
Appendix 1:

Design of effect study of continuing education for teachers: issues to be discussed in the dialogue with the tenderers

The principal assumes that the following issues will be discussed in the dialogue with the tenderers. The tenderers are also encouraged to discuss other issues if this is necessary to provide the principal with a good basis for making decisions regarding a possible effect evaluation.

1. OUTCOME VARIABLES/PERFORMANCE MEASUREMENTS

As the principal, the Ministry assumes that the goal for continuing education is to contribute to a better learning outcome for the students in primary and lower secondary school, alternatively also that teachers stay longer on the job as a consequence of access to continuing education. The tenderers may also suggest other relevant outcome variables/performance measurements.

Based on this, the tenderers must discuss to what extent the existing data sources regarding learning outcomes are sufficient to determine whether the continuing education does have an effect on the learning outcome for the students. There probably are many different issues which may be addressed within this field, but as a minimum the following issues should be discussed and clarified in the dialogue with the tenderers:

- National tests measure basic skills, while the overall achievement and examination marks measure the competence in school subjects. To what extent are national tests suitable as data sources for the project given that the continuing education is aimed at school subjects?
- The overall achievement and examination marks at the grade 10 level are based on a relatively rough scale, including at the individual level. To what extent are school mark statistics suitable for identifying any effects, especially if the effects are small?
- Overall achievement marks are decided locally and may thus be influenced by the participants in the continuing education. To what extent is it probable that this will have an impact on the calculation of any effects from participation in continuing education?
- Although the existing data sources are at an individual level, it is possible that the students have had teachers in the relevant school subject who have applied for

continuing education (and either participated in continuing education or not) as well as teachers who have not applied for continuing education. The tenderers should discuss to what extent it entails a methodical problem that the outcome variable/performance measurement may possibly be influenced by both groups of teachers, and how it is envisioned that this will be resolved in the design.

- The tenderers should discuss at what point in time the effect should be measured (grade level in the education programme) based on the access to existing data sources and the teachers' participation in continuing education. In connection with this, the tenderers should discuss short-term vs. long-term effects. The duration of the measurement period should also be discussed, including how long any control groups consisting of teachers who do not participate in continuing education must remain to allow the study to identify both short-term and long-term effects; i.e. for how long these teachers must be refused access to continuing education.
- The tender should include an account of how any register information on the teachers may be linked to the measurement of the effects.

On the basis of the discussion of these issues as well as any other issues the tenderers consider to be of relevance for the matter at hand, the tenderers should discuss whether it will be necessary with other data sources which may provide information on goal achievements, such as special-purpose student tests. If special-purpose tests or use of tests developed for other purposes are recommended, the discussion should include an evaluation of the expenses and practical challenges as well as any negative consequences associated with the implementation in the schools covered by the study.

2. EXPLANATORY VARIABLES/INTERVENTION

The Ministry assumes a relatively broad understanding of the intervention or explanatory variable, and it leaves it up to the tenderers to discuss how the measure should be delimited methodically in order to make it possible to evaluate the effects and for this evaluation to function as a basis for relevant analyses for formulation of policies.

Based on this, the tenderers should discuss which types of comparisons provide the most relevant knowledge for formulation of policies, and what will be the probable scope of the effects of the various delimitations based on existing research. Here is a non-exhaustive list of issues that can/ should be discussed:

- The tenderers should discuss how and to what extent the selected delimitation of the measure will establish a clear contrast to the current situation:
 - Is it most relevant to understand the measure as a pedagogical intervention which consists of specific continuing education elements, for example specific didactic skills or content in the school subjects?
 - Is it most relevant to understand the measure as a type of system intervention which is intended over time to change the teachers' formal subject-specific competence (number of credits or equivalent in the school subjects) which is achieved either through the basic studies or subsequent continuing education?

- If the measure is to be understood as a type of system intervention, the tenderers should discuss to what extent effects which are estimated based on participation in various continuing education provisions, will reflect an equivalent or comparable intervention; i.e. to what extent there is variation between the various continuing education provisions, whether this constitutes a problem for the estimation of effects and how this may be resolved in the design of the research. Many universities and colleges offer continuing education courses and each institution has several different options. Many of the courses have been available for a long time.
- Correspondingly, the tenderers should discuss how the implementation of the intervention may have an impact on the outcome variable, especially if it is assumed that the measure constitutes a system intervention. Transfer of effects to the students' learning outcome may be complicated and probably assumes a high intervention strength. This involves a long causal chain from the Ministry making resources available for continuing education to the students achieving a better learning outcome than they otherwise would have achieved. This includes elements such as whether the educational institutions increase their continuing education capacity, the courses are of high quality, the schools free up enough time and the teachers are able to gain new knowledge and integrate it into their own teaching practice. The tenderers must discuss to what extent the evaluation may or should generate knowledge regarding such process factors, including whether it is possible to produce effect estimates for participation in continuing education financed through a grant model and temporary replacement model.
- Regardless of scheme, the tenderers should estimate the effects for specific school subjects. Thus, the tenderers should discuss to what extent effect estimates can be established for all school subjects in the primary and lower secondary school based on the available choices and participation in continuing education. If it is necessary to prioritise between the school subjects, the principal requests that Mathematics and Science be prioritised highest followed by Norwegian and English.
- It is claimed in the research literature that the effect of subject-specific competence in terms of the learning outcome will decrease above a certain threshold. Thus, the tenderers should discuss how such a potential effect may be documented based on Norwegian data, and whether it is possible to estimate approximately what such a threshold value will be, for example based on the number of credits in school subjects, and whether it varies according to the grade level in the primary and lower secondary school; i.e. whether there is a difference between the primary level and the lower secondary level, for example.
- The tenderers should also address the consequences of losing participants in the group covered by the measure (that teachers do not finish the education)
- The tenderers should discuss the need for "stability in the background conditions", for example that teachers in control groups, or the other teachers at the schools that are part of either the experiment or control groups, are not offered any other relevant measures, such as continuing education financed by the school owner or privately. If

this constitutes a problem, the tenderers should discuss how this may be resolved, either in practical or methodical terms; cf. the section on the duration of the measurement of outcome variables.

3. METHODOICAL DESIGN

As the principal, the Ministry specifies that the methodical design must be able to identify causal effects at the highest possible evidence level, that the current target figure for participation in continuing education may not be reduced and that individual municipalities may not be forced to wait with competence enhancement measures due to the design of the research.

Based on this, the tenderers should discuss and propose a specific design which can identify the causal effect of the intervention (explanatory variable) on the students' learning outcome in a credible manner, as well as the teachers' tendency to stay on the job or other relevant outcome variables if relevant.

If the design of the research assumes a real randomisation of the group granted admission to continuing education courses, the tenderers should discuss the implications of this for the current system for allocation of study places. If the design is based on the premise of random granting (i.e. some type of lottery) of study places in case of a surplus of applicants, the tenderers must discuss and in a clear manner describe how the allocation of study places must be handled, how many more applicants than there is room for in each school subject is assumed in the design and the consequences for the evaluation if there is no surplus of applicants for continuing education in one or more years. The tenderers who assume a real randomisation must also discuss these issues:

- In the current system for allocation of study places in continuing education, the teachers must first apply to the school owner, the school owner must then approve a number of these applications before the Norwegian Directorate for Education and Training allocates the approved applicants among the existing study places based on a set of criteria, cf. enclosed background documents. The tenderers should discuss how to achieve best possible randomisation, and at what level the randomisation should/may be effected (teacher, school, municipal level).
- The tenderers should discuss whether randomisation will be required for all applicants or whether some type of sub-selection may be established while the rest of the applicants are offered continuing education in accordance with the current system for assignment of study places, for example whether randomisation may be carried out within a limited region/group of municipalities.
- The tenderers should discuss whether the allocation of study places may partly be based on criteria other than randomisation, for example by granting schools/teachers with certain attributes a higher probability of participation in the experiment group in connection with such randomisation.

The tenderers should discuss how large the experiment and control groups must be to allow identification of accurate causal effects, given that the effects as a minimum

must be estimated for specific school subjects, and whether this is realistic given the participation in the various continuing education courses.

The tenderers are encouraged to discuss any alternative methodical designs which do not assume real randomisation of the allocation of study places. If so, the tenderers should discuss to what extent such methodical designs may increase the risk of more inaccurate and uncertain effect estimates, and how this may be reduced in methodical terms or in some other manner.

4. ANALYSES

The tenderers must discuss and propose relevant effect size frameworks for interpretation of the effect estimates. It is important for the principal to gain an understanding of how substantially significant the effects which may be documented are in terms of the students' learning outcome and what constitutes a reasonable basis for comparison of effect sizes; i.e. the effect sizes of comparable measures.

The tenderers must also discuss whether and, if relevant, how effect estimates may constitute a basis for a cost-benefit analysis of investments in continuing education measures.

The tenderers should also discuss whether it is possible to analyse any ripple effects at the school level from participation in continuing education by individual teachers, for example the effects for students who do not participate in the study or other types of ripple effects.

5. COLLABORATION AND ORGANISATION

Collaboration with teachers, the schools' management, school owners and the parties involved (the Union of Education Norway, the Norwegian Association of Local and Regional Authorities, etc.) is essential for the work on evaluating the effects. The tenderers should discuss and propose solutions for how this collaboration should be organised to make sure the effect evaluation project can be carried out, especially as regards the establishment of control groups.