
Fostering personalized learning in primary schools through the use of learning analytics dashboards

A Data Management Plan created using DMPonline.be

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Project abstract:

Digital technologies can be used to achieve more adequate personalisation, but primary school teachers are often not guided and trained in the use of digital technologies and struggle to use the data these technologies offer. The proposed research project addresses this problem by investigating teachers' use of learning analytics dashboards. Learning analytics dashboards provide teachers with data about the learner and thus offer opportunities for teachers to further personalise the learning environment to the needs of the learner. However, whether these dashboards will lead to more personalisation in the classroom depends very much on teachers' competence, and more specifically on their dispositions and situation-specific skills to use these dashboards, as well as on their actual behaviour regarding personalised learning. The objectives of the project are twofold. First, I want to identify different facets of teachers' professional competence regarding the use of learning analytics dashboards by developing and validating assessment instruments. Second, I want to examine individual differences in teachers' professional competence in using dashboards. This research will allow to identify weaknesses and strengths in teachers' competence to use dashboards and will be informative to design future trainings to achieve more effective dashboard use in primary school teachers.

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GDPR

GDPR

Have you registered personal data processing activities for this project?

- Yes

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Application DMP

Questionnaire

Describe the datatypes (surveys, sequences, manuscripts, objects ...) the research will collect and/or generate and /or (re)use. (use up to 700 characters)

During the project, new data will be created by the researcher from first-hand sources. We will collect personal data of pre-service and in-service teachers. Through tests and questionnaires we will assess several components of teachers' professional competence. In addition, logdata derived from learning analytics dashboards (e.g. what the teacher clicks on the dashboard) will be stored and analysed as well as audio and video recording data comprising actions of teachers while using the dashboard. Also background information from the teacher (age, function, experience, gender, name), class (average SES) and school (type of school, number of children) will be collected. The name of the teacher will only be asked in case data from different sources needs to be combined (i.e. study 1C). The data collected during different studies will be linked in several composite files each line comprising the data of a teacher.

Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research? Motivate your answer. (use up to 700 characters)

During the project only the supervisors (Fien Depaepe, Bert Reynvoet) and postdoctoral researcher will have access to the data. We will pseudonymize each data file consisting of personal data. The file with the original personal data and the blinding key will be stored by the data manager of our research group. This is Marc Vlecken who will be responsible to preserve the data during the research. A total amount of 3GB is available for free on the server of KU Leuven, which should be sufficient for the present project. Data (raw and digitalized) will be preserved for min. 10 years by keeping relevant data on KU Leuven servers and in closed archives.

What's the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years? (max. 700 characters)

We will not deviate from the principle of preservation of data and of the minimum preservation term of 5 years.

Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (use up to 700 characters)

The required ethical approval of the ethics committee will be administered for all studies. The participants (student teachers and teachers) will receive the informed consent, so they can decide whether or not to participate in the project. The informed consents will be provided before the start of the study. The information consists of a description of the aims, methods, implications of the research, and any benefits, risks or discomfort that might be involved. They are also informed that all data will be analysed in an anonymous way.

Which other issues related to the data management are relevant to mention? (use up to 700 characters)

Informed consents, tests and questionnaires will be administered online as much as possible. Therefore we will make use of LimeSurvey which is specialized software that is supported by KU Leuven. In line with the guidelines from PPW and the recommended possibilities of the IT services of KU Leuven campus Kulak, we will choose for the most appropriate way to save the data. Only KU Leuven drives will be used to save data files. After the project, the pseudonymized data will be shared with research groups to which I am associated (CIP&T, Numerical Cognition Lab, itec). The developed questionnaires and tests will be shared to the scientific community via the Open Science Framework platform.

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FWO DMP (Flemish Standard DMP)

1. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

See attachment 1 (table with research data summary) and attachment 2 (visualizations of how the data will be analyzed) on DMP online.

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

NA

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- Yes, human subject data

Yes, human subject data will be collected. For each substudy within the project there will be an ethical approval code. We will add these to the DMP as soon as they are available.

Preparatory study: G-2021-3002 (v.3.6)

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- Yes

The following personal data will be collected:

- Personal data of adults: institution, teacher training year, gender, age (Pilot 1B, Study 1AB)
- Personal data of adults: log data, video data, name, school, age, gender, teaching experience (Study 1C)
- Personal data of minors: video data, school and class (Study 1C)
- Personal data of adults: school, age, gender, teaching experience (Study 2)

In the pseudomized data, each participant and school will receive an ID number and we will remove their names.

Because we collect data from minors, we will ask the parents/ guardians approval to participate throughout an active informed consent form. The child will give this document signed to his/her teacher who will hand it to the researcher before the experiment starts. The child will also have to give approval to participate throughout an informed consent form.

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, ...)? If so, please comment per dataset or data type where appropriate.

- No

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements/ research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

2. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g., in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).

Data files will be accompanied by a .csv or .txt file describing all the information that is required in order to be able to find and use the data (i.e., variable list, measurement units, conditions under which the data are collected, scale information, etc.).

The read.me file created per data file will include:

General information on project-level:

1. Title of the datasets
2. Contact information of the PI
3. Date of data collection
4. Geographic location of data collection
5. Keywords used to describe the data topic
6. Language information
7. Information about funding sources that supported the collection of the data
8. The detailed experimental protocol will be described in the scientific papers (or preprints) generated based on this project.
9. The ethical application will be saved as a PDF document and the approval code will be added to the project documentation. An empty informed consent form will be provided as a word file.

Information about the study:

1. Details about the interview guidelines, questionnaires and tests (number of items, theoretical background, references)
2. For qualitative data: documentation with meaning of codes, a list of documents with transcribed interviews per participants
3. For quantitative data: variables will be named with a logic name and labels will be assigned to each variable and to each value of the variable. We will include this information in the raw data set in the statistic software (SPSS)
4. A codebook will be created in word and saved in PDF with information about the variables.

Information on research data-level:

1. The data management plan will be provided as a pdf file.
2. The data preparation and statistical analyses will be documented in an annotated analysis code file (SPSS syntax and R code file). The version of the used software will be documented in the scientific paper.

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- No

There is no metadata standard in our field.

Project metadata of the numerical dataset in .csv or .txt will be created manually. For the three experiments, the metadata file will contain all information on the actual data to enable discoverability and reuse.

Controlled vocabulary (e.g., APA Thesaurus of Psychological Index Terms) will be used for the keywords.

3. Data storage & back-up during the research project

Where will the data be stored?

During the project all the digital data will be stored on the personal one drive of the principal investigator (Stefanie Vanbecelaere). Final datasets will also be shared with supervisors using a shared One Drive folder (Prof. Dr. Bert Reynvoet and Prof. Dr. Fien Depaepe) and the research managers (Ine Windey and Frederik Cornillie).

In case informed consents with personal data of the participants are collected physically, these will be stored in a locker in the principal investigators office. Only the two principal investigators have a key of this office.

How will the data be backed up?

Standard back-up provided by KU Leuven ICTS for my storage solution.

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely.

If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.

- Yes

Since the total amount of data to be stored is quite small, the available one drive has sufficient capacity.

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

Only the principal investigator (Stefanie Vanbecelaere) and their supervisors (Prof. Dr. Bert Reynvoet and Prof. Dr. Fien Depaepe) will have direct access to the collected data, since they will be stored in the shared folder on the one.drive.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

None.

4. Data preservation after the end of the research project

Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

All data will be preserved for 10 years according to KU Leuven RDM policy

Where will these data be archived (stored and curated for the long-term)?

Informed consent forms will be separately stored (during the research) and archived (after the research) in a locked room.

All the digital data will be stored in a folder in the shared J-drive. Before the projects ends, the supervisor and principal investigator will have a meeting, where they discuss how the data is structured within these folder.

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

There is no additional cost for data storage.

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in an Open Access repository

The datasets with pseudonomized data will be the open data.

If access is restricted, please specify who will be able to access the data and under what conditions.

The data is intended to be open access.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain in the comment section per dataset or data type where appropriate.

- No

Where will the data be made available? If already known, please provide a repository per dataset or data type.

- KU Leuven RDR (Research Data Repository)

Only the researchers working at the research centers to which the PI and collaborator belong can have access to the anonymized data upon publication of the project results and after the project.

Only the PI and collaborator have access to the pseudonymized data.

In case international researchers are willing to use the anonymized data we can provide access to this anonymized data set through Belnet file sender. The data will be saved in open formats (e.g., csv or txt) in view of fostering reuse on a longer term.

When will the data be made available?

- Upon publication of research results

The pseudonomized dataset used for particular publications will be made available to other researchers (cf. supra) upon publication of the research results. Furthermore, all pseudonomized datasets of the project will be made available through the protected university network system to other researchers immediately after the end of the project.

Which data usage licenses are you going to provide? If none, please explain why.

- CC-BY 4.0 (data)

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- Yes

Yes, a PID will be added upon deposit in a data repository

What are the expected costs for data sharing? How will these costs be covered?

None

6. Responsibilities

Who will manage data documentation and metadata during the research project?

The principal investigator (Stefanie Vanbecelaere) is responsible for the data management during the time of the postdoctoral research project. The supervisors and IT staff will support the principal investigators in this task. After the research project ends, preservation of data is the responsibility of the supervisors.

Who will manage data storage and backup during the research project?

The principal investigator (Stefanie Vanbecelaere) is responsible for the data management during the time of the postdoctoral research. The supervisors and IT staff will support the principal investigators in this task. After the research project ends, preservation of data is the responsibility of the supervisors.

Who will manage data preservation and sharing?

The principal investigator (Stefanie Vanbecelaere) is responsible for the data management during the time of their postdoctoral research. The supervisors and IT staff will support the principal investigators in this task. After the research project ends, preservation of data is the responsibility of the supervisors.

Who will update and implement this DMP?

The principal investigator (Stefanie Vanbecelaere) and the supervisors of the project (Fien Depaepe and Bert Reynvoet).

					Only for digital data	Only for digital data	Only for digital data	Only for physical data	
Work Package	Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume	How created
Throughout entire project: Literature review	Bibliographic references	Bibliographic references managed in Mendeley	New	Digital	NA	.pdf .docx	Estimated 1GB	X	
	Notes	Notes to bibliographic references managed in Mendeley	New	Digital	NA	.pdf .docx	<100MB	X	
WP1 Development and validation of instruments	Construct validity 1A	Questionnaire (digital quantitative ratings of experts and digital qualitative reviews of test items from experts)	<i>New</i>	<i>Digital</i>	Numerical data (ordinal data, each participant will rate all items), Textual data (review of each item)	.txt .csv	<100MB	X	Questionnaire completed by experts, SPSS datafile
	Content validity 1B	Questionnaire (digital quantitative ratings of experts and digital qualitative reviews of test items from experts)	<i>New</i>	<i>Digital</i>	Numerical data (ordinal data, each participant will rate all items), Textual data (review of each item)	.txt .csv	<100MB	X	Questionnaire completed by experts, SPSS datafile
	Pilot 1B	Questionnaire teachers situation-specific skills (<i>N</i> = 20)	<i>New</i>	<i>Digital</i>	Textual data (answer on three open questions) will be transformed to numerical data (scores determined based on rubric of two raters)	.txt .csv	<100MB	X	Questionnaire completed by teachers, SPSS file
	Study 1AB	Questionnaire and test data teachers (<i>N</i> = 400)	<i>New</i>	<i>Digital</i>	Numerical data (ordinal data, likert scale items SE and PV), Numerical data (binary data 0/1 for each item of data literacy test), Textual data (instrument SSS), Personal data (institution, teacher training year, gender, age)	.txt .csv	<100MB	X	
	Study 1AB_Statistical analyses	R-script and SPSS script with analyses	<i>New</i>	<i>Digital</i>	Numerical data	.R .sps	<100MB	X	
	Study 1C_questionnaire Teachers	Questionnaire data teachers (PLSI)	New	Digital	Numerical data	.csv	<100MB	X	Questionnaire completed by teachers
	Study1C_questionnaireStudents	Questionnaire data students (PLSI)	New	digital	Numerical data	.csv	<100MB	X	Questionnaire completed by students
	Study 1C_video	Raw video data	New	Digital	Audiovisual data (teacher-dashboard interaction and teacher-learner interaction)	.mp4	<100MB	X	Collected in primary education classrooms

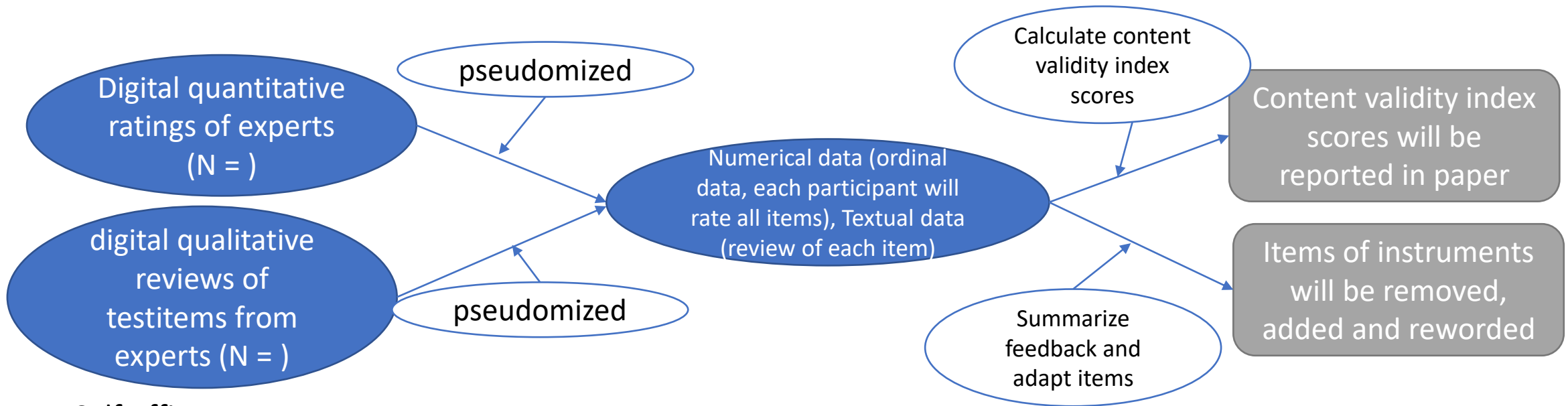
					Only for digital data	Only for digital data	Only for digital data	Only for physical data	
Work Package	Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume	How created
	Study 1C_logdata	Raw log data	New	Digital	Logdata (numerical)	.csv	<100MB	X	Logdata while using digital learning application and included teacher dashboard
	Study1C_aggregated data file	Combined data file of teacher questionnaire, video and log data	Reused	Digital	Numerical data	.sps	<100MB	X	
	Study1C_Statistical analyses	R-script and SPSS-script with analyses	New	Digital	Statistical data	.R .sps	<100MB	X	
WP2 Identify individual differences	Study 2	Combined data file of questionnaire and test data of teachers' dispositions, situation-specific skills and teaching behavior ($N = 120$)	New	Digital	Numerical data, textual data, personal data	.sps	<100MB	X	

Content validity 1A – development instruments to assess teachers' self-efficacy, perceived usefulness and data literacy skills

Raw data

Processed data

Analysed data



- Self-efficacy
- Perceived value
- Data literacy

Dataset content validity 1A

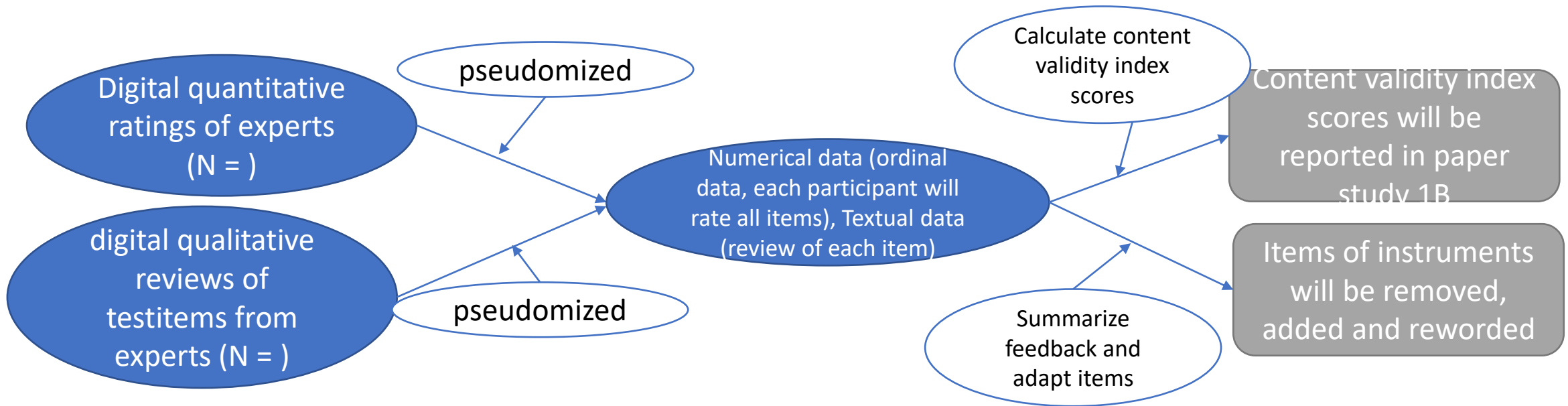
[illegible]

Content validity 1B- development instrument to assess teachers' situation-specific skills

Raw data

Processed data

Analysed data



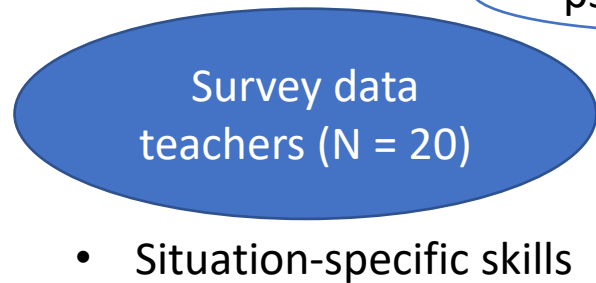
- Situation-specific skills

Dataset content validity of instrument 1B

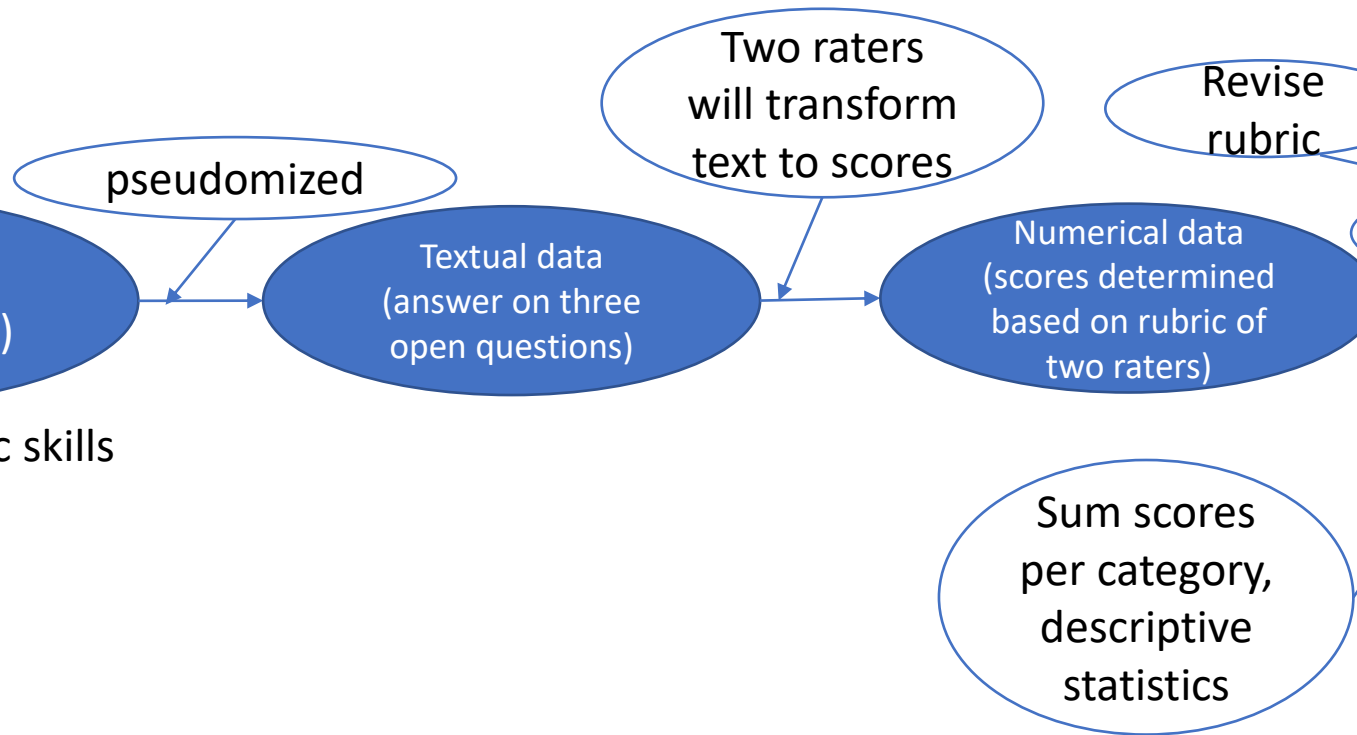
[illegible]

Pilot 1B- development instrument to assess teachers' situation-specific skills

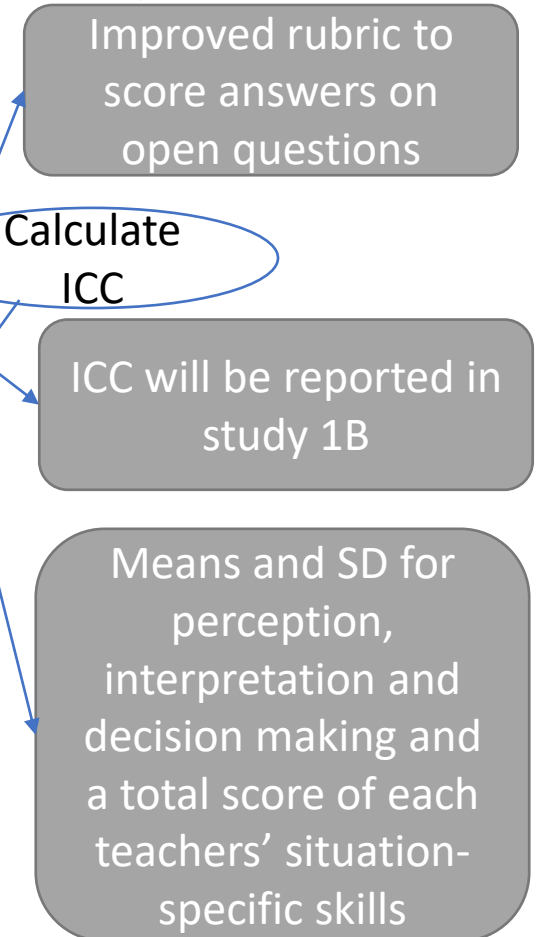
Raw data



Processed data



Analysed data



Dataset content validity 1B

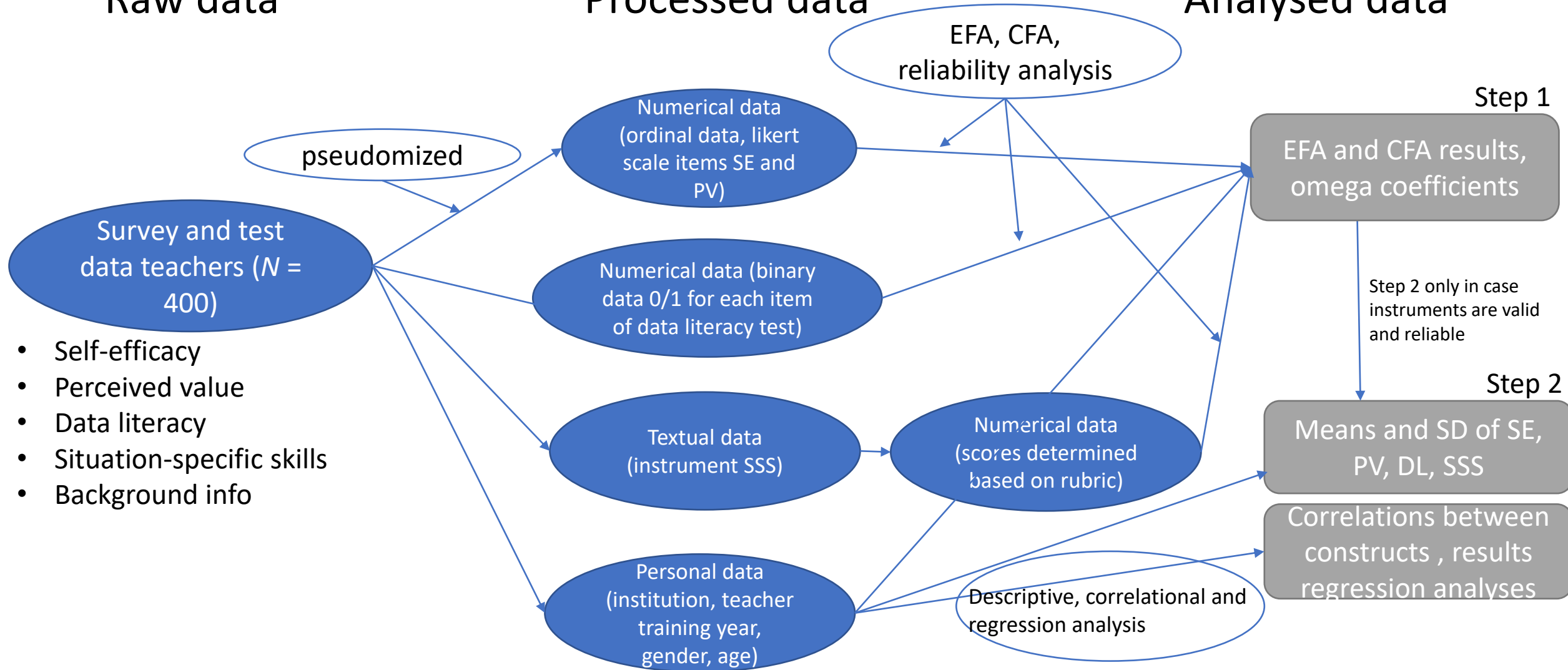
[illegible]

Study 1ab – Validation of instruments to assess teachers' dispositions and situation-specific skills

Raw data

Processed data

Analysed data



Dataset study 1AB

[illegible]