

### Projekttitel (svenska)

Best practice? – En forskarskola om ämnesdidaktiska modeller i grundläroutbildningen (BEPPE)

### Projekttitel (engelska)

Best practice? – Researching subject didactic models in primary teacher education (BEPPE)

### Abstract (engelska)

This graduate school (BEPPE) enhances primary teacher education by addressing the relationship between subject teaching and students' learning outcomes, making it a more distinct content area in primary teacher education. Subject didactic models with different qualities – variation theory, inquiry-based learning, and the four resources model – are evaluated as elements in a possible repertoire of best practice. The aim is to develop a firm ground for subject-specific research at the primary level by comparing and evaluating these models. This will be accomplished through classroom studies, covering four subject domains—social studies, science, mathematics, and language—to address research questions about the qualities in primary school teaching.

The research environments at Karlstad University (KAU) and the University of Gothenburg (GU) have a strong record nationally and internationally in subject didactics. The PhD students will be admitted at GU or KAU but may be employed at any university nationally as teacher educators. Courses specifically developed for this theme will enhance direction and high-quality standards. BEPPE operates within and contributes to the development of subject matter education networks on both national and international levels. Students will attend conferences and undertake research visits to international research environments associated with the graduate school.

### Populärvetenskaplig beskrivning (svenska)

Trots att lärarutbildning sedan länge ges på universitetet så har inte kunskapen om samspelet mellan undervisning och lärande som behandlas i lärarutbildningen en tillfredsställande vetenskaplig grund. Forskningen på området är diversifierad, svår att överblicka och inte sällan motsägelsefull. Forskarskolan BEPPE avser att bidra till en stabilare vetenskaplig bas för grundlärostudenterna att utveckla sin kunskap om och förmåga att genomföra god ämnesundervisning. Forskarskolan tar sin utgångspunkt i tre vetenskapligt etablerade, men sinsemellan olika, ämnesdidaktiska modeller: variationsteori, inquiry-based learning samt the four resources model. Kunskap om ämnesdidaktiska modellers möjlighet till kvalitativ undervisning är av största vikt för grundläro (F-6). Behovet är stort av lärarutbildare som har kunskaper kring såväl specifika ämnesdidaktiska utmaningar som modeller för undervisningen i grundskolans tidigare del. Genom koordinerade didaktiska klassrumsstudier inom olika ämnesområden (SO, NO, Ma, Språk) kommer forskarskolan att bidra till att identifiera och beskriva kvaliteter för ämnesundervisning för att förbättra förutsättningar för elevers lärande. På detta sätt bidrar forskarskolan till vidare förståelse av vad som kan vara best practice för undervisning och hur det kan variera kontextuellt där ämnesinnehållets olika karaktär är en viktig faktor. Doktoranderna antas vid Göteborgs universitet (GU) eller Karlstads universitet (KAU), men kan vara anställda vid annat nationellt lärosäte som bedriver relevant lärarutbildning. Forskningsmiljöer vid GU och KAU har en stark ställning nationellt och internationellt på de relevanta områdena. Det betyder att också forskarskolan BEPPE bedrivs i ett internationellt sammanhang där doktoranderna ges möjlighet till internationella nätverk, konferenser och vistelser. Internationella forskare deltar aktivt i forskarskolans verksamhet som läsare och lärare på de olika kurserna.

### Tematisk klassificering

4.5 Ämnesdidaktik övriga/flera ämnen och allmän didaktik

### Klassificering enligt utbildningsnivå

Grundskola

---

### Forskningsprogram

Se nästa sida för bilaga.

## Best practice ?

### – Researching subject didactic models in primary teacher education (BEPPE) Research Programme

#### Objective

This graduate school - BEPPE - contributes to primary teacher education by addressing the relationship between subject teaching and student learning, making teaching a more distinct content in teacher education. A core perspective is that “students learn something, that they learn it for a reason, and that they learn it from someone” (Biesta, 2015, p. 76), most often a teacher. Becoming a good teacher is about developing knowledge about how to enhance students’ learning (Guskey, 2002). However, to achieve this, the knowledge base of future teachers needs to be developed. They need to establish a repertoire of action-oriented subject didactic models that constitute professional knowledge regarding the selection and transformation of subject matter (Wickman, 2018). In primary education, this is particularly complex because teachers must relate to various subjects and subject traditions, as well as teaching themes that cut across subjects. Primary education must also relate to external societal processes of change, including the emergence of generative AI, which challenges established teaching practices while simultaneously offering new opportunities.

This research school aims to contribute to teachers’ repertoires and explore how these can be built in teacher education by testing and evaluating three established subject didactic models — variation theory, inquiry-based learning, and the four resources model — within the complex educational context of primary school.

Subject didactic models display a tension between generalities and specificities. Although these models can be utilized across various subjects and content areas, the unique characteristics of each subject necessitate tailored approaches. For instance, inquiry-based learning manifests differently in chemistry compared to history. The challenge is to determine where the line is drawn between the general validity of the model and the need for it to be specific enough to avoid jeopardizing its power. BEPPE addresses this tension between the general and the specific. It constitutes the subject didactic research problem, which will frame the discussion on possible best practice in primary education.

BEPPE adheres to a three-faceted purpose. The *first facet* is to develop the object of subject specific teaching across the subject domains of mathematics, science, social science and language in primary school, articulating this core of the teacher profession further and alleviating a central aspect but weak link in primary teacher education. The *second facet* of the purpose is to systematically compare and evaluate the functions of these models and their impact on students’ learning outcomes across the four subject domains and in different educational contexts. The *third facet* concerns building the professional knowledge of student teachers, in-service teachers, and teacher educators, where subject didactic models constitute elements of better teaching practices as a path towards best practice.

The results generated in BEPPE will be relevant on two levels for teacher education, (1) in terms of in-depth professional knowledge of how teachers’ appropriate use of subject didactic models can benefit students’ learning outcome and be an expression of best practice, and (2) how the use and evaluation of subject didactic models can become a content in teacher education, building the student teachers teaching repertoire. BEPPE will also contribute to the integration of the scientific base with respect to teaching shared between different subject domains, still recognising the imperative of the specific *content* for teaching and learning in primary school. In this way will the findings of the graduate school serve teacher education both for direct application and for critical reflection on teaching practice.

BEPPE provides a highly relevant PhD education of strong international standing for teacher educators. This enables major contributions to the development of the field of didactic classroom studies and cross-fertilizing subject didactic specializations, with direct relevance to primary teacher education.

The overarching generative research question is: *What role can professional knowledge of subject didactic models, tested and evaluated in various teaching contexts, play in teacher*

*education and professional development in identifying pathways to best practices in primary education?*

This question has a diagnostic and comparative aspect within and across the different models, as well as a development aspect in which the models possibly constitute building blocks of a best practice. Both of these aspects, within and across models, will have a shared baseline of common measures of students' learning outcomes and different educational settings. This baseline will be established in connection with the start-up of the graduate school by the management team (applicants) in collaboration with participating international researchers and members of the graduate school's supervisory collective.

*Primary teacher education, subject didactics and classroom studies – a background*

Primary school is crucial for developing fundamental skills like literacy, numeracy, scientific inquiry, and understanding democratic practices and societal structures. Students should gain a foundational knowledge of mathematics, Swedish, English, social studies, and natural science. Teacher competence and how teaching is organized – regarding general as well as subject-specific concerns – is perhaps the most decisive factor in order to reach desired outcomes (cf. Hattie, 2003; Nordenbo et al., 2008). Historically, in primary teacher education, stemming from the older seminary tradition, subject breadth has been prioritised over subject depth (Furuhagen & Holmen, 2019). Today, however, subjects play a more prominent role in primary schools, and the requirements for teachers' subject didactic knowledge have intensified. Teacher education must respond to this change while also recognizing the importance of working across subjects to tackle current societal issues (Stolare, et al., 2022). Consequently, BEPPE aims to address the complexities of teaching practice in primary schools and teacher education (Primary Teacher Programme F-6).

Subject didactic models require further articulation and validation in educational research, teacher education, and primary schools in order to constitute best practice. Additionally, the models should be tested more extensively in Swedish contexts to identify their comparative strengths and weaknesses. The research school adopts a programmatic approach to move forward. This implies systematically, and simultaneously, taking a critical, pragmatic and constructive approach to a set of subject didactics models, and how they may be used in comparing and for generating best practices across several subject domains. The comparative approach in relation to the three models will have a shared baseline in assessment practices and tests of student learning outcomes (Gipps, 2012). The researchers involved in the research school are based in research environments where national and international tests and assessment materials are developed (language, mathematics, science and social sciences). Together they have considerable experiences of assessment practices, tests and different subject evaluations. This expertise will be drawn on to make use of appropriate assessment practices and measures.

The overall approach in BEPPE is explicitly subject didactic, in relation to different subject domains. Teaching and learning center around specific content, with its selection and transformation being a crucial didactic process (Gericke et al., 2018). We recognize the critique directed at the concept of best practice (Zembylas, 2023), which can also be associated with the subject didactic perspective. At the same time, research indicates that certain models and specific methods of utilizing them are more effective than others when it comes to enhancing students' learning outcomes (see descriptions of models). With this in mind, BEPPE will explore the foundations for establishing scientifically grounded best practices for teaching in primary school. This focus is crucial for advancing school development and enhancing teacher education. Through didactic classroom studies, the research school will critically examine and refine these processes in primary school and teacher education, following the arguments of Ball and Forzani (2009).

In close cooperation with teachers in primary school and student teachers, BEPPE will focus on investigating the teaching-learning relationship (cf. Nuthall, 2004; Svensson, 2016). In the practice-developing and teacher participation research, a significant challenge has been identifying clear descriptors of teaching practices pointing towards best practice. These descriptors need to be reliable, meaning they can be distinctly linked to specific examples of practice, while also being valid, ensuring they accurately represent different practices, espe-

cially regarding learning outcomes (Klette & Blikstad-Balas, 2018). This means that the descriptors need to be related to internal and external aspects that affect the planning and implementation of teaching. Examples of relevant aspects include the characteristics of the subject matter, existing teaching traditions, student composition in terms of intersectional dimensions, prior knowledge and patterns of teacher-student interaction. Additionally, the descriptors may encompass both qualitative aspects and quantifiable measures. Such descriptors must be open to both analytic and generative processes of teaching practice.

The research milieu behind BEPPE has extensive experience in design studies and practice-development projects. Within the framework of these have subject didactic instruments been developed to evaluate teachers' didactic actions and students' learning outcomes. BEPPE can be seen as part of the effort to develop method standards and enhanced scientific quality for didactic classroom research. Didactic classroom studies have large potential for developing school practices of teaching and learning as well as teacher education, which BEPPE aims to utilize (Osbeck et al., 2018). This is in line with international trends, in e.g. Asia, where classroom studies are common and schools and universities work in close collaboration (Pang et al., 2015).

### *Subject didactic models for teaching and learning*

The three subject didactic models highlighted in BEPPE have clear scientific grounds. The models emphasise quite different aspects of classroom events and highlight slightly different salient outcomes: the variation theory (content-oriented), inquiry-based learning (student and constructive orientation), and the four resources model (critical orientation). These serve as examples of subject didactic models. While other models exist, these three were selected because the research groups involved in BEPPE have substantial experience with them and that they can serve as a starting point for investigating what best practice constitutes from a subject didactic perspective. Below are short descriptions of the models.

#### Variation theory

Variation theory is a content-focused learning theory that provides explicit guidance for designing teaching aimed at a specific learning objective. It originated from phenomenographic research (Marton & Tsui, 2004) in response to essential conditions of qualitative learning as identified in phenomenographic studies (Marton, 2015). Combined with the systematic and action-oriented development process of learning study (Marton & Pang, 2006), variation theory has demonstrated large potential to detailed design of lessons in terms of how content is handled, and what may be learned as a result. The phenomenography and variation theory tradition thus offers a subject didactic model for developing subject-specific teaching and learning with a large degree of efficacy (e.g., Lo, 2012). It has been most frequently used in mathematics education, but there are also a number of examples from natural sciences, social sciences and language (Kullberg et al., 2024). Thus, variation theory can both be used as diagnostic tool in articulating how various aspects of the content are attended to in teaching, and as a generative theory for organizing teaching to enhance specific learning outcomes.

#### Inquiry-Based Learning (IBL)

Inquiry-based learning (IBL) has since the 1960's had a prominent position in the organisation of teaching in natural sciences (Kidman & Casinader, 2017). In recent decades, IBL has been transferred to subjects such as history and geography (Voet & De Wever, 2016; Roberts, 2014). In IBL students' doing and thinking are in the centre. The idea is that students should conquer knowledge through active thinking and take responsibility for their own learning. The link to the academic disciplines is emphasized (Lederman et al., 2014), introducing models for student work in terms of scientific working methods, asking questions, doing surveys and drawing conclusions. IBL thus both points to the selection of learning goals and ways in which teaching and learning is organised. The positive effect of IBL on student learning has been demonstrated (Barron & Darling Hammond, 2008) although IBL has also been questioned (Kirschner et al., 2006). Evaluation instruments significant for IBL include "The Views About Scientific Inquiry" (VASI) (Lederman et al., 2014) and assessments of how well

teaching aligns with IBL principles (Minner et al., 2010), along with various observation protocols like EQUIP, RTOP, and ISIOP. These tools allow for descriptive analysis of teaching, serving as a foundation for instructional improvement.

#### The Four Resources Model

The Four Resources Model (Freebody & Luke, 1999; 2003) was initially developed in the L1 context of Australia to understand language as a resource rather than as a set of rules (Halliday 1985) and has significantly influenced the design of literacy education worldwide. The model was created as a tool for interpreting curricula for teachers; therefore, it serves as an excellent resource for diagnosing and enhancing the quality of teaching, as well as for the teaching of literacy (Honan, 2003). This model summarises four practices that encompass and integrate a wide range of textual practices across various contexts needed in today's society. It can be utilised to visualise language practices in the development of literacy and includes cognitive aspects of language learning. The four-fielder comprises the following parts: (1) Code Breaking: decoding and encoding the codes, symbols, and conventions of literacy texts in response to contextual factors; (2) Meaning-making: understanding texts and being able to contribute to meaningful communication, and having "semantic competence"; (3) Text using: understanding the purpose of different texts; (4) Text critic: understanding how texts are constructed within social contexts. Given the importance of communication and text in all subjects in primary education, the Four Resources Model has much to offer across all subjects, and research on pupils' possibilities for critical language use in all subject areas is much needed. The Four Resources Model is therefore suitable as a holistic framework of best practice and a road map for teachers, teacher educators and researchers.

#### **Research environment**

The research environment features semi-integrated, subject-specific areas at Karlstad University (KAU) and the University of Gothenburg (GU). It fosters collaboration both within each university and between them for each subject specialisation. This environment has evolved over time through various collaborations, including the ongoing licentiate programme (VR 2018-04257). The breadth and strength of the combined environment are substantial, and they are very active internationally. At both universities, the subject-specific milieus collaborate in larger environments: [Research on Subject-specific Education](#) (ROSE), KAU and [Didactic Classroom Studies](#), GU. The milieus at both universities share a common speciality in practice-oriented subject-specific educational research (praktiknära forskning), which, for example, is evident in the large number of projects funded by Skolforskningsinstitutet or the trial with practice-based research (ULF project, <http://www.ulfavtal.se>). Based on these projects, a broad and solid repertoire of methods and theoretically grounded analytical frameworks has been developed (see below and applicants CV). The PhD students will be welcomed into vibrant and internationally active research milieus.

#### *Social Studies Education (SSE)*

Although Social Studies Education is often mentioned as one field, research related to the four school subjects differs significantly. A strength of the GU-KAU combination is that strong research in religion and civics education – more specifically in ethics and critical thinking – at GU is paired with experienced researchers in geography, history as well as civics at KAU. The milieus are currently collaborating on, for example, the Journal of Humanities and Social Science Education – Nordidactica, the current licentiate programme, and previously the graduate school CSD-FL 2012-2015 (KAU). In both milieus, the research focuses on teaching and learning in primary and lower-secondary classrooms. Several projects funded by VR, Skolforskningsinstitutet, and ULF are ongoing, where cutting-edge subject didactic research is elaborated, applied, and critically explored in collaboration with teachers. Some of these projects are inspired by inquiry-based learning (e.g., Att undervisa kring samhällsfrågor, Stolare et al. 2017-2022 Skolforskningsinstitutet; Enquiry i SO-undervisningen: frågedrivna och elevaktiva modeller, Nordgren et al. 2020-2023, Skolforskningsinstitutet). Others utilise quasi-experimental designs to test knowledge development over time with teaching interventions based on socio-cultural theory (Refining the ethical eye and ethical voice – The possi-

bilities and challenges of a fiction-based approach to ethics education, School Year 8: Skolforskningsinstitutet Osbeck et al., 2019-2022; School Year 5; ULF GU i.a. Osbeck 2019-2020, Lilja PI) or field experiment design to test variation theory-teaching as a tool for Civic education (Hur lära sig att tänka kritiskt i samhällskunskap?, Larsson, 2019-2023, Skolforskningsinstitutet; Att utveckla undervisning från årskurs 1 elevers uppfattningar om samhällsfunktioner., Andersson 2022-2025, Skolforskningsinstitutet). Other current themes concern the problematization of the relationship between academic disciplines, school subjects, and children's interests, drawing theoretically on discussions about "powerful knowledge" (Child and curriculum, i.a. Osbeck 2019-2024, VR). Current societal issues, such as diversity, are explored and elaborated on in projects (Att skapa vi:et i hembygden, Stolare, 2024-2026, Skolforskningsinstitutet) The two SSE milieus have been involved in both development work and critical research on assessment and national tests (KaU: Hi; GU: Re, Civics; e.g. What may be learnt in ethics? Varieties of conceptions of ethical competence to be taught in compulsory school, Osbeck et al., 2014-2018, VR; Krafffull kunskap i nationella prov i samhällsorienterande ämnen, Franck et al., 2025 – 2027.). The researchers hold central positions in national and international networks in their fields.

### *Mathematics education*

The Mathematics Education research milieus at GU and KAU have during the last fifteen years conducted research on mathematics teaching and learning in classrooms. Areas of interest are for example students' experience of particular topics in mathematics, of tasks and examples in teaching, communication in classrooms, problem solving, and prospective teachers' learning. The GU milieu has experience from diagnostic testing (TIMSS) conducted in collaboration with the Swedish national agency for education. Intervention studies (e.g., learning study) together with practitioners in schools and preschools have for a long time been used to promote student learning of specific topics in arithmetic, algebra, or geometry. Several larger projects, *FASETT - The ability to discern the first ten numbers as a necessary ground for arithmetic skills* (VR 2015-18, Björklund, i.a. Kullberg), *EXTENT- Seeing or counting? Students' counting strategies in addition and subtraction bridging through ten* (Skolforskningsinstitutet 2019-21, Kullberg), and *SATSA - Structural approach in teaching as foundation for sustainable arithmetic learning* (VR 2021-2024 Björklund, i.a. Kullberg) and *PROTEA - Prospective teachers learning of early arithmetic skills* (VR 2023-2026 Kullberg) are based on variation theory. Further, early years mathematics and teachers' professional development have been in focus (VR 2016-2019, Liljekvist, van Bommel, Olin-Scheller) as well as focus on platform pedagogy and mathematics in an ongoing project *Platform pedagogy* (VR 2019-2022 Nilsberth, Olin-Scheller, Liljekvist & Samuelsson).

### *Language education - Swedish, English, and Multi-literacy*

GU and KAU have interconnected milieus that promote the development of concrete examples to draw on for teaching in the subject Swedish. These involves research projects, a joint doctoral programme (*En ämnesdidaktisk forskarskola om hållbar utveckling och klassrumsundervisning i mellanårens svenska, samhällsorienterande och naturorienterande ämnen*, VR, 2019-2025), and publications – see projects like *Läsa mellan raderna* (VR, 2012-14, Olin-Scheller), *Quality in Literature Education* (Nordforsk, 2018-2024, Olin-Scheller and Randahl), and publications like *Läsning och demokrati (Utbildning och demokrati*, 2018:3, Lyngfelt and Olin-Scheller) and *Svenskämnets berättelser och berättelser om svenskämnet (Forskning om undervisning och lärande 2021:3*, Lyngfelt). Inquiry-based learning and interventions, are used in *Värmland (Re)-imagined* (Skolfi, 2025-2027, Olin-Scheller & Stolare), *Vart leder en bro av poesi?* (ULF, 2024-2026, Lyngfelt), *Läsa mellan raderna, Att skärpa den etiska blicken och rösten* (Skolfi, 2019-2023, Osbeck and Lyngfelt), and *Science and Literacy Teaching* (VR, 2015-2018, Hajer and Lyngfelt). Both milieus conduct research in multilingualism– see *Tellability* (VR, 2023-2025, Sandlund and Olin-Scheller), *Samverkan om nyanlända ungdomar med långsam progression* (ULF, Winlund, 2024-2026) and Rinnemaa's and Lyngfelt's research (2024) about multilingual students' reading, aiming at bridging cognitive and socio-cultural perspectives. By the Four Resources Model (Freebody & Luke, 1999; 2003) it is possible to discern and make use of ongoing research relevant for teacher education, in projects like *Kommer skrivande någonsin att bli detsamma? Om AI, skrivprocesser*

och skriftpraktiker i högstadiet (VR, 2023-2026, Lindgren and Sturk). Of interest is also research about what teachers consider to be 'best practice' in early literacy education (Utter and Lyngfelt). At both universities research on literacy development includes both reading and writing, and multimodal practices. Research environments serve as bases not only for research, but also for knowledge exchange with practitioners outside the universities: at KAU Centrum för språk- och litteraturredidaktik, and at GU Didaktiska klassrumsstudier and Fler-språkighet i utbildningssammanhang. At GU (Osbeck and Lyngfelt), the international co-operation within the network Ethics Education Research, Teacher Training and the Potential of Fiction Reading, is also important.

### *Science education*

The subject didactic research in science at GU and KAU have shared interests in how educational programs and school development can bring about changes in teaching and whether these affect pupils' learning. The collaboration between the milieus has a long history and has concerned doctoral programmes such as *Hasselbladstiftelsens forskarskola i molekylärvetenskapernas didaktik*. Another example of a joint research project is the international research project BIOHEAD, where teachers' attitudes to the environment were examined, which led to several joint publications (e.g. Nyberg et al. 2019). There is also a joint engagement in a collaborative STINT project with South Africa on issues of sustainability in relation to science and technology teacher education. The interest in classroom studies can be seen in both milieus. In the form of video-based studies, the relation between interactive teaching and learning is studied in a project (*Investigating interactive science education at the university level*, VR 2017-2020, Linder, i.a. Ingerman), where social semiotics (including multimodality) is used to describe the what of teaching and variation theory is used to describe the how. The effect of group discussion in science and mathematics teaching in primary school is studied in *GDNM* (Skolforskningsinstitutet, 2021-2023, Ingerman) making use of variation theory. Design based projects aiming at developing teaching practices of specific content knowledge in the classroom with teachers is another focus (FORMAS, 2024-2026, Lampert, i.a. Gericke). In the project *Developing Action Competence for Insect Preservation*, a teaching design in biodiversity education targeting insect decline was developed with lower secondary teachers and effects of the design on students' self-perceived action competence for insect preservation was assessed and evaluated using a scale developed in the project (EU, Excellent Science, Marie Skłodowska-Curie Actions, 2021-2023, Gericke). Several projects at KAU have worked with developing IBL.

### **Programme description**

BEPPE will facilitate teacher educators in gaining direct hands-on knowledge of scientifically based subject didactic models, along with the insight and ability to integrate them into the daily practice of teacher education, giving the direction towards best practice in primary education.

This will be achieved through a series of interconnected didactic classroom studies, taking a programmatic approach that encompasses all PhD projects. At the same time, BEPPE will promote the development of method standards for didactic classroom studies and create further conditions for a collaborative development of research and teacher education in establishing a community across different subject domains while also serving school development. The relevance for and integration into teacher education will be further enhanced by investigating teaching in schools where collaboration with the university is established. This includes collaborative school development focused on both teaching and student teacher practice ('övningskolor', training schools in VFU) as well as established collaboration in ongoing and prior research projects, such as those funded by Skolforskningsinstitutet and ULF.

### *Recruitment of PhD students*

The application process to BEPPE will be open and national, already active teacher educators will be encouraged to apply. After admission the graduate students will be employed at GU or KAU. In the recruitment process, scientific potential and quality will be given first priority, while distribution across subjects will also be given consideration. Ämnesdidaktik [[subject matter education](#)] with different specialisations will be available as PhD subject at GU. In

Karlstad, doctoral students can be admitted to PhD subjects with subject didactic specialisations. Educational work will be available at both [GU](#) and [KAU](#), making teacher educators with different backgrounds qualified to apply. The breadth of subject specialisations in BEPPE may also boost the number of potential applicants.

### *Research design*

When the PhD students have started, the supervisory collective will, together with the PhD student collective, develop a preliminary research design, that on the one hand allow collaboration on empirical data generation (underpinning cohesion, data quality and effectiveness in data collection) and on the other hand connect different individual projects to a whole that adds up to more than the individual parts. The preliminary plans will gradually develop into more stable plans when the empirical data collection phase is conducted. The research design will generally draw on both qualitative and quantitative research methods, but individual PhD projects will vary in their balance with respect to this.

### **Organisation**

BEPPE will be led by Stolare, who is well-experienced in leading and coordinating graduate schools. Kullberg will be the director of studies for the graduate school. This is important as the doctoral students are admitted to two universities. At the same time will BEPPE align with and utilize the formal organisations within each institution, for e.g. the practical organisation of courses, formalities of admittance, and various quality controls including study plans and regular follow-up. The senior researchers engaged in the school (applicants) will form a collective decision body for the major decisions, such as regarding admittance, level of coordination, and themes of major events in BEPPE. Together with other colleagues at the two milieus will the applicants constitute the collective of supervisors. A supervisory college (håndledarkollegium) is organized, meeting regularly to follow up and discuss the progress of the doctoral students' projects. Each doctoral student will work with colleagues and supervisors in two constellations, i.e. first one group that has the relevant experience when it comes to his/her specific subject domain, and second a constellation that has the relevant experience in relation to the subject didactic model that the doctoral student focus on. By organizing the students into cross-groups, based on subject and model, conditions are created for comparative designs. The plan is to form BEPPE as a research school with highly active supervisors/researchers who also draw on their own ongoing research as resources. This supports in-depth analyses of rich materials as well as high quality knowledge contributions.

### *Courses and the BEPPE-seminar & conference series*

Mandatory courses and joint seminars provide a common ground in BEPPE. Three profile courses that are closely connected to the three subject didactic models give a distinct focus to BEPPE. The course "*Developing professional knowledge*" frames best practice from a subject didactic perspective and highlights what a double-didactic approach (Ellebæk et al., 2022) can mean for teacher educators. "*Classroom studies and models for observations, evaluations, and development of teaching*" is a course that provides theoretical, methodological, and practical knowledge regarding the three models in BEPPE. The course "*Methods and theories for classroom practice and practice developing research*", focuses on intervention studies in classrooms. Methods and research designs concerning different types of classroom research, their historical background, and example of used theories are part of the course content (course developed in the joint licentiate programme, VR 2018-04257). Besides these three specific courses there are mandatory courses for BEPPE such as an introduction course, courses in [Subject matter education](#), [Educational work](#), [Qualitative](#) and [Quantitative](#) Research methods (see box B).

A BEPPE-seminar will serve as a central hub for the graduate school, with three seminars held each semester (face-to-face and online). The BEPPE-seminar series connects profile courses to general doctoral courses and fosters ongoing discussions about the graduate school's profile and the doctoral students' projects. Additionally, special BEPPE-conferences are arranged at the beginning, middle, and end. The school starts with an introductory conference focusing on ongoing relevant research at the two universities and international collaboration (the international advisors will participate in the conference).

**A. Profile courses (25 cred.)**

- Developing professional knowledge, 7,5 credits.
- Classroom studies and models for observations, evaluations and development of teaching, 10 credits.
- Methods and theories for classroom and practice developing research, 7,5 credits.

**B. Courses in Subject Matter Education (GU), PhD-subject with didactic specializations (KAU) and Educational work (GU & KAU)**

- Introduction course.
- Educational science research methods.
- Subject matter education course/ Educational work, Elective courses.

**C. Seminars & conferences**

- Joint seminars, organized all through BEPPE - exploring the graduate school's overall research question.
- Conference, introductory, mid and final. Joint attention to individual projects.

**Significance**

BEPPE has significance in that it attempts to establish a programmatic approach to the teaching of subject specific teaching by focusing on three subject didactic models, i.e. distinct ways of analysing and developing teaching across four subject domains, having a baseline for comparison in common measures of students' learning outcomes. The results and empirical data in BEPPE as a whole will be compiled into scientifically grounded and empirically exemplified 'packages' for best practice in relation to the subject didactic models investigated in BEPPE. This implies addressing practical, ethical and technical issues, having the structure and context of teacher education in mind. Something that will partially take the form of a collection of analysed video data that can be used in teacher education, with examples across the subject areas and models. Writing *an anthology* will be another important effort for furthering the research front, as well as for collating the insights jointly in a form that may be used in teacher education. PhD students, supervisors and international collaborators (see below) will be invited to contribute. The BEPPE end conference is planned to be open to primary teachers and teacher educators. Furthermore, the results from the graduate school will be disseminated through participatory contexts where subject didacticians, teacher educators, and teachers convene; one example is NCM (Nationellt centrum för matematikutbildning).

**National coordination**

Participating researchers at GU and KAU connected to each sub-milieu at each university function in BEPPE as supervisors with different capacities in terms of subject specialization. All participating researchers are experienced supervisors. Below follows a short overview: *Martin Stolare*, professor, social studies education, inquiry-based learning. *Angelika Kullberg*, professor, mathematics education, variation theory and learning studies. *Yvonne Lilljekvist*, professor, mathematics education, classroom studies. *Christina Osbeck*, professor, social studies education, classroom studies, classroom discourses and testing. *Christina Olin-Scheller*, professor, L1 education, multimodality, four resources model. *Anna Lyngfelt*, Professor, literacy education. *Åke Ingerman*, professor, science and technology education, phenomenography and variation theory, classroom studies.

**International and other national collaboration**

The research environments behind BEPPE have extensive relevant international networks. The programme will utilize them in various ways, and the doctoral students will be introduced as active network members. International research groups working with the three subject didactic models as well as with different subject specialization are well represented in the networks, and specific international expert advice will be sought for individual PhD projects when relevant. An international research group will be advisors in BEPPE and contribute throughout the programme: *Jennifer Alford*, associate professor, language education, Queensland University of Technology; *Arthur Chapman*, professor, history education, IBL, IOE, University College London; *Ute Harms*, professor, science/biology education, IPN, Kiel; *John Lee*, professor, Social studies, IBL, NC State University; *Angel Lin*, professor, language education and classroom research, Simon Fraser University; *Ida Mok*, associate professor, classroom research, mathematics education, Hong Kong University. *Kathleen Swan*, Professor, Social studies, IBL, University of Kentucky

Of particular relevance is the network [KOSS](#) (Kunskap och kvalitet i skolämnen och lärarutbildning). Through KOSS, KAU, and thus BEPPE, is connected to similar groups in England (SSRG, IOE, University College London) and Finland (HuSoEd, University of Helsinki). KOSS is financed by VR (UVK - 2018-03603) and draws from comparative approach attention towards concepts as powerful knowledge, epistemic quality and do so in relation to initial teacher training programmes in the three different countries. KOSS reflects very well the focus of BEPPE and its participants will be partners of the network.

The international advisors will take on concrete duties in BEPPE, as lecturers and teachers on courses (both in the courses on subject matter education and on the three subject didactic models). They will also function as readers of the doctoral students' texts at different stages, e.g. at the BEPPE conferences and at mid-seminars. By using internet-based communication applications (e.g. Zoom) on a regular basis in combination with face-to-face meetings the international advisors will be integrated into BEPPE activities. The international researchers and their research groups ensure the quality and international relevance of the research carried out by the doctoral students. As active members of the networks the doctoral students will not only take part in the activities of the network but also be expected to plan stays at one of the research milieus, hosted by one of the international researchers. During these stays the doctoral students will present manuscripts and take part in seminar discussions. This will support them to build their own international research networks.

## References

- Ball, D. & Forzani, F. (2009). The work of teaching and the challenge for teacher education. *Journal of teacher education*, 60, 497-511.
- Barron, B & Darlin-Hammond, L. (2008). *Teaching for a meaningful learning*. The George Lucas Educational Foundation.
- Biesta, G. (2015). What is education for? *European Journal of Education*, 50(1), 75-87.
- Burnard, P., Apelgren, B-M & Cabarolu, N. (Eds.) (2015). *Transformative Teacher Research*. Sense Publishers.
- Ellebæk, J. J., Dolin, J., & Daugbjerg, P. (2022). *Den dobbelte didaktiske dimension: i læreruddannelses naturfag*. NAFA.
- Ellis, V. (2007). Taking subject knowledge seriously. *The Curriculum Journal*, 18(4), 447-462.
- Freebody, P., & Luke, A. (1999) Further notes on the Four Resources Model. Reading Online. <http://www.readingonline.org/research/lukefreebody.html> [2016-10-16].
- Freebody, P. & Luke, A. (2003). Literacy as engaging with new forms of life. In G, Bull and M. Anstey (Eds). *The literacy lexicon*, (pp. 51-66). Pearson Education.
- Furuhagen, B., Holmén, J. & Sääntti, J. (2019). The ideal teacher. *History of Education*, 48(6), 784-805.
- Gericke, N., Hudson, B., Olin-Scheller, C., & Stolare, M. (2018). Powerful knowledge, transformations and the need for empirical studies across school subjects. *London Review of Education*, 16(3), 428-444.
- Gipps, C. (2012). *Beyond Testing: Towards a theory of educational assessment*. Routledge.
- Guskey, T. R. (2002). Professional development and teacher change. *Teacher and Teaching*, (3), 381-391.
- Halliday, M. (1985). *An introduction to functional grammar*. Edward Arnold.
- Hattie, J. (2003). *Teachers Make a Difference*. Paper presented at ACER, Melbourne Australia, 19–21 October, [http://research.acer.edu.au/research\\_conference\\_2003/4](http://research.acer.edu.au/research_conference_2003/4).
- Honan, E. (2003). Teachers as researchers. *ICET 2003 International Yearbook on teacher education*, 48th world assembly, pp.1-11, ICET, Melbourne.
- Ingerman, Å., & Wickman, P. O. (2015). Towards a teachers' professional discipline. In: *Transformative teacher research* (pp. 167-179). Brill.
- Kane, T. J. & Staiger, D.O. (2012). *Gathering feedback for teaching*. Research paper, MET Project, Bill & Melinda Gates Foundation.
- Kidman, G, & Casinader, N. (2017). *Inquiry-Based Teaching and Learning across Disciplines*. Palgrave Macmillan UK.
- Kirschner, P, Sweller, J. & Clark R. (2006). Why minimal guidance during instruction does not work. *Educational Psychologist*. 41(2), 75-86.

- Klette, K., & Blikstad-Balas, M. (2018). Observation manuals as lenses to classroom teaching. *European Educational Research Journal*, 17(1), 129-146.
- Kullberg, A., Ingerman, Å., & Marton, F. (2024). *Planning and analyzing teaching: Using the variation theory of learning* (p. 122). Taylor & Francis.
- Lederman, J. S., Lederman, N. G., Bartos, S. A., Bartels, S. L., Meyer, A. A., & Schwartz, R. (2014). Meaningful assessment of learners' understandings about scientific inquiry. *Journal of research in science teaching*, 51(1), 65-83.
- Lo, M.L. (2012). *Variation theory and the improvement of teaching and learning*. Acta Universitatis Gothoburgensis.
- Marton, F. (2015). *Necessary conditions of learning*. Routledge.
- Marton, F. & Pang, M. F. (2006). On some necessary conditions of learning. *The Journal of the Learning Sciences*, 15(2), 193-220.
- Marton, F. & Tsui, A. B. (2004) *Classroom discourse and the space of learning*. Routledge.
- Minner, D.D, Levy, A.J. & Century, J. (2010). Inquiry-Based Science Instruction. *Journal of research in Science Teaching*. 47(4), 474-496.
- Nordenbo, S. E., Søggaard Larsen, M., Tiftikçi, N., Wendt, R. E., & Østergaard, S. (2008). *Teacher Competences and Student Learning in Pre-school and School*. School of Education, University of Aarhus.
- Nuthall, G. (2004). Relating classroom teaching to student learning. *Harvard Educational Review*, 74(3), 273-306.
- Nyberg, E., Castéra, J., Mc Ewen, B., Gericke, N., & Clément, P. (2019). Teachers' and student teachers' attitudes towards nature and the environment. *Scandinavian Journal of Education*.
- Osbeck, C., Ingerman, Å. & Claesson, S. (Eds.) (2018). *Didactic classroom studies*. Nordic Academic Press.
- Pang, M. F., Marton, F., Cong, L. X., & Ki, W. W. (2015). Learning theory as a teaching resource. In *Transformative Teacher Research* (pp. 13-24). Brill.
- Roberts, M. (2014) Powerful knowledge and geographical education. *Curriculum Journal*, 25(2), 187-209.
- Shulman, L. (2015). PCK: Its genesis and exodus. In A. Berry, P. Friedrichsen & J. Loughran. *Re-examining pedagogical content knowledge in science education*. (pp. 3-13) Routledge.
- Sjöström, J. & Tyson, R. (2022). *Didaktik för lärande och bildning*. Stockholm: Liber.
- Stolare, M., Bladh, G., & Kristiansson, M. (2022). Supporting Teachers' Professional Development in Social Studies Education. In B. Hudson, N. Gericke, C. Olin-Scheller, & M. Stolare (Eds.) *International Perspectives on Knowledge and Quality* (pp. 185-204) Bloomsbury Press.
- Svensson, L. (2016). Towards an integration of research on teaching and learning. *Scandinavian Journal of Educational Research*, 60(3), 272-285.
- Voet, M., & De Wever, B. (2016) History teachers' conceptions of inquiry-based learning, beliefs about the nature of history, and their relation to the classroom context. *Teaching and Teacher Education*, 55, 57-67.
- Wickman, P. O. (2018). Didaktik och didaktiska modeller för undervisning i naturvetenskapliga ämnen. *NorDiNa*, 14(3), 239-249.
- Zembylas, M. (2023). Theorizing the affective regime of "best practice" in education policy. *European Educational Research Journal*, 22(2), 281-294.