LISA (Linking Instruction and Student Achievement)

A large-scale video study of instructional practices in lower secondary mathematics and reading classrooms

AIMS, PURPOSE AND RELEVANCE

1.1 Aims and purposes

The aim of the proposed LISA study is to investigate the impact of different modes of classroom instruction on students' learning by comparing student achievement data with classroom data collected through video-observations, assignment samples, student questionnaires and teacher reflections. The empirical material is taken from lower secondary level classrooms in reading and mathematics. Findings from the study should be used to improve instructional practices in these two subject areas.

The project has three objectives:

- To understand how instructional practices within mathematics and reading support and contribute to student learning.
- To develop a research design that enables us to link classroom data with achievement data within an integrated model, and thus make a significant contribution to integrative theory development in this area.
- To test and develop robust coding manuals and instruments aiming to measure teaching within a Norwegian context, and thus support teachers' professional learning. The coding manuals will serve as a possible tool for developing quality indicators relevant for teacher training and the teaching profession.

1.2 Relevance

Education has become a key factor in shaping global economic and social development (OECD, 2010). However, our knowledge of how and why instruction contributes to effective and relevant learning is lacking. This has led to many countries prioritizing research on instruction and teaching, and recent reviews (OECD, 2005; Seidel & Shavelson, 2007; Timperley & Alton-Lee, 2008; Hattie, 2009; Baumert et al., 2010; Bryk et al., 2010, Konstantopoulos & Chung, 2011) indicate that instructional practice does make a difference to students' learning – and is more important than other factors including students' socio-economic background, class size, classroom climate, teachers' year of experience and formal training. Research in the field has been slow due to competing theoretical paradigms and methodological approaches, thematic fragmentation and weak research infrastructure, and there is need to go behind correlational patterns and open the "black-box" (Rowan et. al. 2004) of instruction. In order to progress from such a stalemate, studies of instructional quality must follow new paths scholars argue (Clarke et al, 2006; Raudenbusch, 2008; Klette, 2010). Video analysis of classroom interaction is a particular promising methodology as it captures students' and teachers' behaviour simultaneously and in situ.

Whereas international large scale assessments like PISA and TIMSS provide quality data of student achievement, they have only to a modest degree been able to address issues of instructional quality. Several scholars have asked for studies that correlate achievement data with records of learning processes and teaching strategies (Baumert et al., 2010; Bryk et al., 2010). This line of research has expanded over the later years and shown to be quite promising (Boyd et al., 2010; Grossman et al., 2010). However, it has become evident that there is a need to understand determinants at different levels (class, school, regions), and recently advances in hierarchical linear and structural equation modelling have enabled researchers to generate theoretical constructions that adequately represent a larger complexity of interacting variables. Such a research program is quite demanding since it requires a concerted effort by researchers from different fields of expertise and traditions; psychometric research, advanced statistics, micro-genetic classroom studies and research into domain-specific instruction and learning. A main objective of the LISA study is to advance such integration, as its participating research groups represent an internationally unique mix of competences. The Unit for Quantitative Analysis in Education (EKVA) and the two research groups Measurement and Evaluation of Student Achievement (MESA) and Studies of Instruction across Subjects and Competences (SISCO) at our department have a high standing both among

national and international researchers in the above fields. Due to the competence profile among the LISA scholars, and the available outcome data from TIMSS, PISA, and National Tests in our department[1], we will use the teaching of mathematics and reading in lower secondary school as a field of inquiry when analyzing how different instructional regimes might optimize students' learning. Much effort on reading and numeracy has been targeted towards the early years of schooling, while the secondary level has received less attention in terms of working systematically with these areas of instruction. However, securing and improving students' learning in mathematics and reading in lower secondary education is crucial, as these subject areas both represent basic knowledge and skills that are necessary for successful adaptation to a changing world. Moreover, lower secondary school serves as a transition phase for providing students with the competences that they need to succeed in further education and adult life, whether they choose an academic or a vocational career.

In addition to providing a multi-disciplinary basis for theory development this joint effort will be used to explore research-based methods for pre-service and in-service teacher training.

2 ASPECTS RELATING TO THE RESEARCH PROJECT

2.1. Background and status of knowledge

Prior contribution from the LISA scholars: The suggested LISA study draws on existing expertise in video-based micro-genetic classroom studies, in measurement methods, and in domain-specific instruction (mathematics and reading) in our department. While research on classroom instructional activities has a strong position in Norway (see publication list Klette, Hertzberg and Bergem), these studies have not been systematically correlated with outcome measures. Innovations in methodologies and video design has, however, made it possible to consider factors and data operating on different levels and time lines, and combine them within nested research designs (Raudenbusch, 2008; Rowan et al., 2004). The PISA+ Video Study conducted by Klette, et al. (2008), National reading tests (Vagle & Roe, 2011), and analyses of Norwegian PISA 2009 results (Roe, 2010; Roe and Vagle, 2010), establish a foundation for the upcoming LISA study. Below we summarize international research on instructional quality and link it to relevant Norwegian findings.

Research on instructional quality – status of knowledge:
Research on instructional quality is voluminous, yet fragmented. In the following we summarize the field and identify three major challenges to be addressed in the proposed LISA study: (1) Effects of instruction on student learning, (2) the systemic and differential effects of instructional strategies relevant for mathematics and reading, and (3) measures and measurement tools for instructional quality. We understand "instructional quality" as simply instructional strategies that are measured and validated (Walford et al., 2010). Our view highlights both the scripted and the enacted aspect of teaching, roughly corresponding to the concepts "instructional regimes" (Raudenbush, 2008), and "instructional practices" (Grossman & McDonald, 2008). This is a wider concept than teaching in a strict sense, and includes different ways of organizing the learning environment.

Effects of instruction on student learning
Three research traditions have addressed instructional quality in teaching: (1) The process-product literature (e.g. Brophy and Good, 1986, Konstantopoulos & Chung, 2011), (2) the educational production literature (e.g. Hanushek, 1996, Wayne and Youngs, 2003), and (3) the teacher knowledge literature (Shulman, 1986; Ma, 1999; Hertzberg, 2011). The three strands differ not only in substantial findings, but also in theoretical anchoring, level of analysis and methodological approaches. The teacher knowledge tradition combines research in the learning sciences and cognitive psychology with expertise in the subject areas. It shares common methodological

[1] EKVA (Quantitative Analyses in Education) is the national hub for PISA and TIMSS data, and National Test data.

elements with the process-product literature with regard to the use of psychometric measures. However, studies within the latter tradition more often add classroom observations and adopt interpretational schemes from a wide specter of theoretical frameworks. In the proposed LISA study we combine elements from the process- product tradition and the teacher knowledge tradition within what might be described as a systemic process-product model. We furthermore distinguish between teachers' attitudes and beliefs (TALIS, see OECD, 2009a), teacher preparation and teachers' knowledge (Hill, 2005; Ball et al., 2008; Baumert et al., 2010), and teachers' activities (Rowan et al., 2004; Klette et al., 2008; Grossman et al., 2010) as different analytical lenses and methodological designs for measuring teaching qualities. Studies of differences in teacher preparation (Darling Hammond et al., 2005; Boyd et al., 2010), and teachers' scores on tests of content knowledge (CK) and pedagogical content knowledge (PCK) (Baumert et al., 2010), may account for some of the differences in students' achievement gains. However, the emphasis on teacher characteristics and preparation may obscure the importance of instructional practices in the classroom, as instruction itself is not investigated. There is a need to investigate the relationship between teaching practices and student achievement gains, and subsequently use such findings for the improvement of teacher education and professional development.

The systemic and differential effects of instructional strategies

In order to facilitate the discussion of differential effects we have made a simple classification of central teaching practices relevant for mathematics and reading instruction: Classroom interaction strategies, content-oriented strategies, meta-instructional strategies, and individualization strategies. Below we summarize some central international and national findings relevant for our study.

Classroom interactions, for example presenting, structuring, dialoguing and giving feedback, are believed to have a large impact on learning outcomes (Hattie, 2009). However, there is a need for studies that disentangle the specific relationships between teachers' activities, the quality of students' classroom interactions, and learning outcomes (Cohen, Raudenbusch & Ball, 2003; Bergem & Klette, 2010). Several studies underscore the critical role of verbal communication and classroom interactions for language art learning (Nystrand, 1997) and learning mathematics (Lampert, 1998). However, recent studies from language arts (Grossman et al., 2010) and mathematics classrooms (Cobb, 2011) have not succeeded in establishing a strong connection between interactive patterns and students' learning. From Norwegian secondary mathematic classrooms, Klette et al. (2008) and Bergem & Klette (2010) report on high student participation when it comes to turn-taking and teacher- student interaction. How these interactional patterns contribute to students' mathematical reasoning and achievement score, needs further probing.

Content-oriented strategies involve decisions about cognitive demands, conceptual richness, modeling and the use of different representations. Interesting variations between countries in the use of such strategies have been found (Stiegler & Hiebert, 1999; Clarke et al., 2006). Instructional practices should therefore be explored in relation to different school subjects and national contexts (Grossman & McDonald, 2008). TIMSS data (Bergem & Grønmo, 2009) and the PISA + video data (Bergem & Klette, 2010) reveal a narrow repertoire in instructional practices in Norwegian lower secondary mathematics classrooms, where individual seat work predominates, peer learning is rare, and students are hardly challenged to solve complex mathematical problems. Analyses from language arts classrooms indicate a wider instructional repertoire (Klette et al., 2008; Roe, 2008), and a better balance between group work, individual work and plenary work. However, micro—genetic video analyses revealed little explicit reading instruction and modeling of reading strategies in 9th grade classrooms (Anmarkrud, 2009) and students report that the teachers only to a small degree stimulate their reading engagement (Roe,2008; 2012*[2]). PISA 2009 showed that Norwegian

[2] Due to space restriction references marked with a * are to be found in the CV section.

15-year-olds' reading engagement and knowledge of reading strategies are significantly below the OECD average (Roe, 2010), and whereas gender differences favoring girls are large (Hopfenbeck & Roe, 2010).

The concept of *meta-instructional strategies* refers to general scripts and enactments ranging from directive, explicit teaching to inductive and discovery-oriented approaches. Recent studies and reviews tend to favor the explicit strategies with regard to effectiveness, whereas strategies like inquiry-based methods fail to show any decisive influence on students' learning (Seidel & Shavelson, 2007). Explicit or formal instruction of reading strategies is believed to lead to an improvement in text understanding (OECD, 2010), and a number of studies have found a high correlation between reading proficiency and metacognition strategies (Artelt, Schiefele, & Schneider, 2001; Brown, Palincsar, & Armbruster, 2004). Both Norwegian PISA findings (Hopfenbeck & Roe, 2010) and the PISA+ video study (Klette et.al. 2008, Anmarkrud, 2009) report a poor register when it comes to the use of meta-instructional strategies. Assignments and tasks in language arts classrooms are scored as ambitious and cognitive demanding (Carlsten, Grossman & Klette*, forthcoming), though seldom supported with explicit teaching strategies and modeling illustrations. While *individualisation strategies* in Norwegian schools are reported to be moderately successful, these relationships need to be further investigated and compared with international studies (Hopfenbeck & Roe, 2010; Klette at al., 2008; Bergem 2012*).

Measures and measurement tools for research on instructional quality

Research on "measurement of teaching" has been suffering from "paradigm wars", fragmentation and local production of instruments (Darling-Hammond et al., 2010; Klette, 2009), and thus there is an urgent need for standardization, harmonization and integration of measures. In research on instruction and teaching we can distinguish between four clusters of methods for measuring instructional quality: (1) Large-scale teacher and student tests and questionnaires, (2) interviews and logs, (3) observation methods, and (4) artefact collections from classrooms. In the LISA study we combine 1, 3, and 4. Classroom data (video recordings, student assignments, teacher reflections, and data from student questionnaire) will be correlated with achievement data (National Test data from grades 8 and 9) to explore how instructional regimes in reading and mathematics affect students' learning. In line with the above argumentation, our choice of study design will give us the opportunity to contribute to the international discussion on developing common instruments for investigating teaching quality. Particularly, the design and instruments for measuring teaching quality in the proposed LISA study make comparisons with the on going projects "Understanding Teaching Quality" (UTQ) (http://www.utqstudy.org/) and "Measures of Effective Teaching" (MET) (http://www.metproject.org/) possible (see enclosed letters from partners Professor Rowan, Michigan Ann Arbor University; Professor Grossman, Stanford University; and Associate Professor Hill, Harvard University).

2.2 Approaches, hypotheses and choice of method

Based on the overview and conceptual framework outlined above, our analyses will take place at the intersection of instructional practices, students' perceptions of the classroom instructional environment, subject/curriculum resources (i.e. assignment collections), teachers' reflections, and student achievement score. The perspectives guiding this analysis will be the following research questions:

i. How do the different instructional strategies (interaction strategies; content-oriented strategies; meta-instructional strategies; individualized strategies) interact and influence students learning?
ii. What kind of instructional strategies are effective?
iii. How could measurement tools like coding manuals and observation schemes serve as indicators of quality of instruction?
iv. How could these measurement tools in combination with interactive video feedback improve teaching?

The above research questions will define subsets of hypotheses subject to specific analyses. In the domain of instructional strategies, for example, we will expect that content oriented strategies are

stronger correlated with high student performance than the other strategies. With regards to measurement tools a hypothesis will be that coding manuals and observation schemes are more valid and reliable tools to measure instructional quality than survey data and teachers reflections.

Methods and design of study

Core research design

The core design of the study is to collect and analyse instructional data, assignment data, and achievement data in mathematics and reading. Data collection will occur over 14 months in 50 classrooms at the lower secondary level. Collecting data over such a long period will ensure that enacted instructional practices from the beginning of the 8th grade, throughout this entire school year, and a bit into 9th grade are covered. Achievement data from the comprehensive Norwegian National Tests in mathematics and reading for 8th and 9th grade will be used as measures of students' achievement score.

Data on instructional practices that include interactional strategies, structuring of classrooms and use of curriculum resources will be collected through the use of video recording, observation manuals, student questionnaires and assignment collections. These instruments will be validated as indicators of instructional quality to the extent that they are able to predict student achievement. In addition the LISA study aims at exploring how the different instruments, for example coding manuals, can be used for professional development by providing systematic feedback to teachers on their own practices. The different elements of the LISA design are described in more detail below.

Strategic random sampling of classrooms

PISA-data have revealed that the between-school variance in Norway is low from an international perspective (Kjærnsli et al., 2004, Kjærnsli & Roe, 2010). Consequently, we hold that as long as the full range of student achievement levels are sampled within a certain region the findings and interpretations will to a high degree be generalizable to the national level. We have therefore chosen municipalities in the South Eastern region of Norway. By comparing classrooms that work systematically with reading comprehension with those who do not offer such a systematic approach, indicators of different instructional practices will be generated. Schools in five selected municipalities in this region are representatives of the former, and about 25 classrooms from schools in these municipalities (Oslo, Fredrikstad, Moss, Bærum, Skien) will be selected. Some of these schools use for example the LUS program (LeseUtviklingsSkjema – ReadingInstructionForm) as a guiding device to secure students' reading comprehension, while others use adapted versions of research based reading instruction programs, for example Concept Oriented Reading Instruction (CORI) (Guthrie, Wigfield, & Perencevich, 2004). The other 25 classrooms will be selected from municipalities that do not follow specific instructional programs in reading. Classrooms selected on the basis of the described criteria, will also be used for math. We assume that a certain variation of instruction will be reflected in the math classrooms, but these analyses will have a more exploratory character. The number of classrooms suggested here represents a balance between study manageability and statistical power (Maas & Hox, 2004). Although statistical power will vary with the precise model employed, a simple comparison between two groups of teachers with a sample of this size would reveal differences as small as .286 of a standard deviation, which represents a small-to-moderate effect size. Differences much smaller than this would not be of practical importance even if they could be detected.

A. Data collection framework: Markers of instructional practices

Video studies have proven especially promising for analyzing teaching and learning in classrooms (Clarke et al., 2006, 2010; Hiebert & Stigler, 2000; Klette, 2009). Contrary to the TIMSS video study, which videotaped single lessons across a large sample of classrooms and contexts, LISA will film mathematics and language arts (reading) classrooms as time series for periods of 2 x 1 week in each of the 50 different classrooms. This will provide opportunities for detailed studies of the

teaching and learning processes over time, essential for understanding the learning that takes place in each classroom.

The LISA project will take advantage of video recording facilities already set up for classroom research. A recent grant for the establishment of a video lab (TeachingLearningVideolab/Oslo (see TLVoslo.org)) has enabled us to build national expertise in video design and video analysis at our department (equipment, storage facilities, a physical and virtual video lab, and a toolbox of software programs). In the LISA study we will use recording equipment specifically suited for classroom research. The software programs "StudioCode" and "Interact" will be used to do the video analysis. Through the PISA+ video study we have already established close collaboration with scholars within the "Learners' Perspective Study" (LPS), at the ICCR, Melbourne University (see Clark et al., 2006), and colleagues working with video studies at Stanford (Prof. Grossman) and Michigan Ann Arbor (Prof. Rowan). On a European level our expertise on video studies is acknowledged, and LISA scholars have delivered keynote contributions (see enclosed CVs), book chapters (Klette, 2009) and edited volumes (Klette, Bergem & Roe, 2012*) on video analysis as a methodological design for investigating classrooms.

Collection of educational material

Scholars agree that instructional practices and curriculum materials are key factors when examining qualities of teaching. An important part of the LISA project is to not only document and analyze instruction through video recordings of the selected lessons, but also to collect the educational material that is being used in these lessons. This means that teacher lesson plans, instructional material and student assignments from all of the videotaped lessons will be copied and registered. The involved teachers will be asked to comment on their lesson plans. Analysis of required classroom assignments across subjects and classrooms will be conducted. This will provide us with yet another approach to measure teaching quality. Borko (2011) argues, based on studies of math- and science classrooms, that collection of artifacts can provide reliable and valid information for judging instructional practices.

Data on students' experiences

A short student questionnaire will be developed and administered, based on a translation and adaptation of the Tripod survey instrument, designed by Harvard researcher Ron Ferguson. A main goal is to assess the extent to which the students in the LISA study experience the classroom environment as engaging, demanding and supportive of their intellectual growth.

Data on student achievement

In Norway, all students undergo national tests in mathematics and reading at the beginning of the 8th and 9th grades. The national tests are meant to provide information on the students' basic skills, and the results are also used for improvement and development within each school. The national tests are based on the descriptions of reading and numeracy in the subject curricula, where these skills are integrated and adapted to each subject. The reading tests are influenced by the PISA reading framework, which means that different genres, text types and text formats are represented, and that three aspects of reading are tested: Retrieving information, interpreting texts and reflecting on form or content.

B. Analytical framework - Coding of observational data

Coding manuals will be a key instrument when analyzing the effects of instructional regimes in the observed classrooms. Coding manuals serve several purposes: (1) To examine and structure observation of practices in a systematic way, (2) to develop a consensus on codes within the field of studies of teaching and instruction, and (3) to make interpretations explicit, traceable and measurable.

Table 1 presents coding manuals from relevant classroom studies and our intention is to translate and adapt these instruments to a Norwegian setting. Some of these manuals are content

specific (see for example the PLATO-manual and the MQI-manual), others capture more generic features of classroom interaction and teaching (CLASS-manual, PISA+ manual) while others again focus on intellectual demands and cognitive activation linked to the different activities (IDAP-manual). All these manuals have been validated by the respective research groups. A pilot study testing out the possible fit for using the PLATO manual on Norwegian classrooms has already been undertaken (Carlsten, Grossman & Klette, forthcoming*). In addition, we will use items from the PISA Student Questionnaire to measure teacher practice in relation to stimulating reading engagement and supporting metacognitive reading strategies. Existing coding manuals developed within the PISA+ video study will be validated and compared with the above listed manuals.

The design of the LISA study is modelled on similar studies (UTQ study; MET study) conducted by educational research groups at the University of Michigan Ann Arbor and Stanford University. Close cooperation with these research groups is already established, and the proposed LISA study extends this collaboration further (see enclosed letter of confirmation from international partners). In addition to being a necessary step in our own study, our ambition is that the development and validation of coding schemes appropriate for a Norwegian context will be a significant contribution to the international discussion on measures of teaching quality.

Table 1 Coding manuals

Variable	Measure	Reference
Classroom environment/ Classroom interaction	The Classroom Assessment Scoring System for secondary settings (CLASS)	Hamre and Pienta (2001) University of Virginia
Classroom observation manual	Framework For Teaching (FFT)	C. Danielson (2009)
Mathematical quality of instruction	The Learning Mathematics for Teaching Project (MQI)	H. Hill (2011) University of Michigan
Observing language arts teaching	Stanford Protocol for Language Arts Teaching Observation (PLATO)	P. Grossman (2010) Stanford University
Intellectual demand on daily assignments	The Intellectual Demand Assignment Protocol (IDAP)	Little et al. (2009)
Motivation and reading strategies	The PISA Student Questionnaire items on teacher motivation and reading strategies	OECD (2009b)
Classroom instruction	PISA + coding manual for instruction	Klette et al., 2005 University of Oslo
Teachers' instructional activities in math/reading	PISA + coding manuals for instruction in math and reading	Odegaard et al., 2007, University of Oslo

Another ambition of the LISA study is to validate the coding manuals as tools for professional development and quality assurance within the area of reading instruction. Training facilities with teachers from the selected municipalities together with exchange seminars and workshops on how for example the PLATO manual could be used for professional development purposes will be arranged. The TeachingLearningVideolabOslo will be used to support professional capacity building providing online manuals, video-supported training facilities and interactive feedback linked to the use of the different manuals. The design of such a capacity building program with will be developed in close collaboration with the newly established PRoTed center of excellence in teacher education at our institution.

B. Analytical framework - Multi-level analysis

Effects of instructional practices will be investigated using multilevel regression models (see Goldstein, 2003), in which the administration of the 9th grade Norwegian National Test in mathematics and reading is used as the dependent variable, and 8th grade scores serving as an independent (control) variable alongside markers of specified instructional practices. Students will be treated as level-1 units and classrooms as level-2 units in the multilevel models, to account for the clustered nature of the data. The markers of instructional practices will be derived from analysis of video recordings taken during the students' 8th grade year and from analysis of the data collected

through the observation manuals, student questionnaires and assignment collections. The statistical analysis will be performed by members of the LISA-research team (Roe, Olsen, Bergem and Maul). These scholars all have extensive experience in analysing quantitative data from largescale educational studies (PISA, TIMSS, and National Tests).

2.3. Project plan, project management, organisation and cooperation

The proposed LISA study will begin in February 2013 and will run for a period of 4 years. The project comprises the following activities:

Table 2 Condensed Project plan

Time Line	Research Activities	Milestones	Responsible
2013	Feasibility study: Equipment - Video & Assignment data	Feb - April	Klette, Bergem & Roe
	Translate, adapt and test out coding manuals	Feb - June	LISA research group
	Plan data collection/ Sampling classrooms	By June	LISA research group
	Hiring Ph.D. Student/Post doc position	By Aug	LISA research group
	Start data collection: Classroom data, Grade 8	Aug – Dec	LISA research group
	Start data collection: Achievement data, Grade 8	Sept	LISA research group
	Workshops / training for coding procedures	Oct - Nov	LISA research group
	Coding data	Nov - Dec	LISA research group
2014	Data collection: Classroom data, Grade 8 continues	Jan - Sept	LISA research group
	Coding data	Jan – Dec	LISA research group
	Annual seminar & workshop with international partners	May	LISA research group
	Data collection, Achievement data, Grade 9	Sept	LISA research group
2015	Data analyses	Jan - Dec	LISA project group
	Annual seminar with int. partners and coop. teachers	May	LISA project group
2016	Data analyses	Jan - Nov	LISA project group
	International conference	May/June	LISA project group
	Final analyses/ final report	Dec	LISA project group

Project management / Project organization

The project involves the following scholars and expertise:

- Professor Kirsti Klette – Project leader, Expertise in classroom studies, studies of curriculum and instruction, and video research design, director of the research group SISCO, director of the TeachingLearningVideolabOslo
- Professor Astrid Roe – Expertise in reading instruction; psychometrics and statistics analyses and qualitative classrooms studies (interviews; curriculum resources); Project leader National Tests in reading
- Professor Rolf Vegar Olsen – psychometric expertise, math education expertise, current leader of EKVA
- Post doc. Ole K. Bergem – expertise in math instruction, psychometrics and video studies
- Post doc. Andrew Maul – psychometric expertise, University of Oslo/University of Berkeley (BEAR-center)
- Professor Frøydis Hertzberg – expertise writing skills - writing across the disciplines, and language art instruction

In sum, the proposed research group integrates scholars with complementary methodological skills, and with expertise in both generic and subject-specific instructional practices required for conducting comprehensive and advanced video studies in reading and mathematics.

International collaborators for the LISA study are:

- Prof. Brian Rowan, Michigan Ann Arbor University, leader of "Understanding Teaching Quality" (UTQ), co-leader of "Measures of Effective Teaching" (MET), expertise in nested research design for measuring teaching
- Prof. Pamela Grossman, Stanford University, expert in language art instruction and video analysis
- Assoc. Prof. Heather Hill, Harvard University, expert in mathematical knowledge for teaching; video analysis

Rowan will serve as an adviser throughout the various stages of the LISA-study. Grossman, Rowan and Hill will all participate as resource persons in targeted workshops and seminars. Our international partners have made considerable contributions in research issues addressed in LISA (Rowan et al., 2004; Grossman et al., 2010; Hill 2005) and we see it as especially compelling to connect our study to the ongoing UTQ and MET studies and thus represent a European counterpart.

Collaborating researcher partners, national network building and researcher training

On a national level we will collaborate with the VideoMath project at HiST and colleagues at the University of Stavanger (video design, teaching quality). The TeachingLearningVideolabOslo serves as a national hub and resource center for conducting video studies in Norway and the proposed LISA study will expand and strengthen our role as national authorities on video design.

LISA scholars hold a strong position in the National graduate school of education (NATED), where Klette is one of the leaders of the largest track on "Teaching and Learning in and out of schools" with 25 PhD students. SISCO hosts 15 of these national PhD students and have a strong record for systematic training (weekly PhD lunches, seminars etc). The PhD student will be enrolled in this systematic training environment and have a research period at Stanford University.

2.5. Budget

A detailed budget is included in the application form.

3 KEY PERSPECTIVES AND COMPLIANCE WITH STRATEGIC DOCUMENTS

3.1 Compliance with strategic documents.

The proposed LISA study meets the strategic objectives and plans laid down by the Norwegian research agenda for educational research (RCN, 2009; 2011; Evaluation of the Educational sciences in Norway, 2006) regarding substantial and methodological challenges faced by the educational disciplines. The LISA study works at the intersection of instructional formats and student achievement, and combines innovative developments in methodologies and theoretical perspectives in this area of educational research. The LISA project draws on acknowledged expertise at our faculty and supports prioritized areas of research for the next decade as identified at faculty level.

The generic spin-offs of LISA will strengthen our position as a national centre for studies of instruction, our role in the interfaculty research area Knowledge in Schools (KIS) at UiO, and our leading role in National Graduate School in Education (NATED). The LISA study will contribute to ongoing restructuring efforts within the teacher training program at our university, specifically the module "Classroom observation and Classroom learning" in the revised teacher training program.

It will also extend our bilateral cooperation with universities in the USA (Stanford, Harvard and University of Michigan) and with the ICCR at the University of Melbourne, Australia.

3.2 Relevance to society and gender perspectives.

There is, and probably will continue to be, a strong dispute about the goals of education in our country. But as several scholars have suggested, education reformers around the world have slowly come to agree that instruction is a key factor in improving student achievement (Timperley & Alton-Lee, 2008). The proposed research design will extend our knowledge about how different instructional regimes affect learning in particular curricular domains (e.g. reading and mathematics). To conclude, the proposed LISA project exploits the strength of multidisciplinary, collaborative approaches and methodologies and have the potential to make a valuable contribution to our knowledge about central issues related to improved student learning.

3.3 Ethical perspectives

The LISA study will pay attention to confidentiality, anonymity and security with regards to digital video data and serve as a test bed for a functional eInfrastructure for rich media data at UiO.

3.3 Gender issues

Gender issues, especially girls' low motivation for mathematics, and how girls outperform boys in reading, have considerable policy implications. Identifying classroom practices associated with high student achievement gains, and then target these practices in teacher education and professional development provides opportunities for improving the quality of instruction for all students.

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