MaSDiV

Supporting Mathematics and Science Teachers in adressing Diversity and promoting fundamental Values

Development of the monitoring grid

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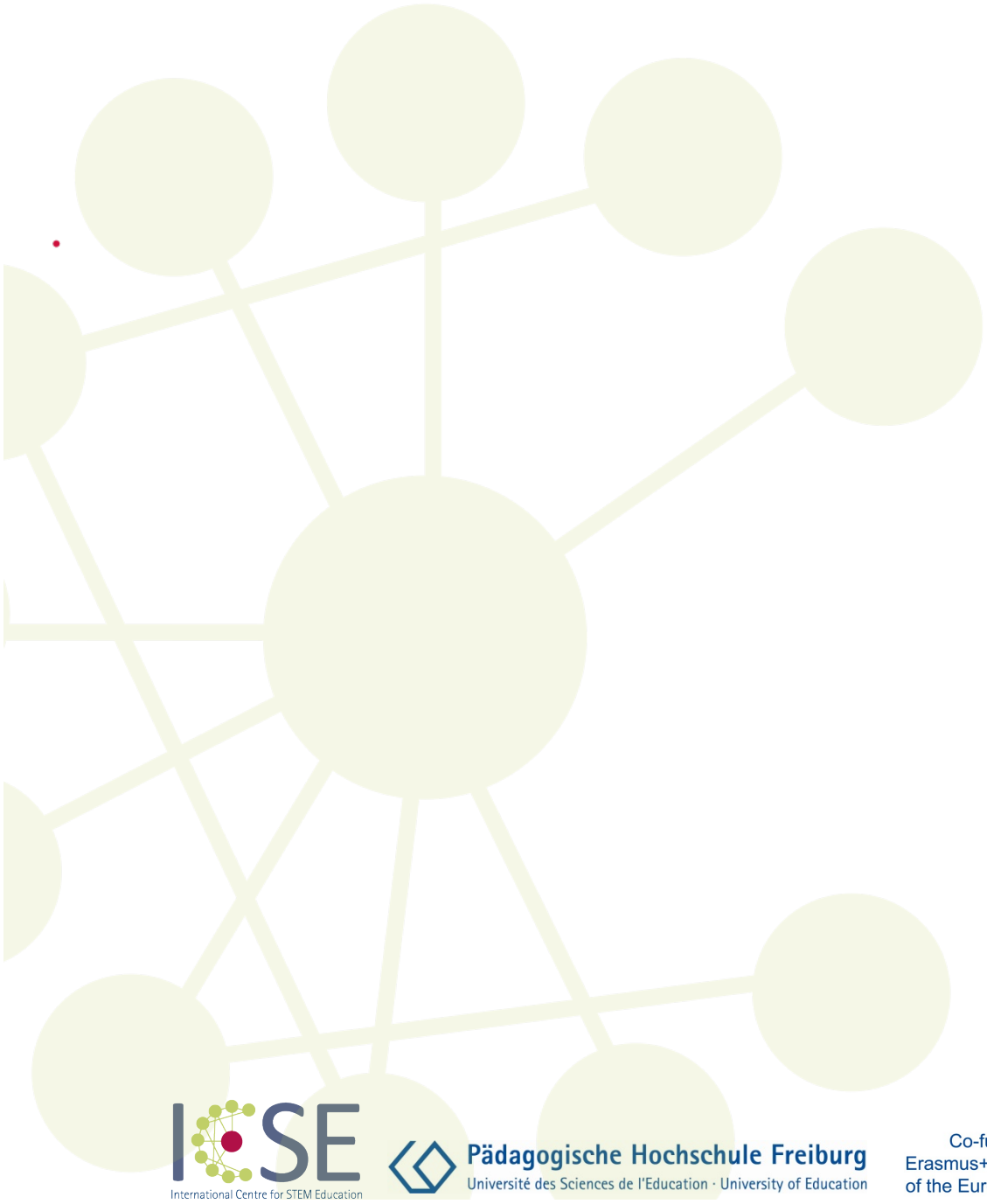

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Executive Summary

This document describes the development of the monitoring grid as an instrument for the quality control of the management and the activities conducted within the European project MasDiV.

The final goal of the MaSDiV project is to provide evidence to inform educational policies across Europe about effective teacher professional development concerning the delivery of high quality STEM education for all students (including those from minority or disadvantaged socio-cultural groups). A multi-method research design will be used to evaluate the impact of specific teacher professional development courses combining STEM education and the promotion of fundamental values in the different partner countries.

Within the MasDiV project, WP7 is responsible for developing a monitoring grid to facilitate an on-going evaluation of the project, along with the provision of constructive feedback for improvement in order to enhance the quality of the activities and products of the project.

This report describes the development of the evaluation instrument through five subsequent phases involving the participation of experts and key stakeholders. The five phases described are: 1) identification of key aspects for evaluation and quality indicators; 2) revision of the products of the first phase by experts and development of an initial comprehensive instrument for the monitoring grid; 3) piloting of the first version of the comprehensive instrument by key stakeholders and 4) revision of the comprehensive instrument based on the feedback received after the piloting process; 5) Development of complementary instruments for the monitoring the quality of meetings, the experimentation protocol, the field trials and dissemination activities within the project in collaboration with leaders of WP1, WP3, WP4 and WP6.

According to the specialised literature and the experience reported in this document, the use of a participatory approach involving experts and different stakeholders is recommended for quality assurance, as well as for the external validation of evaluation instruments, such as the one reported here as a 'monitoring grid' for quality assurance.

1. Main report

This section starts with a brief introduction to the content of this document and a short background in order to justify the purpose and utility of the deliverable being described. The introduction is followed by the description of the process used for the development of the monitoring grid as an evaluation instrument for the quality control of the MasDiV project.

1.1 Introduction: background and aims

MaSDiV is a high-level research and evaluation project involving 13 partner institutions arranged in university-ministry tandems collaborating for the improvement of STEM education. The main focus is on developing and evaluating the impact of teacher professional development courses for STEM teachers aimed at better equipping them to promote science and mathematics literacy for all students (including disadvantaged students from diverse cultural and social backgrounds) together with the learning of fundamental values in multicultural settings. The impact of TPD will be rigorously evaluated through a multimethod research design. In this policy experimentation measure (funded within Erasmus+ Key Action 3), the aim is to scale-up successful measures across Europe.

The MasDiv project is especially committed to quality through the definition of a specific working package (WP7) for quality assurance.

The main aim of WP7 is to support the quality of the management and activities conducted within the project through the definition of evaluation criteria and the development of instruments and

procedures to identify areas for improvement. The monitoring grid provides an instrument for such evaluation.

The concepts of quality and quality assurance have evolved over time (Elassy, 2015; Filippakou & Tapper, 2008) and different definitions have been provided. Quality as the conformance to standards, quality as fitness for purpose, quality as effectiveness in achieving institutional goals, quality as excellence in the provision of products and services and quality as meeting customers' stated needs are some of the most widely accepted definitions (Brink, 2010; El-Khawas, 2013; Elassy, 2015; Gibbs, 2011).

The International Project Management Association (IPMA) defines project management success as "the appreciation by the various interested parties of the project outcomes", the interested parties being "people or groups who are interested in the performance and/or success of the project, or who are constrained by the project" (IPMA, 2006).

The Project Management Institute (PMI) defines stakeholder "as an individual, group, or organization who may affect, be affected by, or perceived itself to be affected by a decision, activity or outcome of a project. Stakeholders may be actively involved in the project or have interests that may be positively or negatively affected by the performance or completion of the project" (PMI, 2013). ISO 21500:2012 suggests the relevance of a detailed analysis of stakeholders and their impact on the project.

Based on the previous considerations, key stakeholders have played a crucial role in the definition of quality criteria and in the validation of the monitoring grid as an instrument for formative evaluation. They will also be actively engaged in the continuous evaluation of the project and the provision of constructive feedback through the application of the instrument developed.

The following sections describe the process related to the participatory development of the monitoring grid. The process has encompassed four phases:

1. Identification of key aspects and their associated quality indicators for the evaluation of the activities conducted by any work package
2. Revision by experts of the initially proposed quality indicators and development of the first version of the monitoring grid, setting the structure of the instrument and the scale.
3. Piloting of the first version of the monitoring grid for its external validation.
4. Development of a revised version of the monitoring grid based on the feedback received from key stakeholders after the piloting process.

In the following sections more information about any of the developmental phases will be provided:

1.2 Phase 1: first definition of key aspects for evaluation and quality indicators

In this section we will start by providing a brief description of any of the MasDiV work packages followed by the identification of the key aspects for evaluation and the first definition of quality criteria suggested in collaboration with the work package leaders:

WP1 (Management)

This work package is responsible for the project management. The main objectives are to provide efficient and effective administration and project management to enable the project's goal to be met; to facilitate involvement of all partners and foster open, active dialogue among all partners and panels, supporting the development of effective meetings and to maintain the link to the European Commission.

Table 1: Key aspects to evaluate and quality indicators for WP1

Key aspects	Quality indicators
Efficient and effective administration and project management to meet project's goal Involvement of all partners, active dialogue among all partners and panels	• Development of a Consortium Agreement that clearly outlines duties and responsibilities, securing widest impact through open access foreground and open research data facilitation • Efficient meeting planning (also in cooperation with partners when meetings hosted by partners) • Strategic scheduling of the meetings (communicating with partners, keeping in mind upcoming tasks and different lines of actions, establishing collaborations between WPs) • Efficient communication and coordination with European Commission / Executive Agency, handling of all contractual matters / legal issues • Preparing technical reports based on reports by partners, giving feedback from perspective of contractual obligations and taking corrective actions if needed • Financial reporting and related payment of instalments according to schedule • Implementation of Strategic Leader Board and Governance Board • Facilitation of fluid communication among partners • Efficient communication between management and partners, providing information, templates etc.

WP2 Policy measure

This work package plans all details for measure implementation and develops the teacher Professional Development (PD) concept and needed PD toolkit for the course. After field trials, the PD toolkit will be optimised based on the evaluation to maximise systemic impact. Important deliverables and milestones are the development of the detailed concept of the PD course (deliverable, month 6), the finalisation of the PD toolkit for the trials (milestone, month 10) and the post-trials optimisation of the PD materials in order to support scalability (deliverable, month 33).

Table 2: Key aspects to evaluate and quality indicators for WP2

Key aspects	Quality indicators
Development of the PD concept Engagement of partners Adaptation to national contexts Dissemination of the PD concept	• Literature supports topics and ways of working in the modules • Examples (contexts) from each partner became part of the PD materials. • There is 'evidence' in every partner country that the MaSDIV teacher training approach is fitting in the national 'tradition' of teacher training • The PD concept has a high commitment among the partners • National agencies/partners are involved in disseminating the final (translated) PD materials

WP3 Experimentation protocol

The main objectives of this work package are to develop a data collection concept and ensure that all partners are committed to it; to develop the data collection instruments and to distribute a detailed experimentation protocol and guidelines on how to implement it.

Table 3: Key aspects to evaluate and quality indicators for WP3

Key aspects	Quality indicators
Questionnaire development Development of case study instruments Guidelines on how to implement protocol	• Smart aims (specific, measurable, achievable, relevant, time-based) of the PD/material/evaluation/project • Instruments, guidelines are accepted by the partners. • Partners are informed about the status of evaluation in a policy experimentation project.

WP4 Field trials

WP4 carries out the field trials in each country. This includes implementing the policy measure, data collection, and reporting on implementation. The important deliverable of this WP is an advertising text for the policy measure that includes an explanation about the experimentation.

Table 4: Key aspects to evaluate and quality indicators for WP4

Key aspects	Quality indicators
Standardized announcement to advertise PD course Field trials	• The announcement template is appropriate for the needs of the project and has the required criteria identified by partners. • The required number of participants has been reached. • Field trials are carried out according to the experimental protocol agreed by partners. • Data collection is carried out within the agreed timeframe. • Data collected is of high quality i.e. collected in a consistent, reliable and valid way. • PD course for control group is carried out. • Workshop on field trials supports exchange, discussion and reflection.

WP5 Evaluation

This work package is responsible for the evaluation of the collected data and the development of relevant conclusions.

Table 5: Key aspects to evaluate and quality indicators for WP5

Key aspects	Quality indicators
Data evaluation	• Numbers are reached by the partners • Results/Data are discussed with the partner • Final report

WP6 Dissemination, communication and systemic impact

This work package organises dissemination and scaling-up activities to ensure the exploitation of our foreground, sustainability of project outcomes and maximised impact of the tested measure. An important milestone is the first version of a European dissemination plan (month 6), which will guide our dissemination and communication activities and lead to best possible impact. Setting up the first version of the project website (month 6) is WP6's second milestone, while its third key milestone is project's final conference to ensure policy measure scale-up (month 33). The most important deliverable will be an exploitation and sustainability strategy plan (month 36) which will guide the

exploitation and sustainability activities and give recommendations on how to scale-up the measure in the partner countries and to other European nations beyond project end.

Table 6: Key aspects to evaluate and quality indicators for WP6

Key aspects	Quality indicators
Widespread dissemination and communication Exploitation and scaling-up within the partnership and beyond Sustainability	• Stakeholder Analysis is provided • Draft of European dissemination plan is provided • Dissemination form to evaluate dissemination means is provided • Dissemination, communication and exploitation workshops to refine related strategies • Setting up European project website, suitable presentation for target groups, template for national websites is provided • Final conference to ensure policy measure scale-up – including a policy seminar targeted to policy makers and stakeholders from educational authorities • Development of an efficient exploitation and sustainability strategy plan to guide activities and give recommendations on scaling up beyond project end
Partners' engagement in dissemination activities	• Partners set up national dissemination plans • Partners proactively carry out dissemination and scaling-up activities • Evaluation of activities using the dissemination form • Participation in dissemination, communication and exploitation workshops • Partners set up national websites • Active participation in the final conference • All partners contribute to the exploitation and sustainability strategy plan

WP7 Quality Assurance

This work package is responsible for the quality control of the management and activities conducted within the project.

Table 7: Key aspects to evaluate and quality indicators for WP7

Key aspects	Quality indicators
Monitoring Grid to evaluate the quality of the project management, activities and products Partners' engagement in quality assurance Communication among partners	• The evaluation grid is based on the quality criteria provided by key stakeholders. • The evaluation grid is piloted in order to ensure its validity • Partners show a high commitment to quality issues • Partners identify strengthens in the project processes and products • Partners identify weaknesses in the project processes and products • Partners provide constructive feedback • Partners suggest ways to improve • There is a fluid and efficient communication among partners

1.3 Phase 2: revision by experts and development of the first version of the monitoring grid

The main purpose of this phase is to engage experts in the revision of the quality indicators initially proposed by the different work packages. Additionally, the structure and the scale of the instrument had to be discussed with experts in order to develop the first version of the monitoring grid.

Three experts (two men and a woman) provided feedback on the way quality indicators were defined and expressed as well as the potential scale and structure of the evaluation instrument (monitoring grid). Two of them had extensive experience in teacher professional development in science and mathematics education and in research methodologies; the other expert was involved in international project management and in policy issues related to education and teacher professional development.

The experts' comments were taking into account for the development of the first version of the monitoring grid to be piloted by consortium members. Their feedback allowed the re-definition of some of the quality indicators and the introduction or elimination of a few of them. They also provided suggestions about how to collect information from partners and the scale used for evaluating to what extent any of the quality indicators are met.

1.4 Phase 3: piloting of the first version of the monitoring grid by key stakeholders

The involvement of consortium members, project managers and advisory experts in the piloting process is justified considering them as key stakeholders, since they will be deeply engaged in the project activities and affected by the project management.

Appendix 1 displays the instrument used for piloting the first version of the monitoring grid. 23 individuals from 8 different countries (Malta, Turkey, Norway, The Netherland, Germany, Check Republic, France, Austria) analysed and discussed the monitoring grid raising questions and providing feedback for improvement and validation. The feedback received came from 18 Masdiv partners, 3 advisors from the International Impact Board and one project manager of two related European projects (IncluSMe and STEM PD net). Some of the comments suggested the used of different terms to avoid ambiguity or lack of clarification, a more concrete formulation of some of the items and the elimination or replacement of some of them for new ones. The adjustment of the instrument to meet the requirements expressed in the piloting phase produced a new version externally validated by the stakeholders involved in the piloting phase.

1.5 Revision of the first version of the monitoring grid after the piloting process

The leader of WP7 and other UJA partner with experience in management and quality control issues analysed the feedback collected through the piloting phase in order to discuss how to build on it to produce a revised version of the monitoring grid. This phase involved an iterative process that doubly checked the instrument according to the feedback received. Special attention was paid to themes repeated or issues mentioned by more than one stakeholder. As a result, a new revised version of the monitoring grid was produced. This revised version is included in appendix 2.

The instrument allows partners to evaluate to what extent the quality indicators defined for any of the work package has been met according to the activities and the products developed within the project. Parallel to a quantitative evaluation on a 4-point scale, there is room for providing explanations of the mark and feedback about how to improve in relation to any of the particular items or quality indicators being used. Additionally, evaluators can decide whether they do not have enough information or evidence to make a judgement or whether a particular item is not applicable at the stage when the evaluation is being made.

1.6 Development of complementary instruments for the monitoring of management, the experimentation protocol, the field trials and the dissemination actions

A questionnaire for the evaluation of partners' expectations and satisfaction with meetings and management has been proposed in agreement with WP1 and was applied for the evaluation of consortium meeting 2 (October 2017). This instrument is included as part of D7.1 in annex 3.

Additionally an according to the project description, in order to ensure a thorough implementation of field trials, which allow for reliable results and valid conclusions, an instrument for the monitoring grid in cooperation with WP3 (Experimentation protocol) should be developed. The instrument used for this purpose is shown in Annex 3 and was first implemented in the second consortium meeting in Utrecht (October, 2017) in order to gather information about how any partner institution was planning to conduct the experimentation protocol.

Other two complementary instruments have been developed in collaboration with the respective WP leaders in order to monitor the field trips (WP4) and the dissemination actions conducted by partners (WP6). Those instruments are included in Annex 3.

2. Conclusions

The development of a comprehensive evaluation instrument for the continuous monitoring of the MasDiV project has entailed a complex process were different experts and key stakeholders have taken part in four subsequent phases: 1) identification of key aspects for evaluation and quality indicators; 2) revision of the products of the first phase by experts and development of an initial instrument; 3) piloting of the first version by key stakeholders and 4) revision of the initial instrument based on the feedback received after the piloting process.

As a consequence, the definitions of quality indicators and the structure and the scale used to evaluate the project have significantly evolved to ensure a common interpretation and understanding of criteria and the validation of a comprehensive evaluation instrument for quality assurance.

The information gathered through the previously mentioned comprehensive instrument will be triangulated with data offered by four other complementary instruments intended at monitoring the quality of other key project activities: meetings, experimentations protocols, field trials and dissemination actions. Those latter instruments have been proposed in collaboration with leaders of the WP responsible for those actions (WP1, WP3, WP4 and WP6).

The collection of instruments developed as a monitoring grid offers interesting tools for the continuous evaluation of the project. This evaluation will allow the identification of strong and weak points, will provide the basis for constructive feedback and as a result will guide improvement and enhance the quality of the activities conducted within the project.

3. Recommendations

According to the specialised literature referred to in the introductory section and the experience reported in this document, the use of a participatory approach involving experts and different stakeholders is recommended for quality assurance, as well as for the external validation of evaluation instruments, such as the one reported here as 'monitoring grid'.

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