

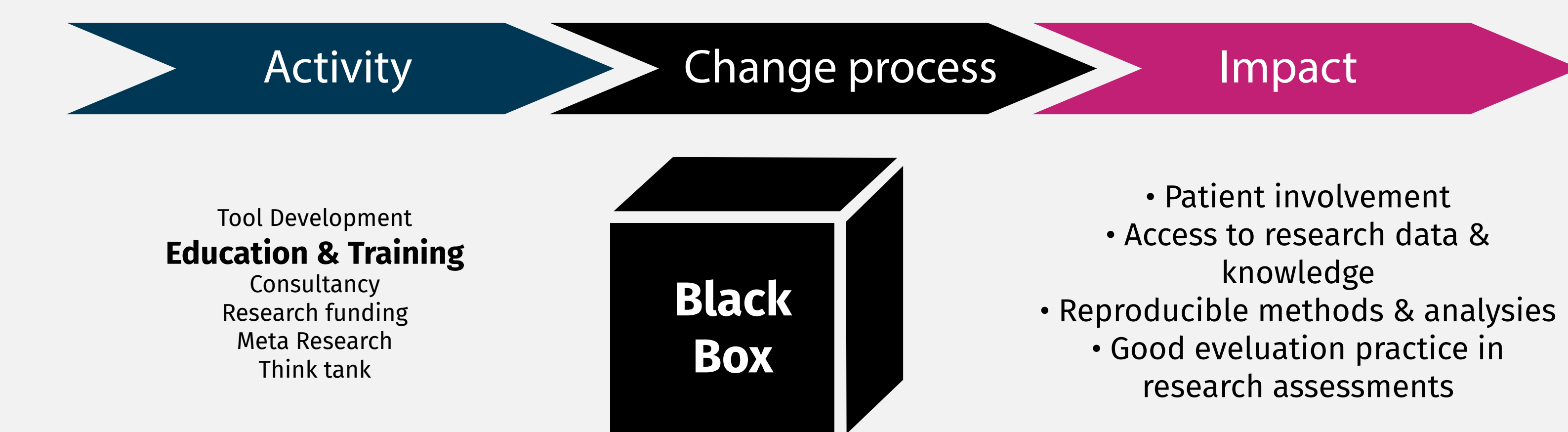
Opening the BLACK BOX: The three stages of translating education into responsible research practices

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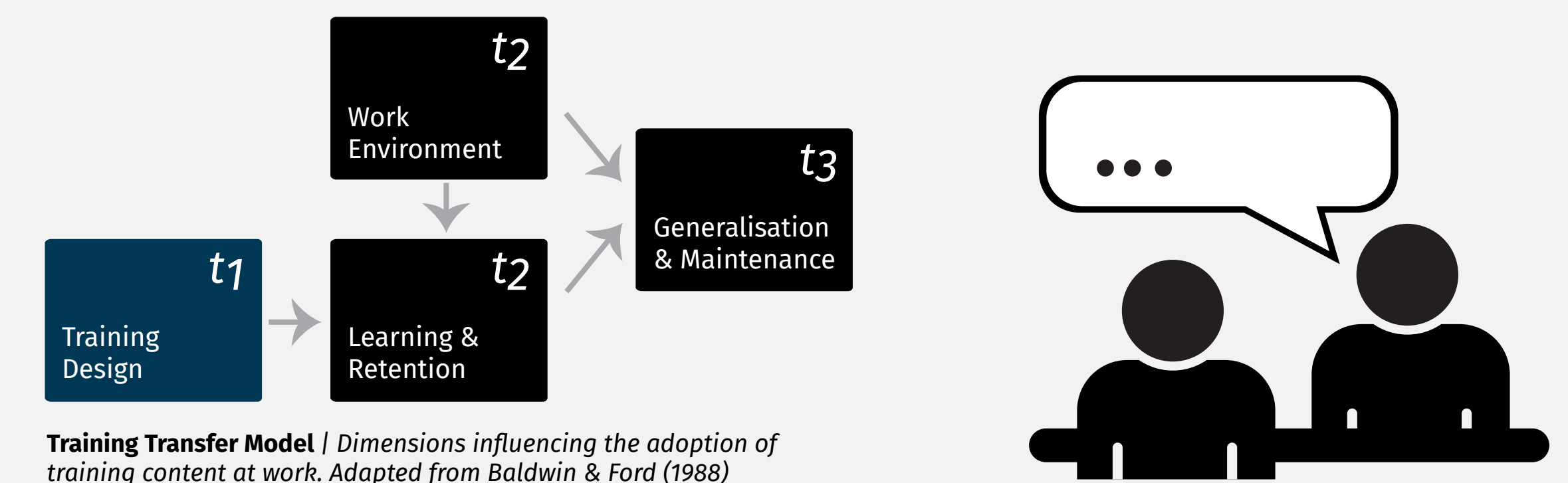
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Introduction



BIH QUEST Center conducts *Open and Responsible Research & Innovation (ORRI)* interventions at Charité/BIH, focusing on robust and reproducible research practices in experimental biomedicine. Implementing ORRI practices constitutes a complex transformation of contemporary scientific knowledge production, whereby the social mechanisms driving this transformation are hidden in a 'black box'. | **Evaluation of ORRI training** | For several decades, professional education has been challenged by a 'transfer problem', i.e. large expenditures on job-related training do not lead to the intended organisational outcomes. As part of the impact-oriented *Monitoring & Evaluation System COMPASS*, the project's objective is to examine the organisational transfer conditions for ORRI training at Charité/BIH. QUEST training, which addresses more than 5000 researchers at Charité – Universitätsmedizin Berlin, one of the largest university hospitals in Europe, aims to facilitate reproducible research practice in experimental biomedicine.

Theory frame & Methodology



A mixed-methods approach combining quantitative and qualitative research strategies was based on the training transfer model introduced by Baldwin & Ford (1988). A standardised 3-stage survey adapted from Kauffeld et al. (2008) and Sandmeier et al. (2022) has been distributed regularly to participants of QUEST education and training activities since 10/2021. In addition, seven interviews were conducted with eleven Berlin/Oxford Summer School participants between 09-11/2021. Transcripts were analysed through qualitative text analysis, with two researchers coding the data. Codes were triangulated and merged into an inductive-deductive category system, based on which implications were found to answer the research question.

Results

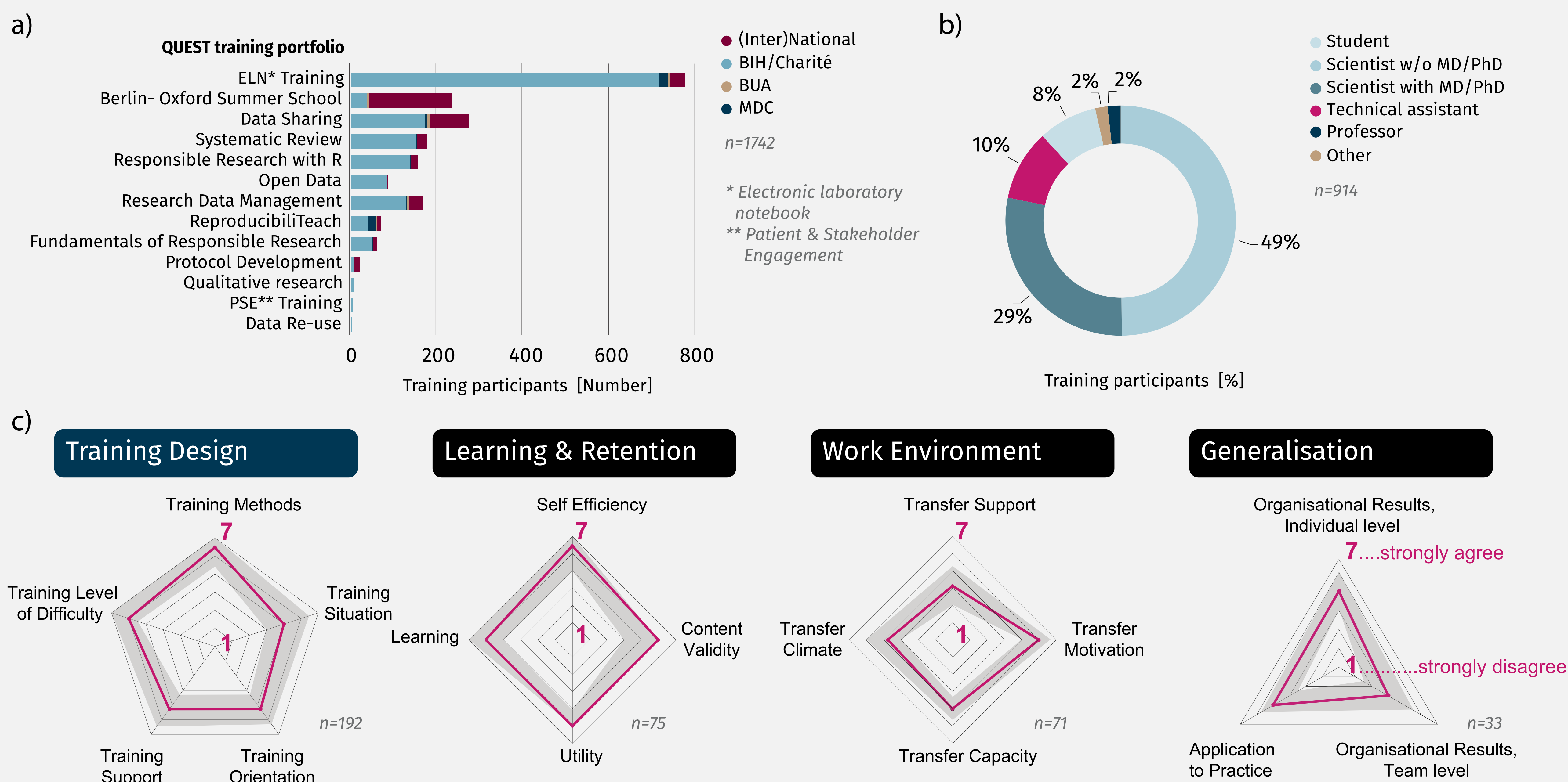


Figure legend | The QUEST Center offers a broad portfolio of Open and Responsible Research & Innovation (ORRI) courses, seminars, or summer schools respectively. a) Participant numbers for QUEST educational measures conducted since 11/2017 are shown. b) The qualification level of participants affiliated with Charité/BIH is shown. c) Since 10/2021, all QUEST courses are regularly evaluated using the standardized Training Transfer Survey. The current survey results (dated 2023-09-22) are shown. Note that the survey encompasses three short questionnaires presented to QUEST course participants at three different time points after course completion, addressing the distinct stages of transferring course contents into everyday research practice. The stage ONE questionnaire is distributed directly after course completion (t1), representing a typical course feedback questionnaire; the stage TWO questionnaire is distributed app. 2-3 months after course completion (t2) addressing the early implementation phase, the stage THREE questionnaire is distributed app. 12 months after course completion (t3), addressing the maintenance of course-related ORRI practices both on the individual level of the participants and on the level of the research team. To date, the t1 questionnaire was sent to a total of 557 participants with a response rate of 36%, and the t2 questionnaire was sent to 328 participants with a response rate of 23%. The t3 questionnaire was sent only recently for the first time, inviting all previous course participants, including those who had taken courses before the start of the evaluation study in 10/2021, to examine the sustainability or impact of QUEST's education and training activities. Hence, the t3 questionnaire was sent to 754 participants with a response rate of 7% (so far, the survey is still running). Items are answered using a seven-point endpoint-labelled Likert-type rating scale ranging from strongly disagree (1) to strongly agree (7), median (magenta), and the range between the 1st and 3rd quartile is displayed (grey).

In-depth insights from the work environment

Building on the training transfer survey results, the qualitative analyses, particularly the inductive codes, indicate that training participants perceive a **spectrum of working conditions** regarding **Transfer Support** from discouraging supervisors or those who have no interest in ORRI implementation to supportive supervisors. Further, interviewees refer to the **Transfer Climate** in two dimensions: First, their colleagues' **level of knowledge** about ORRI is mostly rated as low or mixed. Second, **interactions with colleagues** are described as either informal or lacking resonance, especially with senior researchers. Notably, interviewees' **perceptions of organizational change towards ORRI** and their own role in it vary by researcher career stage: ECRs and MCRs (Early/Mid Career Researchers) seem to be primarily influenced by their perceptions of transfer support from their supervisor. Especially for ECRs, senior researchers, including their supervisor, play a critical role in enabling or hindering the transfer of new practices such as ORRI.

Implications

Understanding the social dynamics within the work environment is essential for effectively promoting organisational change towards ORRI. The work environment shapes the sustainability of researchers' transfer motivation and thereby influences both the second and third stage of training transfer. Considering researchers' perceptions of their own role in ORRI implementation processes is crucial for organisations aiming to foster a cultural change in research practice.

CRedit

Author contributions | IF: quantitative data analysis (lead), methodology, data acquisition (equal), instrument development (supportive). SW: QTA methodology, coding, qualitative data analysis (lead), poster review, editing (supportive) AV: coding (supportive). AP: design and preparation of training transfer dashboard (lead), quantitative data analysis (supportive). CW: conceptualization, methodology, instrument development, project administration and supervision, poster draft, review, editing (lead), data acquisition (equal). **Ethics approval** | Charité EA4/140/21. **Competing interest** | The authors have no competing interests to declare. **Acknowledgement** | The authors acknowledge and express their gratitude to the implementation teams at BIH QUEST Center for their close collaboration as well as Ulrich Dirnagl and Stephanie Müller-Ohlraun for their support. The study could not have been accomplished without the contribution of the researchers participating in the study and their interest in answering the authors' questions. **Contact** | christianewetzel@bih-charite.de