. Through data storage, researchers can make use of each others tools and data sets. CORF® also has a system with which interactive tools and data sets of certificates of scientific quality can be provided. CORF® is an Open Access system, which means that ESoE's teaching staff all PhD students and Master students have access to it. In this way, it will be easier to involve graduates in doctoral research. For more information, contact Ruurd Taconis at r.taconis@tue.nl.


16 https://static.tue.nl/uploads/media/Promotiereglement_01-09-2015_ENG.pdf
4. QUALITY OF THE DOCTORAL THESIS

A thesis undertaken at ESoE typically comprises of three to five international articles (in SSCI or ICO list journals), and has an introductory and a concluding chapter. Before the defence, at least one article needs to be at the stage of ‘published’ or ‘accepted’. This procedure can only be deviated from in consultation with the supervising team and on the basis of well-substantiated arguments.

4.1 DOCTORAL DEGREE REGULATIONS


More specific information for PhD students at TU/e can be found in a brochure, which can be downloaded from: [https://static.tue.nl/uploads/media/Totale_informatiemap_voor_promovendi_NL_14.pdf](https://static.tue.nl/uploads/media/Totale_informatiemap_voor_promovendi_NL_14.pdf)

4.2 TASKS AND RESPONSIBILITIES OF THE PHD STUDENT, SUPERVISORS, AND INSTITUTE

**RESPONSIBILITIES OF THE PHD STUDENT**

Generally, it is the PhD student’s responsibility to dedicate himself/herself optimally to his/her training as a scientific researcher, and to satisfactorily conclude the doctoral research undertaken. For this purpose, the PhD student should ensure that s/he:

- familiarizes himself/herself with all university rules and regulations that are important for the researcher’s training and his/her progress (e.g. through websites, and information provided by supervisors);
- discusses with the supervisor what kind of support is most appropriate for the conduct of the research and how to comply with the timeframe and phases of research;
- performs the agreed activities to be carried out in accordance with the doctoral plan (research and educational activities);
- tackles problems on his/her own initiative and proposes solutions;
- submits written assignments to the supervisor(s) frequently and in good time before supervision sessions;
- reports on meetings and arrangements with the supervisor(s) and submits a copy of the report to the supervisor(s);
- contributes actively to the R&D meetings/appraisal interviews or evaluation interviews;
- participates actively in researchers’ meetings;
- communicates with other researchers in the Netherlands and abroad (e.g. by participating in researchers’ networks, attending conferences, and writing publications).

**RESPONSIBILITIES OF THE SUPERVISORS AND THE PROMOTOR(S)**
Typically, the supervisor or supervisors is/are jointly responsible for training/educating the PhD student to become a scientific researcher, and for supervising and supporting the progress of the doctoral research. This implies that the supervisor/supervisors ensures/ensure that:

- the PhD student has at his/her disposal all the written information that is important for attending the research training program and for his/her progressing as a PhD student at ESoE;
- the PhD student works on a study that can be concluded within the given timeframe;
- an education and supervision plan is drawn up in consultation with the PhD student;
- the supervision contributes to the quality and efficiency of the research;
- his/her/their own knowledge and competences that are required to supervise a doctoral research study is appropriate, maintained and improved;
- the PhD student is frequently given feedback on his/her progress and at appropriate times;
- the PhD student is frequently invited to provide feedback on the supervision and on the facilities provided by the ESoE;
- the PhD student is encouraged to form/participate in an adequate network;
- the PhD student is encouraged to develop a scientifically critical attitude.

RESPONSIBILITIES OF ESOE

The ESoE Management ensures that the education and supervision of PhD students is of a high standard and is appropriate for all ESoE’s research students. Safeguarding and improving the quality of the training of researchers is a prime responsibility in this respect. This means that management mainly ensures that:

- the PhD student complies with the admission requirements set out in the regulations governing the training of scientific researchers;
- the research proposal is suitable for doctoral research;
- the phrasing of the problem definition, conducting of the research, and reporting of research results can be concluded within the given timeframe;
- the institute is suitable in every respect (content-wise, organizationally, physically, and with regard to staff) for supervising and facilitating the proposed doctoral research;
- supervision by promoters and co-promotors is appropriate (annually evaluated through R&D meetings based on information collected by PhD students), and facilities are provided to optimize the supervision;
- the quality of the education and supervision of PhD students is constantly safeguarded, and, if necessary, improved.
5. RELEVANT SOURCES/LINKS

TU/e promotierglement

Association of universities in the Netherlands
(Vereniging van (Samenwerkende Nederlandse) Universiteiten –VSNU): http://www.vsnu.nl

Interuniversity Centre for Educational Research

Netherlands Educational Research Association
(Vereniging voor Onderwijs Research –VOR): http://www.vorsite.nl/

The Netherlands Educational Research Association’s interest group for PhD candidates
(VOR Promovendi Overleg –VPO): http://www.vorsite.nl/nl/vor_promovendi_overleg/

PhD network of the Netherlands
(Promovendi Netwerk Nederland –PNN): http://www.hetpnn.nl/

The European Association for Research on Learning and Instruction (EARLI):
http://www.earli.org/

The Junior Researchers of EARLI (JURE) network:
http://www.earli.org/JURE

The European Educational Research Association EERA:
http://www.eera-ecer.eu/

The American Educational Research Association (AERA):
http://www.aera.net

The National Association for Research on Science Teaching (NARST):
http://www.narst.org/

The European Science Education Research Association (ESERA):
www.esera.org

International Study Association on Teachers and Teaching (ISATT)
http://www.isatt.org

Universitaire bibliotheek TU/e:
http://w3.tue.nl/nl/diensten/bib/
Preparation and supporting teachers for innovative STEM learning

Mission of ESoE

The Eindhoven School of Education (ESoE) is the educational expertise center of the Eindhoven University of Technology (TU/e). ESoE’s mission is three-fold:

1. STEM teacher education (pre-service teacher education);
2. STEM teachers’ continuous professional learning and development: school & university;
3. STEM innovation in education in collaboration with teachers at both classroom and school/institute level.

Leading is ESoE’s vision on professional STEM teachers: innovative experts in their subject domain who design and develop (technologically) rich contexts for learning. They evaluate their education, including their own role, and demonstrate an inquiry and learning attitude towards their subject and work as teachers. As such they are a role model for their students. In innovative contexts they act as agents of change together with colleagues inside and outside their schools and demonstrate professional leadership needed for this. ESoE wishes to educate these academic professionals in close cooperation with schools. The ultimate goal of the ESoE research program is to contribute to the education of more and better STEM teachers. In turn, more STEM students will be attracted.

The research program on/in STEM education can be regarded as a permeating strand (linked to the three-fold mission). The program’s focus is STEM education (Science, Technology, Engineering, Mathematics), both as object and as context of research in secondary and higher education.

Teaching innovative STEM education: background and rationale

There is now ample evidence that preparing students for becoming and being active participants of an innovative society goes well beyond preparing them for science-related professions. Regarding the STEM domain: new roles are required from engineers, as the world faces grand challenges, which in particular pertain to the domains of health, energy and environment, mobility and safety. These “new” engineers and scientists must be professionals capable of thinking critically and independently, to keep developing and renewing their expertise, to use state-of-the-art technology, to contribute to solving societal problems, but also to create new opportunities and the ability to think interdisciplinary and to work in teams (Meijers & den Brok, 2013). Many of these skills are also mentioned so-called 21st century skills (Thijs, Visser & van der Hoeven, 2014). The new educational imperative is to equip a critical mass of workers and citizens with the skills to thrive in innovative societies (Mavareck & Kramarski, 2015).

This places high demands on teachers and their professional development in both secondary and higher/university education. Continuous professional development (CPD) throughout teachers’ career is needed in order to keep pace with societal and educational developments and changes. More than ever before teachers are required to foster deep and meaningful learning with their students and develop appropriate learning environments for this (Martinez & McGrath, 2014). Meanwhile they have to take into account:
1. The influence of technology and interactive media on teaching and learning: it is often claimed that today's learners are "new millennium learners" who have different expectations about education (OECD, 2012). Students' use of technology and interactive media is transforming the ways they learn (cognitive skills development), their social values and lifestyles (e.g., Van den Beemt, Akkerman & Simons, 2011). An important factor here appears to be that they require competencies of careful selection of relevant information, and of judgment about the value of such information (cf. Ito et al., 2009; Walraven, 2008).

2. Changes with respect to their audience: in their classrooms and courses, teachers will face a greater diversity of students, with respect to ethnic background, values and beliefs, learning experiences, learning orientations, and engagement (e.g., Sierens, 2007; Leeman & Wardekker, 2013).

It is ESoE's conviction that some of the most crucial skills necessary for students and future workers in the STEM domain are formed and developed through:

1. Effective science and engineering education, for example: giving shape to deep and meaningful learning through types of design-based and inquiry-oriented learning and making use of ICT (e.g., Gomez, van Eijck & Jochems, 2014). At a more general level, "new learners" will need to be able to constantly adapt in their future work and lives and must therefore learn to become more self-directive and life-long learners.

2. Motivating students for science and engineering education, for example: making instruction more context-based ('concept-context education'), cooperating with companies, undertaking outreach activities, and doing justice to different beta motivations as well as beta identities (e.g., de Putter-Smits, Taconis & Jochems, 2013). At university level, it is important to create education trajectories that are attractive, engaging, and flexible in order to realize the higher and more diverse student population in science courses.

3. Integrative or interdisciplinary science education within the STEM domain and with other domains as well.

New competencies of teachers are required for both teachers in secondary and higher education, such as the following:

1. The expertise to adapt their curricula, resources, and learning environments to new insights and new teacher roles as coaches and facilitators of learning, for example when students do a design or research project (teachers as adaptive experts; cf. Bohle Carbonell et al., 2014). Teachers' role needs more than now be one of “teaching for learning”. For teacher education this means a shift towards learning to teach from a student-centered learning perspective instead of a teacher-centered teaching perspective (Swinkels, Koopman & Beijaard, 2013).

2. The ability to effectively utilize existing curricular resources to design instruction (Brown, 2009). Teachers’ interaction with tools/resources is clearly a participatory (two-way) process, in which teachers and resources interact (Pepin, Gueudet & Trouche 2013). Making sense of and using these tools/resources to design and enact instruction places a demand on teachers' beta-didactical design capacity (Pepin, 2015). This implies that teachers need to base their decisions on subject knowledge, knowledge of how to make subjects teachable and knowledge of how to evaluate curricula.

3. Teachers must be capable to organize, implement and monitor change, thus becoming managers of innovation and change (van der Heijden, Geldens, Beijaard & Popeijus, 2015).

New teacher competencies as those mentioned above are the basis for ESoE’s vision on professional teachers as expressed in the beginning of this research program under “mission”.

Research questions

ESoE is committed to addressing the challenges for STEM education, both in secondary schools as well as in higher/university education. Since ESoE educates student teachers in the academic master “Science Education and Communication”, findings from research are thus of direct relevance to its own teaching and professional
development activities and also to innovative work in schools. Furthermore, as one of the roles of ESoE is to take an active part in supporting other TU/e departments in instigating and investigating educational innovations, findings from the research are directly relevant to the departments, and TU/e at large. In order to realize these aims, research projects within the research program will be anchored in, and link to, the following research questions:

1) **What ways of STEM learning and learning environments contribute to preparing learners for the challenges of the 21st century?** This research question pertains to elements of these learning environments that play an important role in this, e.g.: shared vision by teachers, tasks or assignments, curriculum materials, tools, resources.

2) **What characterizes a professional STEM teacher’s professional identity in innovative contexts and schools and what are relevant issues that need to be addressed in teacher professional learning and development?** First, this question refers to the teacher as coach, using interactive media, dealing with diverse classrooms, and designing/developing curricula. Second, it refers to professional qualities (teacher knowledge, skills, and dispositions) needed for developing environments that foster deep learning and how teachers can be prepared for/supported in that in close collaboration with schools.

3) **How can teachers’ professional development for these challenges (see question 2) be stimulated and supported?** One important way of doing this is to engage teachers in design-based research. Other ways pertain to teachers participating in professional learning communities and carrying out specific interventions.

4) **What are the various effects of (student) teachers’ professional development/learning processes?** These effects may be discerned in classroom practices, departmental/school professional learning cultures, and eventually student learning/outcomes.

The research program of ESoE will investigate the above questions in contexts ranging from lower/upper secondary to higher/university education, covering the whole STEM domain.

**ESoE research**

All projects of the ESoE research program have been designed to have practical orientations. To explain, the criteria are the following:

1. For ESoE it is important that the research questions and topics often find their origin in practice, even though the research may take various forms: e.g. PhD or post-doc projects (often supported by grants); master thesis projects in teacher education; teacher practice-based research projects in school-based learning communities with researchers from ESoE; and innovation research projects (evaluative studies of current practices or new interventions). Studies may be performed by researchers, teachers, or other practitioners involved in research – often of their own classroom context – or teams consisting of both.

2. Where possible, research projects are characterized by collaboration with other partners. These partners may consist, in particular, of other TU/e departments; the 3TU Centre of Engineering Education; other academic universities and universities of applied science; (research-based) professional development schools and other schools, amongst them “technasium” and “brainport” schools.

3. Studies may be large or small scale, and can use different research methodologies, depending on the research questions central to the study. These may range from qualitative to quantitative, and from more traditional instruments such as paper or electronic surveys and interviews, to more specific and innovative methods such as electronic data collection apps, eye-tracking devices, networking instruments and data analysis tools, or real-time observation instruments. While designs may vary,
many projects will have an intervention- or design-based character. Despite their varied forms, a crucial feature of studies conducted by ESoE is that they are of highly scientific – academic quality.

For more information about publications and research projects by staff, master and PhD students of ESoE: see www.tue.nl/esoe

References


# Project proposal

## 1. Applicant(s)

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## 2. Title of Research Project

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## 3. Summary

| Abstract |  |

## 4. Anticipated Project Period

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5. Description of the Project

5.1 Problem Analysis
5.1.1 Problem Statement
5.1.2 Research Questions

5.2 Method
5.2.1 Design
5.2.2 Instruments
5.2.3 Analysis

5.3 Significance
5.3.1 Scientific Significance
5.3.2 Practical Significance
5.3.3 Originality / Innovativity

5.4 Literature

5.5 International Orientation

6. Research Plan

6.1 Detailed Research Plan for Year One

6.2 Outline Research Plan for the Remaining Years of the Project

6.3 Publication Plan: Prospective Title and Outline all Publications

7. ICO Education and Supervision Plan
### 7.1 PhD Candidate

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- [ ] regular ICO Member (FTE ≥ 0.6)
- [ ] irregular ICO Member (FTE ≤ 0.6)

### Postal Address

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### 7.2 Within which research theme of the research program of ICO is the proposal being written?

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<td>9. Higher education</td>
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<tr>
<td>10. Neurosciences and education</td>
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</tbody>
</table>

### 7.3 Education Plan

**Planned Educational Activities within ICO:**

<table>
<thead>
<tr>
<th>Course</th>
<th>ECTS Credits/hours</th>
<th>Year</th>
</tr>
</thead>
<tbody>
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</table>

**Planned Educational Activities outside ICO:**

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</table>
7.4 **Supervision Plan**

7.4.1 Agreements on the nature of the supervision, and agreements on the amount and frequency of supervision  
(the PhD candidate has a right to at least 600 hours of supervision).

<table>
<thead>
<tr>
<th>Function</th>
<th>Name</th>
<th>Signature</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PhD Candidate</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Promoter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICO Director</td>
<td>Prof.dr. J.J. Beishuizen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinator ICO Theme Group</td>
<td></td>
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</tbody>
</table>
Education and Supervision Plan

This form can only be used in combination with an approved NWO proposal. In any other case, use the Form for ICO Project Proposals.

<table>
<thead>
<tr>
<th>Applicant (promoter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name, titles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTAL ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>University</td>
</tr>
<tr>
<td>Institute</td>
</tr>
<tr>
<td>Address</td>
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<tr>
<td>Postal Code</td>
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<tr>
<td>Telephone</td>
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<tr>
<td>E-mail</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Promoters and Supervisors</th>
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</thead>
<tbody>
<tr>
<td>Name, titles</td>
</tr>
<tr>
<td>University</td>
</tr>
<tr>
<td>Institute</td>
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<tr>
<td>Role in project</td>
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<tr>
<td>Name, titles</td>
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</tbody>
</table>
### 7. ICO Education and Supervision Plan

#### 7.1 PhD Candidate

<table>
<thead>
<tr>
<th>Full name, titles</th>
<th>Male/female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of birth</td>
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<tr>
<td>Previous education</td>
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<tr>
<td>Start date appointment</td>
<td></td>
</tr>
<tr>
<td>End date appointment</td>
<td></td>
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<tr>
<td>Full-time equivalent for working on PhD project</td>
<td>..........</td>
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</tbody>
</table>

- ☐ regular ICO Member (FTE ≥ 0.6)
- ☐ irregular ICO Member (Fte ≤ 0.6)

### POSTAL ADDRESS

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</table>
### 7.2 Within which research theme of the research program of ICO is the proposal being written?

<table>
<thead>
<tr>
<th>Theme</th>
<th>1st theme</th>
<th>2nd theme</th>
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</thead>
<tbody>
<tr>
<td>11. Learning and instruction</td>
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<tr>
<td>12. ICT and Education</td>
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<td>13. Workplace learning</td>
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<td>14. Teaching and Teacher Education</td>
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<td>15. Domain-specific instruction</td>
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<td>16. Educational design and curriculum development</td>
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<td>17. Schools and the societal context of education</td>
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7.3 Education Plan

Planned Educational Activities within ICO:

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Planned Educational Activities outside ICO:

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7.5 Supervision Plan

7.4.1 Agreements on the nature of the supervision, and agreements on the amount and frequency of supervision

(the PhD candidate has a right to at least 600 hours of supervision).
7.4.2 Tasks

Besides the research project (including training and other activities for professional development), will there be time spent on issues not related to the PhD research project? If so, what is the nature of these tasks, and how much time will these tasks consume?

7.5 Agreement

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APPENDIX 4: TIPS FOR A SUCCESSFUL DOCTORAL DEFENSE

The following tips have been given by PhD students of the Centre for Learning Sciences and Technologies (CELSTEC) and may be of use to ESoE students:

- Make choices; do not try to study everything.
- Make your expectations towards your supervisors explicit.
- Find out what your supervisors expect from you.
- Do not wait too long before carrying out your first study. A study often gives you insight and direction.
- Do not despair when your participants do not show up. It happens all the time and persistence does pay off.
- Do not work all alone but discuss your research with colleagues. This keeps you from thinking in circles.
- Use the Internet to find relevant statistical methods to analyze your data.
- Remember, non-significant results are also results.
- Make use of the strengths of your supervisors and do not get annoyed at their weaknesses (they are only human).
- Take up some additional functions but do not forget that the dissertation has to be ready in four years. This is your main goal.
- Make a detailed “to do” list about a year before your thesis defense.
- Make use of the experience of former PhD candidates to help you through the last year.
- Plan the thesis defense date with the College of Promotions about a year before the PhD contract ends.
- Keep track of the formal processes with regard to the thesis defense. Make sure that every form reaches its destination and verify every formal step with the secretary of the College of Promotions.
- Rehearse your thesis defense with colleagues. Formulate possible questions and answers.
- You may not realize it yet, but despite difficulties you may encounter, as a PhD candidate you have got a great job with many degrees of freedom, which is quite unique, so enjoy your position!