

## **Master's degree programme Educational Science & Technology**

The main focus of the Master's degree programme Educational Science & Technology (EST) at the University of Twente is on the design and evaluation of learning arrangements in schools and organisations. This might be the instruction of young children at primary school, of young adults during their vocational education, or adult employees in a company, such as sales managers or teachers receiving in-service training or training on the job. In the EST programme students acquire knowledge about theories of learning and assessment, curriculum design and implementation, learning technologies, effective training approaches and learning interventions. Students also learn how to design and evaluate different learning arrangements and to translate this into advice and solutions to practical problems.

Graduates from the EST programme will become scientific educational professionals, experts who connect scientific research, scientific design and their own or future practice. Their expertise is developed on the basis of educational issues and problems drawn from practical contexts (both schools and organisations), which are translated into research questions and answered by applying a systematic approach, thus finding appropriate solutions to the specific problem. The result of this approach is a design, or a set of designs, for a solution which can be tested in the context of the problem to determine whether it leads to an improvement or innovation. This evaluation not only leads to an improvement or innovation, but also to more knowledge and the forming of new theories. This systematic, technological and design- and evaluation-based orientation distinguishes the EST programme at the University of Twente from other education-related degree programmes in the Netherlands.

The EST programme features two specialisations: Educational Design and Effectiveness (EDE) and Human Resource Development (HRD). The EDE specialisation focuses on curriculum design and - implementation, and school effectiveness. The HRD specialisation of focuses on the design of learning trajectories in organisations.

The EST programme is a one-year (60 ECTS) Master's degree programme taught fully in English, with enrolment in both September and February. The programme consists of courses and a graduation project. The latter addresses a real-life educational or training problem or research question. Students are challenged to present a solution to this problem or to answer the research question in a scientific and systematic way by studying literature, collecting data and producing sound analyses.

Our graduates work in a wide range of organisations, from government ministries, publishers and educational support services, to universities, other institutes of higher education and multinational companies. A number of graduates have started their own education and training consultancy bureau.

### **Specialisation Educational Design and Effectiveness (EDE)**

The main focus of Educational Design and Effectiveness (EDE) is on the interaction between curriculum design and curriculum implementation, teacher and school development, school effectiveness and ICT in a variety of educational contexts.

Curriculum design and curriculum implementation involves the planning, development and implementation of innovative learning trajectories. Effective implementation of these trajectories at both school and classroom level requires that teachers and schools are prepared for the implementation. Teacher development is therefore a crucial element when designing, developing and implementing a new curriculum. Much attention is paid to the role of ICT and new media when designing a new learning environment. Measuring the effectiveness of education and the implemented educational innovations is essential, as is structural monitoring and the assessment of education. Schools should be able to track the quality and results of their teaching, not only through pupil assessment, but also at the teacher and school levels.

Core questions in this field are: How can curriculum innovations be designed and implemented? How can schools and teachers be supported in the design, development and implementation of curriculum renewal at both the school and classroom levels? How can teachers be empowered in their own professional development while designing their own curricula? How can technology be used and integrated into education? Is it possible to improve the performance of schools by giving them feedback on the level of their performance? To what degree do school leadership, school culture and teamwork between teachers influence the effectiveness of schools? Do schools perform better as a result of education inspectorate or does this only lead to apparent improvements?

EDE has an applied character, in which the *integration* of research, design, advice and reflection skills is central. An EDE graduate is able to:

- understand and analyse different theories and paradigms related to curriculum design and implementation, teacher and school development, school effectiveness and ICT in a variety of educational contexts and indicate what they mean for practice
- plan, design and implement innovative curricula to improve the quality of education and assess the effect of these curricula
- improve the performance of schools by taking school leadership, school culture and teamwork between teachers into account
- reflect on the various core issues in the field of EDE and on his or her own position in this

A graduate specialised in EDE has excellent career prospects. Current graduates work at schools and other educational institutions, centres of expertise, consultancy firms, educational publishers, the Ministry of Education, etc. Some graduates are pursuing research careers at universities in the Netherlands and abroad.

### **Specialisation Human Resource Development (HRD)**

The main focus of Human Resource Development (HRD) is on learning and development for people in a work context. Lifelong learning is important for stimulating the knowledge society and the employability of people. Companies and institutions invest billions of euros in education and training. Large companies often have their own corporate department for developing and offering training to their staff to improve their performance or to further their education. An HRD graduate will be able to develop and implement such training programmes and assess their quality. Graduates might also be engaged in workplace instruction or in the rearrangement of the work and the workplace so that learning becomes an integral part of work.

Core questions in the HRD field are: How do people learn while at work? How do people become experts? How can workplace learning and professional development be facilitated? What makes training programmes effective and how can these be evaluated? How can learning and knowledge be managed in a company? How do organisations change and do HRD professionals assist in this process? What is the role of new media in learning?

The field of HRD uses knowledge and research from a range of disciplines to answer these questions, including the fields of psychology, educational science, business, human resource management and sociology. In addition to providing students with a firm and broad knowledge of HRD research, the

programme also has an applied character, in which the *integration* of research, design, advice and reflection skills is central. An HRD graduate from the University of Twente is able to:

- understand and analyse different HRD theories and paradigms and what they mean for practice
- design innovative and well-considered interventions to improve learning and development in a company or institution
- advise companies and institutions on issues related to the learning and development of their employees
- undertake research on HRD problems and know how to apply research to design good learning interventions and provide solid advice
- reflect on the various core issues in the field of HRD and on his or her own position in this

As a graduate of the HRD specialisation, a student has excellent career prospects. Current graduates work as HRD managers, coordinators, consultants, researchers, learning specialists, course designers, training materials developers, and needs analysts and evaluators.

### **Our philosophy**

The EST programme has been designed with the following aims in mind: the integration of research, design, advice and reflection skills; a curriculum in which students are given increasing responsibility for their own development; and the creation of a strong link with professional practice. This has the following consequences for the programme:

- 1) There are no separate research, design, advice or reflection courses. In each course students work on multiple skills at the same time and learn how to integrate them. When developing a good design, students require research and advice skills to implement the design successfully. Good research should lead to practical advice, while, as a scientist, students also need to be able to base their advice on state-of-the-art research findings.
- 2) Every semester starts with courses with a strong theoretical component and assignments designed by the lecturers. In the second part of each semester, the courses allow students choose a case to work on that matches their interests and the skills they wish to practise. Students will be mentored by experts from the University and from the professional field.
- 3) In the final semester students will primarily work on their Final Project. They will prepare for this by working on their research proposal in groups under the supervision of a teacher. They

will choose their Final Project themselves, developing a solution in consultation with the educational organization or company for whom it is intended. The EST programme has structural relationships with several educational organizations and companies who often have projects available. The final project always has a strong research element, and might also have significant design, evaluation or advice components. During the Final Project, students are responsible for their own learning processes but will be supported by a community of peers and their supervisors.

- 4) Problem-based and project-based learning are major characteristics of the programme. Assignments are based on real problems in practice, and students will visit schools or companies. Part of each student's study trajectory will occur in a 'live context' at an educational organisation or company in which the student will learn with and from professionals. This will also assist students to orient themselves towards their Final Project and of course steer them towards their future career.
- 5) Depending on background, future goals and time limits, students can design their own curriculum. For example, if a student wants to go abroad for Final Project, they can choose to complete all the course work in the first semester. Various trajectories are also possible for part-time students. Students may also take courses from both specialisations or even request to take a course from another relevant Master's programme. To assist them in designing their own learning path, students will be given advice by the programme coordinator, clarifying the possibilities and restrictions.

### **Programme outline**

The EST programme starts with the core course "Trending topics in Educational Science and Technology", which is obligatory for all EST students and therefore offered twice a year, in September and February. In the core course, several instructors present the current topics in their field of expertise, which are aligned with the current areas of research in our research group. The topics presented cover both EDE and HRD domains, including:

- talent management/talent development
- data-based instruction and decision-making
- lifelong learning skills
- twenty-first-century skills & the school of the future
- leadership for learning
- professional learning communities

Each topic will be dealt with in a 3-week block in which (a) the instructor introduces the topic in a lecture, (b) a seminar is given in which the instructor and the students focus on the topic's content-related and methodological issues, and (c) one week is designated to the group-based completion of a topic-related assignment. The nature of the assignments varies but the full set of competences (design, research, advice and reflection skills) to be attained are addressed by all.

In addition to the core course, there is also a preparation course for the Final Project. During this course the students learn how to search for relevant literature, how to design a research project and how to write a research proposal for their Final Project. Students will work on their research proposal and a first literature review in thematic communities of learners, supervised by an instructor who is an expert in that specific area.

**For students who want to specialise in EDE:** we offer you a challenging programme focused on the understanding of underlying theories and principles of educational design and effectiveness, as well as hands-on design experience by working on actual cases from the practical domain. The EDE specialisation consists of six courses, each focusing on a specific EDE theme:

- Monitoring and improving schools and educational systems
- Assessment of and for learning
- Teaching and learning with ICT
- Design in educational settings
- Teacher learning and development
- Curriculum innovation and implementation

All of the courses have a theoretical component, while in the assignments students will also develop and put into practice their research, design, advice and reflection skills. The courses "Teacher learning and development" and "Curriculum innovation and implementation" are courses in which students can apply what they have learned in the other EDE courses, at the same time assisting students to prepare perfectly for the programme's Final Project.

**For students who want to specialise in HRD:** we offer you a challenging programme focused on a deep understanding of underlying principles as well as hands-on experience by working on actual

cases in companies. In this way, students will be optimally prepared for a career as an HRD adviser, designer or researcher.

The HRD specialisation consists of six courses, each focusing on a specific HRD theme:

- Learning at work
- Designing and evaluating effective HRD interventions
- HRD advice in a live context
- Regulation and facilitation of workplace learning
- Leadership and change in organizations
- HRD consultancy in a live context

All of these courses have a theoretical component, while in the assignments students will also develop and put into practice their research, design, advice and reflection skills. These courses are all scheduled in the first part of each semester (quartiles 1 or 3). Two additional courses are scheduled in the second part of each semester (quartiles 2 or 4), in which students work “in the live context” HRD advice and HRD consultancy. In these two courses, students will work on a real HRD case formulated by a company. Students will visit these companies and work in a group to design an advice or create a research plan to find a solution for the specific HRD case. These two courses provide students with a unique opportunity to apply what they have learned in the courses in the first quartile of the semester and will also provide excellent assistance to students in their preparation for the programme’s Final Project.

**Course descriptions EDE & HRD**

Specialisation EDE	Specialisation HRD
<p><b>Monitoring and improving schools and educational systems (EDE1)</b></p> <p>The main goal of educational effectiveness research is to analyse associations between schooling conditions and outcome measures (such as student achievement) as a basis for improving the quality and results of schooling. In short, this research aims to find answers to the question: What works in education? This course deals with the conditions of schooling at the class, school and system levels that enhance educational effectiveness. Examples of such conditions include: time on task, opportunity to learn, performance evaluation, educational leadership, the role of national inspection bodies and features of educational policies at the system level. This course is not limited to theories about these conditions but also pays attention to strategies for monitoring and improving the effectiveness of schools and educational systems. This is illustrated by means of actual projects, such as projects on data-based instruction and decision-making (e.g. the FOCUS project and the data teams project), and international comparative studies of educational achievement (e.g. TIMSS, PIRLS and PISA).</p> <p>At the end of this course the student has knowledge about and insight into:</p> <ul style="list-style-type: none"> <li>• the conditions of schooling at the class, school and system levels that enhance educational effectiveness</li> <li>• how educational effectiveness can be</li> </ul>	<p><b>Learning at work (HRD 1)</b></p> <p>The aim of this course is to offer an overview of the most important theories in the area of Human Resource Development (HRD) that assist in designing, implementing and evaluating learning at work. The course teaches students to understand and analyse different HRD theories and paradigms and what they mean for practice.</p> <p>Learning in the workplace will be studied at three levels: the individual, the team and the organization. Important questions to be addressed are: How does the development of expertise occur? What learning activities are supportive for workplace development? How are formal, informal and non-formal activities related? and What favourable and inhibiting factors can be identified at various levels?</p> <p>The course is thematic and explores topics such as strategic HRD, management development, educational design, talent development and learning in a knowledge society, all related to learning in the workplace. The various perspectives on learning in the workplace will be supported by research in the field of learning and development in organisations.</p>

<p>monitored at the class, school and system (national) levels</p> <ul style="list-style-type: none"> <li>• how the results of both educational effectiveness research as well as of monitoring at the class, school and system levels can be used for improvement interventions</li> </ul>	
<p><b>Teaching and learning with ICT (EDE2)</b></p> <p>ICT plays a key role in education, in particular because it provides teachers with ‘hooks’ for innovative and potentially powerful ways of learning. Research suggests that the effectiveness of technology-enhanced learning depends on the characteristics of the learners, the subject matter, the technology itself, the underlying pedagogical approach and the support offered by the teacher or tools embedded within the learning environment. This course introduces students to the theoretical foundations and practical application of various state-of-the-art ICT learning environments and tools.</p> <p>By using, analysing and rethinking (or redesigning) these ICT applications, students increase their understanding of how and why technological, pedagogical and subject-matter features can work in tandem to increase the effectiveness of the teaching and learning process. These insights provide a solid basis for educational professionals interested in designing ICT learning environments and tools, or coaching teachers in their choice and use of these applications.</p> <p>At the end of this course the student has knowledge about and insight into:</p> <ul style="list-style-type: none"> <li>• the theoretical foundations underlying effective, contemporary ICT learning</li> </ul>	<p><b>Designing and evaluating effective HRD interventions (HRD2)</b></p> <p>In this course students learn to design and evaluate innovative and well-considered interventions to increase learning and development in a company or institution.</p> <p>The aim is to actively engage in the design and application of several HRD interventions and to develop an evaluation plan for one of these interventions. In addition, we invite students to reflect on these interventions. This reflection will concern the effectiveness of the intervention, the perspectives on which it is based, its applicability in different organizational contexts and its role in the future of HRD. The interventions will be based on current organizational issues.</p> <p>This course is organized as a laboratory in which we create, evaluate and reflect on specific HRD interventions. The design methodology in the context of HRD is the central topic, applied to a variety of interventions suitable to specific problems in an organisational context. The main questions are:</p> <ul style="list-style-type: none"> <li>• What makes an intervention effective?</li> <li>• How does one design such interventions and how do we assess the effects?</li> <li>• What are the financial implications of HRD interventions, such as cost effectiveness and return on investment?</li> </ul>

<p>environments and tools</p> <ul style="list-style-type: none"> <li>• design principles and considerations for the development of these environments and tools</li> <li>• research methods to evaluate the effectiveness of teaching and learning with ICT</li> </ul> <p>the mutual influences of technology, pedagogy and content knowledge in designing, investigating and promoting the use of IT in education</p>	
<p><b>Curriculum innovation and implementation (EDE3)</b></p> <p>Many curriculum innovations often fail or are implemented in an unsatisfactory way. To ensure sustainable implementation, teacher development, curriculum development and school development need to be closely connected. In this course students develop an understanding of important curriculum implementation concepts and theories and learn how to apply these concepts in the analysis and design of curriculum innovations from an implementation perspective. Concepts that will be discussed are: adoption, implementation and incorporation of innovations; the curriculum enactment perspective; ownership; and bottom-up versus top-down strategies. These theoretical insights will be illustrated with concrete examples from the practical domain, such as the implementation of ICT in education. In a final assignment, students will analyse a concrete case and design interventions to prevent the unsatisfactory implementation of the innovation.</p> <p>Course objectives:</p> <ul style="list-style-type: none"> <li>• students are able to explain the main curriculum implementation concepts and theories</li> <li>• students are able to analyse the</li> </ul>	<p><b>HRD design in a live context (HRD3)</b></p> <p>The aim is to design an HRD intervention in a real-life context, based on a specific request from an organization, firm or company. The design process requires the integration of HRD theories and research approaches in a real-life context. This not only requires academic skills but also the competences to act in a business environment, negotiating on facilitating and inhibiting factors, and gaining support at the managerial, operational and individual levels.</p> <p>In this design course students work on a real HRD case which is formulated by a company. The course starts with an introduction to HRD design and the practice of some HRD intervention skills necessary to complete the course. You will visit a company and work in a group on a design and research plan to find a solution for the specific case at hand. This course offers a unique chance to apply HRD theories and design methodology and offers relevant preparation for the Final Project.</p>

<p>implementation of curriculum innovations and design interventions to prevent implementation failure</p>	
<p><b>Assessment of and for learning (EDE4)</b></p> <p>It is essential to pay attention to the quality of assessment in education, both with regard to formative as well as summative assessments. What are the important characteristics to consider when designing assessments, and how should they be designed? How can we ensure that assessments are used summatively as well as formatively (to improve education)? In this course we will use examples from different projects that focus on supporting schools in the use of assessment data (and other types of data), such as the Focus project (<a href="http://project-focus.gw.utwente.nl/?page_id=8">http://project-focus.gw.utwente.nl/?page_id=8</a>) and the data team project (<a href="http://www.datateams.nl">www.datateams.nl</a>).</p> <p>After completing this course the student will have knowledge on formative and summative assessments, will be able to explain what constitutes a high-quality assessment, and have knowledge about the use of assessments in schools (formatively and summatively) and knowledge about the type of support schools need in the use of assessments (as well as other data).</p>	<p><b>Regulation and facilitation of workplace learning (HRD 4)</b></p> <p>In this course students will learn:</p> <ul style="list-style-type: none"> <li>• about the advantages and disadvantages of different ways of supporting and regulating learning in the workplace</li> <li>• about factors which influence the learning climate</li> <li>• how to select tools for supporting learning that match learning goals and the context</li> <li>• how to evaluate the quality of a corporate curriculum</li> <li>• how to write an advice optimizing a corporate curriculum in an organization</li> </ul> <p>This course deals with the various ways of regulating and facilitating workplace learning, from formal training courses to self-directed learning. Central to this course is the issue of how diverse ways of learning in the workplace can be facilitated. How do you create a good learning climate? How do you make employees responsible for their own learning and how can you manage this? Which factors inhibit or stimulate learning? What are the roles (mentoring, coaching, peer-support) of others and which tools (ICT, portfolios) can be used?</p> <p>The course will start with some introductory lectures. During the course students will undertake a literature search and present research outcomes on the factors influencing learning as well as the outcomes of various learning tools. The final assignment will consist of an evaluation of a corporate curriculum, resulting in an advisory report</p>

	<p>on how to optimize this curriculum.</p>
<p><b>Design in educational settings (EDE5)</b></p> <p>In this course students develop a more in-depth understanding of educational design knowledge and skills and apply this in an authentic assignment. Educational design is presented and discussed in lectures from both conceptual and practical perspectives. Students apply educational design knowledge and skills in an assignment for an external client, working in teams of 3-4. The assignments aim to design a solution for an authentic curriculum problem at the meso level, such as a series of lessons for a new curriculum domain, guidelines for teacher design teams, an assessment framework for measuring twenty-first-century skills, formats for online courses, etc. Students are assessed on their product (solution) and on a report in which they explain their design process and their design decisions.</p> <p>Course objectives: students are able to apply and adapt generic and domain-specific design methods, techniques, models and strategies systematically, creatively and on a scientific basis in an authentic assignment, taking into account conditions, expertise and the time available.</p>	<p><b>Leadership and change in organizations (HRD 5)</b></p> <p>In this course students will learn:</p> <ul style="list-style-type: none"> <li>• about recent developments in theories and models of leadership and the factors at the meso and macro levels affecting learning and development</li> <li>• how to select tools and/or interventions aimed at improvement</li> <li>• how to analyse and evaluate leadership problems in organizations</li> <li>• how to write a research plan studying leadership practices in an organization</li> </ul> <p>This course deals with the role of leadership in improving the functioning of organizations. Leadership plays a critical role in mediating the effects of external policies and social and cultural demands, the building of capacity in organizations and changing existing practices, and through this mediation can contribute to the improvement of the functioning of an organization. Governance structures, leadership practices, structural and cultural conditions and their effects on the functioning of organizational members are examined in different organizations, including schools. Special attention will be paid to issues such as motivation behind learning, organizational commitment, citizenship behaviour, shared decision-making, innovative climate and politics in organizations.</p> <p>The course starts with a review of general theories of leadership in organizations, subsequently introducing current themes and dimensions of leadership, relating them to the role of leadership in motivating organizational members to learn and</p>

	<p>change their practices. Through discussion and practical assignments, students not only learn to reflect on current research into leadership and organizational change but also to design possible ways of optimising leadership practices in different organizational contexts.</p> <p>The final assignment will consist of an evaluation of a leadership problem in a real organization, resulting in a research plan designed to study ways to improve leadership and introduce organizational change.</p>
<p><b>Teacher learning and development (EDE6)</b></p> <p>The quality of teaching and teachers is crucial to how much pupils learn in schools. This quality varies quite a bit between and within schools. During educational reform efforts it is also important to pay careful attention to the knowledge and skills of teachers affected by such reform. In this course we explore the different kinds of knowledge and skills that are crucial for quality teaching. In addition, we address the effectiveness of different forms of professional development as well as important conditions for teacher learning and change.</p> <p>After completing this course the student will have knowledge about which aspects of teacher knowledge and skills are relevant for quality teaching and sustainable educational reform. Students will be able to explain how professional development measures affect practice and what school conditions are required to improve the effectiveness of the process. Students will also be able to link the issues concerning professional development with other important developments in school, such as curriculum development, school development and data use.</p>	<p><b>HRD consultancy in a live context (HRD 6)</b></p> <p>The aim of this course is to consult in a real context and offer a dedicated HRD advice based on a specific request from a company. This consultancy process requires the integration of HRD theories and research approaches in a real-life context. This not only requires academic skills but also the competences to act as a business partner, building relationships, establishing trust, examining the facilitating and inhibiting factors in the day-to-day work environment and gaining support at managerial, operational and individual levels.</p> <p>In this consultancy course you will work on a real HRD case which is formulated by a company. The course starts with an introduction to HRD consultancy and the practice of some HRD consultancy skills necessary to complete the course. Your consultancy team will visit the company and investigate the problem at hand. Students will develop a tailor-made research plan designed to find an evidence-based solution to the specific problem. This course offers a unique chance to apply HRD theories and design methodology and provides relevant preparation for the Final Project.</p>



## Curriculum outline Educational Science and Technology 2012-2013

	Core Course, "Trending topics in educational science and technology"	
	Preparatory course for the Final Project	
	Final Project	
<b>Electives</b>	EDE1 Monitoring and improving schools and educational systems EDE2 Teaching and learning with ICT EDE3 Curriculum innovation and implementation EDE4 Assessment of and for learning EDE5 Design in educational settings EDE6 Teacher learning and development	HRD1 Learning at work HRD2 Designing and evaluating effective HRD interventions HRD3 HRD design in a live context HRD4 Regulation and facilitation of workplace learning HRD5 Leadership and organisational change HRD6 HRD consultancy in a live context

September enrolment/full-time students

Quartile 1	Quartile 2	Quartile 3	Quartile 4
Core Course (10 ECTS)			
	Prep Course/Research Proposal (5 ECTS)		
	Final Project (25 ECTS)		
HRD 1 EDE 1	HRD 3	HRD 4 EDE 4	EDE 6
HRD 2 EDE 2	EDE 3	HRD 5 EDE 5	HRD 6

February enrolment/full-time students

Quartile 3	Quartile 4	Quartile 1	Quartile 2
Core Course (10 ECTS)			
	Prep Course/Research Proposal (5 ECTS)		
	Final Project (25 ECTS)		
HRD 4 EDE 4	EDE 6	HRD 1 EDE 1	HRD 3
HRD 5 EDE 5	HRD 6	HRD 2 EDE 2	EDE 3

**September enrolment/part-time students**

Year 1				Year 2			
Quartile 1	Quartile 2	Quartile 3	Quartile 4	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Core Course (10 ECTS)				Prep Course/Research Proposal (5 ECTS)			
				Final Project (25 ECTS)			
HRD 1 EDE 1	HRD 3	HRD 4 EDE 4	EDE 6	HRD 1 EDE 1	HRD 3	HRD 4 EDE 4	EDE 6
HRD 2 EDE 2	EDE 3	HRD 5 EDE 5	HRD 6	HRD 2 EDE 2	EDE 3	HRD 5 EDE 5	HRD 6

**February enrolment/part-time students**

Year 1				Year 2			
Quartile 3	Quartile 4	Quartile 1	Quartile 2	Quartile 3	Quartile 4	Quartile 1	Quartile 2
Core Course (10 ECTS)				Prep Course/Research Proposal (5 ECTS)			
				Final Project (25 ECTS)			
HRD 4 EDE 4	HRD 6	HRD 1 EDE 1	EDE 3	HRD 4 EDE 4	HRD 6	HRD 1 EDE 1	EDE 3
HRD 5 EDE 5	EDE 6	HRD 2 EDE 2	HRD 3	HRD 5 EDE 5	EDE 6	HRD 2 EDE 2	HRD 3