



Section
Education & Training

Error Management and No Blame Culture
Working Group Charter Version 1.0

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Working Group Charter

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1. Motivation & Objectives

Errors are a natural phenomenon and occur as frequently in science as they do in other areas of society. In fact, errors are the logical precondition for learning.¹ Yet, feedback from the scientific community shows that scientists have an inhibition regarding the publication of potentially imperfect data. They fear that errors in their data or their scientific work could be discovered through the publication of their data. This would, many fear, be counterproductive to their careers as a result of the “publish or perish” culture.² The challenge of addressing errors is not something that is unique to science. For example, in industry and medicine, so-called “no-blame cultures” have already been implemented in some cases. These areas of work, where errors can have serious consequences, are considered high-risk organisations (HRO)³, namely hospitals, airlines, nuclear power plants. Almost perfect results or almost no errors are expected.⁴ In the context of HROs, the absence of an appropriate error culture can lead to catastrophic consequences. For example, a medical practitioner could have accidentally forgotten to administer a patient’s medication – rather than reporting this to their superior, they hope nobody notices but in the meantime the patient may suffer harm.

If errors are found, blame often ensues. Blame was also found to affect individuals with varying levels of professional experience, e.g. in the medical field, from students to experienced nurses and physicians.⁵ The way criticism is expressed also contributes to this, leading to a defensive and authoritarian culture.⁵ All of which is not conducive to creating an environment that enables organisational learning and improvement.

Therefore, a ‘no blame’ approach to error management and reporting was introduced, enabling teams to improve processes and procedures within the organisation^{6,7}. Error reporting that is deeply rooted in an organisation’s culture^{4,8} provides an environment that enables teams to report potential errors without worry, repercussion and criticism. Teams feel safe without fear of blame, criticism and loss of professional reputation⁹. In a scientific context, the

¹ Metcalfe, J. (2017). Learning from Errors. *Annual Review of Psychology* <https://doi.org/10.1146/annurev-psych-010416-044022>

² Ute Zauf, (2012) <https://www.zeit.de/studium/hochschule/2012-02/publikationen-seminare>

³ Roberts, K.H. (1990). Some Characteristics of one type of high-reliability organizations. *Organization Science*, 1: 160–176 <https://doi.org/10.1287/orsc.1.2.160>

⁴ Wieck, K.E., & Roberts, K.H. (1993). Collective mind in organizations: heedful interrelating on flight decks. *Administrative Science Quarterly*, 38: 357–381 <https://doi.org/10.2307/2393372>

⁵ Ostroff, C., Kinicki, A., & Muhammad, R. (2013). Organizational culture and climate. In Weiner, I.B., Schmitt, N-W. & Highhouse, S., (eds) handbook of Psychology, Hoboken, New Jersey, USA: JohnWiley & Sons Inc. pp. 643–676 <https://doi.org/10.1002/9781118133880.hop212024>

⁶ Provera, B., Montefusco, A., & Canato, A. (2010). A ‘No Blame’ Approach to organizational learning. *British Journal of Management*. <https://doi.org/10.1111/j.1467-8551.2008.00599.x>

⁷ Koolwijk, J.S.J., van Oel, C.J. & Gaviria Moreno, J.C. (2020). No-Blame Culture and the effectiveness of project-based design teams in the construction industry: the mediating role of teamwork. *Journal of Management in Engineering*, 36(4), 04020033. <https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29ME.1943-5479.0000796>

⁸ Gorini, A., Miglioretti, M. & Pravettoni, G. (2012). A new perspective on blame culture: an experimental study. *Journal of Evaluation in Clinical Practice*, 18: 671–675. <https://doi.org/10.1111/j.1365-2753.2012.01831.x>

⁹ Waring, J.J. (2005) Beyond blame: cultural barriers to medical incident reporting. *Social Science and Medicine*, 60: 1927–1935 <https://doi.org/10.1016/j.socscimed.2004.08.055>

implementation of an appropriate error culture would have many benefits, for example to name a few:

- More raw data would be published thus enabling more reuse of data
- Resources could be saved (e.g. a researcher realizes he made a mistake but in the meantime other researchers are carrying out research based on his work. Rather informing everyone immediately the researcher keeps it quiet and the other researchers spend months of research resources until they for themselves find out the previous research contained a mistake).
- Open Science will become more common practice

Unfortunately, there is a lack of information with respect to error cultures in the non-HROs. There is a need to understand the concrete impact of mistakes on researchers and the organisational culture in science and importantly, the precise impact of a “publish or perish”-based funding and reward system on the scientific process needs to be addressed. From this, developing criteria and standards to assess errors and error culture in groups would be important to generate awareness on improving our approach to errors. Furthermore the community needs to be provided with the tools, training and guidance as to how to implement an appropriate error culture in their respective working environments.

2. Work Plan

First of all, a working group consisting of representatives of the consortia should be established to appropriately address the issue and to cooperate with the relevant external experts. The work package would be implemented in 4 phases:

- **Phase 1: Intra-NFDI coordination**

The work will begin with open discussions across the NFDI-consortia on the different states with respect to the implementation (or lack thereof) of error cultures across scientific domains and their various effects on the scientific work being carried out (such as reluctance to publish data). Following this; potential external collaborators will be identified who may have previously been involved with the subject matter. During an NFDI-round table the consortia and external participants (e.g. from industry) will openly share experience, findings and if applicable, existing implementations of error cultures in their respective backgrounds. Following the round table, the working group will make the appropriate adjustments to the initial work plan laid out hereafter which will in turn be disseminated via a second version of this working group charter.

- **Phase 2: Additional data collection**

Surveys and interviews with selected target groups will be carried out to verify the known root-causes (e.g. “publish or perish culture) and to explore other contributing factors. We plan to collaborate with experts from the fields of psychology and sociology, especially with respect to designing the surveys and interviews to ensure the evaluation of these can lead to statistically relevant results. .

- **Phase 3: Evaluation of the results**

The survey and interview results will be carefully evaluated, the appropriate conclusions drawn and recommendations formulated, all of which will be disseminated e.g. in the form of publications/white papers.

- **Phase 4: Community outreach**

Targeted sensitisation for the topic & recommendations for action will be achieved in the community at (inter)national conferences (also with "best-practice"examples of the implementation of error cultures in a scientific context.).

We will cooperate with important organisations to establish the recommendations for action as standards (e.g. inclusion in the Code for Good Research Practice). In addition to whitepapers on the matter, we will develop and provide training materials, workshops and consulting to help support the implementation of an effective error culture in the respective working groups.

#	Milestone	Approx. timeline
1	Formation of working group	Q2 2022
2	Organisation and holding of NFDI-round table	Q3 2022
3	Version 2.0 of Working group charter	Q3 2022
4	Design of surveys and interview questions	Q1 2023
5	Evaluation of results	Q3 2023
6	Development of recommendations for action	Q3 2023
7	Dissemination results and recommendations	Q1 2024
8	Community outreach	Q1 2024
9	Development of training materials	Q1 2024

4. Initial Membership List

(At least 6 members from different institutions and at least 6 consortia)

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5. Collaboration Plan

- Exchange with NFDI consortia represented in the working group
 - DataPlant
 - DAPHNE
 - KonsortSWD
 - MaRDI
 - NFDI4Chem
 - NFDI4Culture
 - NFDI4Matwerk
 - PUNCH4NFDI
- Exchange with NFDI consortia not represented in the working group as well as working groups of other NFDI sections
- collaboration with
 - DINI/Nestor

- RDA
- DFG
- Collaboration partners from the private sector (e.g. industry)
- Publishers and journals
- Learned societies