Path**2**Integrity

Handbook for Trainers and Lecturers

Integrity in Research and Society

M-Series

Acknowledgement

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List of abbreviations

P2I	Path2Integrity
P2ILC	Path2Integrity learning cards
ECoC	The European Code of Conduct for Research Integrity

The purpose of the Path2Integrity handbook

Do you want to teach future researchers how to integrate their knowledge into their own research activities, as well as help them understand how important reliable research is for society? This handbook accompanies the **Path2Integrity learning cards (P2ILC)** on six topics (https://www.path2integrity.eu/ri-materials) and introduces you to an easy and fun learning programme that has been evaluated in over 15 training sessions. The Path2Integrity learning cards M-series is especially designed for graduates who already have a university degree. They learn how responsible research needs to be conducted in order to be reliable and thus useful for society.

The M-series learning cards help students use research findings responsibly while understanding the research landscape and processes within it, and by appreciating the importance of research integrity's criteria for society (cf. Häberlein 2020, 6f.). With the aid of many experienced teachers and trainers, the authors collected tips in this handbook on how to prepare each card, how to support your students' learning curve, and how to overcome the various challenges that might arise as you bring this important topic to your students.

In the next chapters, this handbook helps you prepare and carry out lessons on what makes for good, reliable research with the following learning cards (Fig. 1).

Learning Card M0:
Good research is based on honesty! (cf. ECoC 2017, p.4)
https://doi.org/10.5281/zenodo.3383843

Learning Card M1:
The research environment constitutes itself through clear infrastructure, policies and procedures! (cf. ECoC 2017, p.5)
https://doi.org/10.5281/zenodo.3383849

Learning Card M2:
Researchers design, carry out, analyse and document research in a careful and well-considered manner! (cf. ECoC 2017, 5)
https://doi.org/10.5281/zenodo.3383857

Learning Card M3:
"Researchers comply with their codes and regulations"! (ECoC 2017, p.6)
https://doi.org/10.5281/zenodo.3383860

Learning Card M4:
Research groups work as transparently and openly as possible! (cf. ECoC 2017, p.6-7)
https://doi.org/10.5281/zenodo.3384714

Learning Card M5:
Researchers ensure appropriate authorship and citation! (cf. ECoC 2017, p.7)
https://doi.org/10.5281/zenodo.3384716

Learning Card M8:
Researchers, research institutions and organisations ensure access to data is as open as possible and as closed as necessary. (cf. ECoC 2017, p.6)
https://doi.org/10.5281/zenodo.3965693

Learning Card M9:
Research integrity is a professional, ethical and legal responsibility! (cf. ECoC 2017, p.3)
https://doi.org/10.5281/zenodo.3384720

Figure 1: The Path2Integrity M-series learning cards

What the Path2Integrity learning card programme offers

The Path2Integrity learning card programme empowers people to present and discuss issues in a logical manner and to make evidence-based decisions that follow principles of open, honest, and dependable scientific research themselves. Each card can be used in a session of up to two hours to encourage dialogue, adopt different perspectives and get creative. You can use the cards as a guide for teaching a lesson or as an exercise sheet in the course. Furthermore, the length of the exercises and sessions can be adapted to meet the particular needs

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of your participants; the flexibility of the programme allows you to choose and incorporate individual cards or select exercises from them that you consider suitable for your teaching area (Fig. 2).

> I introduced my students to the subject of safeguards and existing codes and regulations when I used the cards in a course for masters students of healthcare in 2019. As graduates, they already had a lot of knowledge in their field of research, but had no understanding of research integrity at first. Still, they could immediately see the connection in terms of research integrity and their own discipline and research activity. We discussed which regulations are particularly important in healthcare and they realised that the research community follows certain principles that guarantee good research and reliable research results.

As a cornerstone of the Path2Integrity learning card programme, students "[...] learn how to conduct a dialogue on the rejection or acceptance of norms in research integrity"[1]; in other words, they learn how to argue in favour of practices and principles that ensure good, reliable research results. To support them in this process, you can adapt the learning

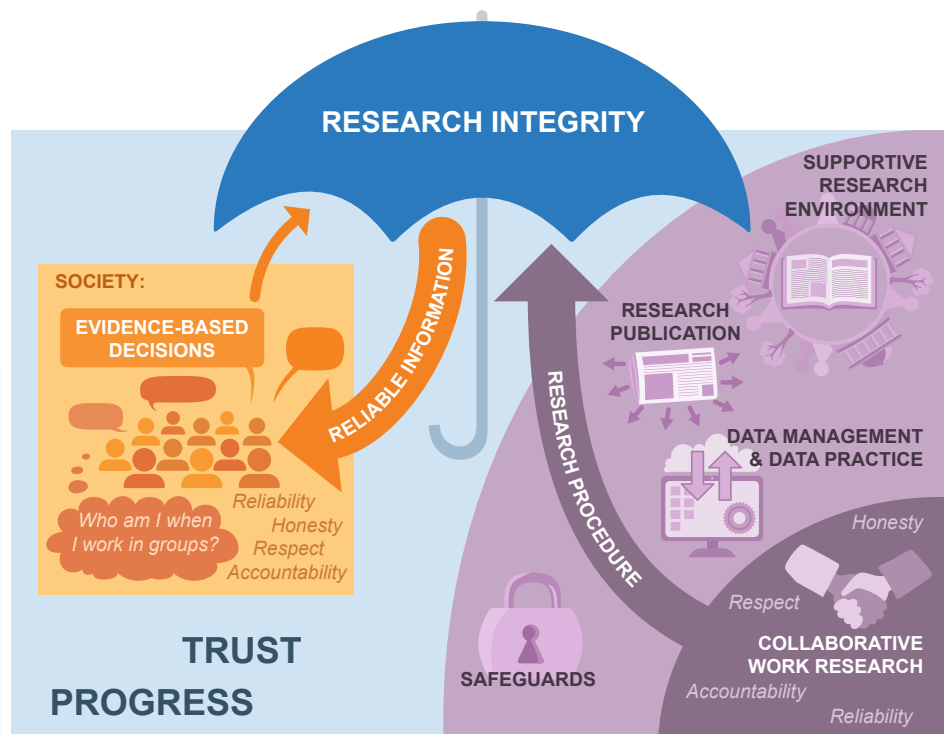1   Prieß-Buchheit et al. 2020, 23, https://doi.org/10.3897/rio.6.e53921.

Figure 2: Integrity in research and society

cards to your and your participants' cultural and religious backgrounds. The following chapters show you how to foster your participants' understanding of good research practice and its importance to society by using the Path2Integrity learning cards from the M-series. If you are interested in material prepared for secondary school students and undergraduates or post-graduates, switch to the handbook for the S-series for pre-disciplinary settings or the Y-series for interdisciplinary settings.

The Path2Integrity learning cards highlight student-centred interactions that help participants address challenging questions through role-playing, storytelling and reaching an agreement with one another. By using Path2Integrity learning cards, you enable future researchers to develop their own standpoint based on sound arguments, and to be able to demand integrity in research and society.

What is research integrity?

Lex Bouter, Professor of Methodology and Integrity at Amsterdam University Medical Centers describes research integrity as concerned with the behaviour of individual researchers. It is about research conduct and in this context about behaviour that affects trust in science or trust between scientists.

"Research integrity has obviously some overlap with research ethics and both of these concepts have some overlap with, what we call in Europe, responsible research and innovation, which is the societal relevance. [...] We call that responsible conduct of research. It's research that's relevant, that's valid, that's reproducible and also efficient".

Amsterdam Scholarly Summit, 2. July 2019 (http://editorresources.taylorandfrancis.com/wp-content/uploads/2019/07/What-is-research-integrity-Transcript.pdf).

> The design of the cards and the step-by-step procedure especially motivated my students when I used four learning cards from the M-series last semester. They also liked the active exercises, and found these exciting and engaging. In the session "Researchers comply with their codes and regulations!", I outlined the exercises from the sheet in detail and made reference to the students' prior experience in my explanations in order to enable them to relate to the topic. When we started to do the role-playing, this encouraged people to ask specific questions about their own area of research. It made me realise what an advanced level of study they're already at. I just supported them whenever questions arose; that has helped a great deal.

How to prepare your teaching with the Path2Integrity learning cards

To orientate yourself and to prepare Path2Integrity learning card sessions, the **first page** of each card tells you what the respective learning card is about (Fig. 3). Using the Path2Integrity learning card gives you both structure for your session as well as additional information for composing your lesson individually. With the cards, the time you save preparing your lesson can then be used to adapt the tasks, subfields and phases to your group, allowing them to dive deeper into the topic.

Before you go into a Path2Integrity learning card session you should:

1. be acquainted with the card;

2. know the story: *Hannah's protocol –Is there a need for a research integrity policy?;*

3. be familiar with a code of conduct for research integrity; and

4. have a plan how to navigate your group through the card.

The **Heading** outlines the main topic of the session.

The **Description and background** box describes the broader spectrum of the learning content.

Research integrity **role models** can serve as orientation and identification. Significant statements from advocates for research integrity can be taken up and discussed in the session.

The **Learning Stages** box outlines the different phases of the session, as well as the different classroom interactions they entail.

The **Learning Objectives** box outlines a series of expected skills that should be achieved through the P2ILC sessions; these skills will enable students to engage in dialogue surrounding norms within various subfields of reliable research results (such as research procedures, complying with codes and regulations, and academic writing).

Figure 3: Path2Integrity learning card first page

"When I started using the P2I learning cards in November 2019, I realised that they contained more information and possibilities than I had expected. By reading the **first page** of each card, I encountered various topics surrounding integrity in research and society. I watched the short introductory video for the M-series (https://www.youtube.com/watch?v=ft-datvhmfo, Fig 4) and read the backgrounds and learning objectives on each card. With so many cards at hand, I was initially overwhelmed by the variety until I saw that each card had a **heading**, which described the main topic of each session.

What I like about the programme is the wide range of topics and the **flipped-classroom** style with reading preparations, in which my learning group was prompted prior to our session to acquaint themselves with the upcoming topic. Because each card outlines which articles, videos, cartoons etc. will help me best prepare my participants, my only task was to inform them what to read. In just three minutes, I had sent my group the task via email. This gave me time to consider extra material and adjust the card to the needs of my course. For my first try with the P2ILC, I chose the card "The Research Environment constitutes itself through clear infrastructure, policies and procedures!" and started to prepare myself with the help of the second page. I worked it through, thought about how I could lead my course through the card's various exercises and tasks using their specific knowledge and habits, and made a copy of the second page for each participant.

As my participants were rather inhibited in performing the exercises, I supported them by limiting the perspective of the research environment to our research area, public health, and decided to start with joint brainstorming on a possible research landscape to ease them into a good working mood. Since they needed a little assistance here, I provided examples related to the different roles in exercise three and four so that students could identify specific stakeholders. It worked out great and helped get my students into a creative mood.

The session was a complete success! In class we introduced ourselves to Hannah, Rory and the various members at the conference, and performed an engaging storytelling exercise about the possibilities of promoting research integrity. Using the card, we got to know our research infrastructure, rules and procedures in detail and were able to identify possible gaps in our discipline. I enjoyed how much fun we had, and continued using the cards in future classes.

After the third session, my students began to anticipate the learning routine, even starting to regulate themselves and creating ideal learning opportunities. I was really able to become a mediator of their learning! In two subsequent sessions, I changed the phases to include longer discussions, after seeing how eager my course was to exchange their thoughts and arguments.

Figure 4: QR code link to the introductory video of the P2I M-series learning cards

How to help participants use the card and adapt it to your teaching

I. You can flip your classroom

Each learning card contains a self-paced preparation phase. **Thus, you can divide each learning session into two phases:**

1. **the individual preparation phase**; and

2. **the classroom training**.

> Whenever I asked my students to study learning material at home, I carefully selected and prepared the material to avoid overloading them. I wanted my course to engage with the subject without losing motivation[2]. It's great that the P2ILC already contain material that I could supplement with guiding questions. I'm lucky that the paticipants of my course are used to doing some learning at home, meaning we had more time for the interactive sessions in class.

If you want, you can change the flipped classroom into a reading session at the beginning of the lesson. **When selecting material, please take into account that each participant needs to be able to access it.**

In the description of each learning card, the authors prepared additional material that you can use for the preparation phase (see the section **"Eight sessions on integrity in research and society"** on page 11 of this handbook). For more information on how to flip your classroom, as well as on how to supplement the learning material, please refer to the Path2Integrity road-map (https://www.path2integrity.eu/teaching-RI Fig. 5).
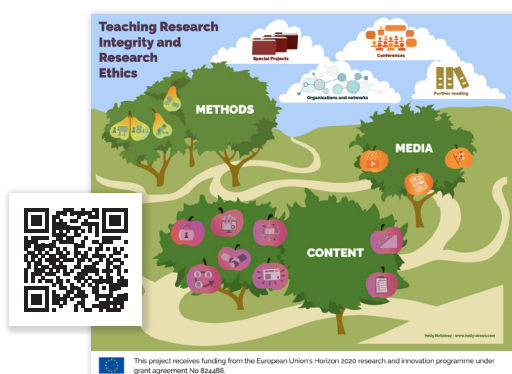

Figure 5: Path2Integrity roadmap

II. You can introduce Hannah's protocol: Is there a need for a research integrity policy?

Hannah's protocol is a narrative from the Path2Integrity learning card programme, in which research integrity is at stake. The narrative is introduced in M0 and subsequently used in several cards while developing in different directions.

> The **story** of Hannah and Rory at the conference meeting, which is used in many of the cards, fascinated us. From session to session, participants identified with the characters and imagined as well as relived their adventures. In particular, my students loved the pink sections of the learning cards, which emphasise taking a dialogical approach to Hannah´s protocol narrative.

With *Hannah's protocol - Is there a need for a research integrity policy?*, you can reflect as well as express different points of view and start a reciprocal learning process. If you want, you can use a graphic (https://zenodo.org/record/3384746#.XySdZedCSUk) at the beginning of each session. To ensure that your participants understand the narrative, you can ask them to describe the story in their own words and to articulate what integrity challenge is being described: namely, a familiar problem of conflicting motivations, in which good scientific practice is weighed against other inclinations and incentives such as obedience, hierarchy, structural forces or more (Fig. 6).
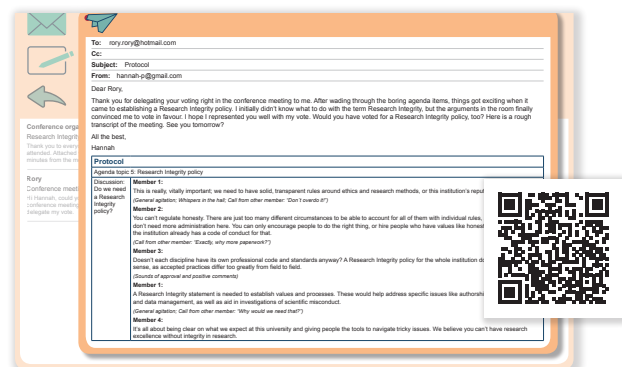

Figure 6: Hannah's protocol – Is there a need for a research integrity policy?

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2   For further information see Nimmerfroh 2016.

> When we reviewed what Hannah´s protocol entailed, my students noticed that Hannah had participated in a meeting in which the need for research integrity policies with respect to different motivations was discussed.
>
> For my course, it was evident that different parties have taken opposing positions in this matter and were presenting conflicting arguments due to their diverse motivations. They understood that the main characters had no fundamental problem in terms of ethical orientation, and that they actually knew what was morally right to do. Nevertheless, they experienced a situation in which other incentives put research integrity at stake.
>
> When they were asked to engage in story-telling in M1, my course listened to different statements from their peers, outlined their knowledge, and started to discuss power structures in the context of Hannah's protocol. They began to develop and rationalise their own arguments for the importance of integrity in research and society.

III. You can encourage storytelling

Storytelling can increase "sympathetic imagination"[3], ethical reflection and comprehension of others, as well as vivid, reflective and experiential responses.[4] Through storytelling, graduates can acquire knowledge, develop solutions to a problem together and build a common language by expressing realities of human experience through the art of narrative.[5]

Figure 7: Storytelling

In the storytelling exercises contained in the P2ILC, participants articulate how they interpret concepts like research integrity or how occurrences of e.g. mistrust can influence their point of view. Using their own words and expressing both common and diverse views, they tell short stories e.g. about rules for appropriate citation, the possibility of fostering reesarch integrity in the research landscape or reasons for reliable research results for both research and society.

Learning with storytelling invites participants to step away from their own feelings and subjective attitudes and to begin developing a common language by "thinking aloud" and exchanging different points of view.

> When I asked participants in my course to write an email to Hannah giving tips for correct citation in our M5 session, they really got into it, referring to common citation rules from our discipline. Participants enjoyed using specific citation styles and supporting Hannah.
>
> At one point, I intervened and pointed out that *'Hannah's protocol - Is there a need for a research integrity policy?'* is a fictional narrative that can develop in different ways, so they created advice that worked for different contexts. The peer correction of citation in exercise four was fun and solved some uncertainties! Working in small groups, they found themselves at the centre of a process in which both interaction and problem-solving skills were required.

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3   Nussbaum 1997, 85 and 95.
4   cf. Frank and Osbeck 2016; Nussbaum 1990; Nussbaum 1997; Phillips 2010; Zipes 2005.
5   cf. Nussbaum 1990, 5.

IV. You can promote role play

Role-playing is an exploratory game in which participants assume an "as-if character".[6] Through role play you promote classroom participation, awareness of the complexities of ethics, critical and reflexive thinking, application of concepts, emotional engagement and personal accountability.[7]

Figure 8: Role play

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6   Fürstenau 2015, 106 [translated by Lisa Häberlein].

7   cf. Löfström 2012, 349 in reference to Clarkburn 2002, Sirin et al. 2003, Sparks and Hunt 1998, DeNeve and Heppner 1997; Grose-Fifer 2017; Löfström 2016; McCarthy and Anderson 2000; McWilliams and Nahavandi 2006; Poling and Hupp 2009; Poorman 2002; Rosnow 1990; Strohmetz and Skleder 1992.

"It is this experience of putting oneself into different roles that helped my course develop a deeper understanding of their own and others' positions, and to engage questionable research procedures and research results, as well as possible solutions by taking an active approach. I liked that the role play imparts technical knowledge by directly referencing sources such as '*The European Code of Conduct for Research Integrity*'.

One challenge, however, was ensuring that participants thoughtfully addressed the learning content of learning card M2 "Researchers design, carry out, analyse and document research in a careful and well-considered manner". Out of shyness towards others or perhaps due to overload, time and again roles were exaggerated or poorly presented. I decided to pause the role play and invite my course to spend some time discussing the screenplay. I asked them to imagine themselves as researchers in a situation in which they are unsure about how to proceed. How could they prioritise different research procedures? What are the consequences? Why would this or that action be good or bad for science and society? We discussed which action should be referred to as good scientific practice or misconduct. This allowed my students to delve into the scenario more deeply. We tried the role play once again and it worked much better.

To get started with role play in the Path2Integrity learning cards, you can orientate yourself using the following steps:

1. Preparation: **You know your learning group best**. Get them in the right mood thematically and emotionally. Read the instructions together and help your participants identify with their role. Offer them a comprehensive picture of the situation. You can also describe characteristics of the role to be played in detail.[8]

2. Performing: **Provide ample space for the role-playing scenario**, making sure to give your students enough time as well. If necessary, you can also provide a start signal or assign moderators to take over a guiding function in the role play.

3. Reflection: Make sure that you plan in at least as much time to reflect the role play as for the role play itself. Gradually guide your group out of the scenario by allowing them to summarise and evaluate what they have experienced[9]. Follow the instructions from the P2ILC or invite your students to share what they have observed in the play, and how they have judged decisions and interpreted the actions of others. Finally, evaluation of the role play should focus on how your participants can apply these concepts in future, and use them to argue in favour of evidence-based decisions and good research practice. If necessary, provoking questions about honesty, accountability, respect and reliability in research can stimulate a reflective analysis of the players' behaviour and their reasoning for it.

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8   cf. Fürstenau 2015, 96.

9   cf. Fürstenau 2015, 104.

V. Refer to a code of conduct for research integrity

The Path2Integrity project uses *The European Code of Conduct for Research Integrity* (ECoC) as a reference document. It provides clear guidelines and reference points for orientation in the research community. By referring to the ECoC, future researchers are able to recognise standards of good research as such and refer to them in specific cases when they need guidance. This document, like other codes of conduct, serves as a basis for regulating one's own behaviour; this makes it possible to avoid thinking in terms of relativism when evaluating research behaviour through a moral lens. Depending on your cultural and disciplinary requirements, you may refer to the ECoC or choose other national, institutional or disciplinary codes of good research practice within your area of teaching that seem most appropriate for your group.

It is important to remember that the code of conduct you choose to refer to should not be used dogmatically, but rather should serve to orientate participants towards basic principles of good research practice.

VI. Evaluating future researchers' knowledge and ability to defend good scientific practice

Over the lifetime of the project, the Path2Integrity learning card programme additionally includes one card each for pre- and post-testing (M0 and M9). If you prefer to evaluate without the cards, you can use the following two links (Fig. 9):

Pre-test:
https://path2integrity.eu/limesurvey/
index.php/238122?newtest=Y&lang=en

Post-test:
https://path2integrity.eu/limesurvey/
index.php/238122?newtest=Y&lang=en

Figure 9: Pre-test & Post-test evaluations

The pre- and post-tests each take approximately 15 minutes. The test evaluates the effectiveness of the learning cards in your course and examines in open and closed questions (1) how to act as a researcher, e.g. how to manage data or where to go to report misconduct; and (2) how to argue in favour of good scientific research, e.g. to achieve systematic and accessible knowledge or to make one's work more transparent.
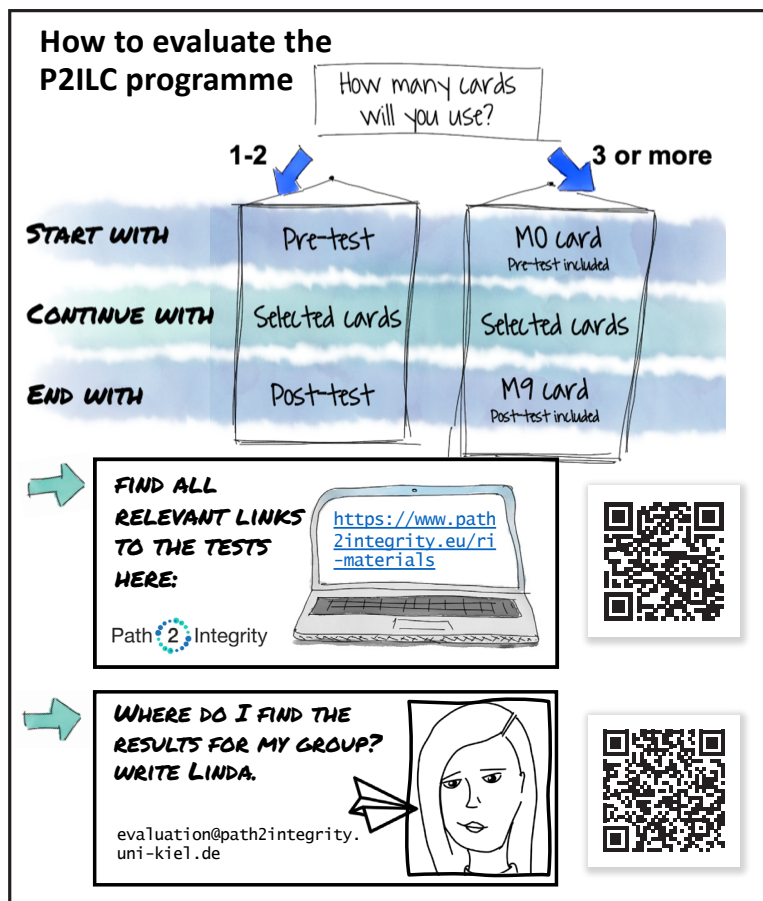

Figure 10: Evaluation of learning units

The test examines the future researchers' points of view on what makes for good and reliable research. Comparing results from the pre- and post-tests will illuminate any changes in the students' knowledge and patterns of argument that have emerged during the course of using the learning cards. As indicated in learning card M9, you only need to send an email to evaluation@path2integrity.uni-kiel.de to receive your results. The anonymised results are indicators of how your students on average (not at an individual level) argued in favour of good scientific practice both before and after P2I sessions.[10]

The P2I project recommends starting with M0 and ending your teaching with M9 if you intend to use three or more learning cards (cf. Fig. 10). As a trainer you can also give feedback on what obstacles you encountered in your sessions or what made you and your students particularly enthusiastic about the learning cards. This feedback will help to identify your trainer-specific needs in the classroom and to develop the programme further. Use this link: https://path2integrity.eu/limesurvey/index.php/593973?lang=en

If you would like to find out how the participants' experience was, you can have everyone fill out the smiley face questionnaire at the end of your P2I courses: https://path2integrity.eu/limesurvey/index.php/553522?lang=en

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10   cf. Wilder et al. 2020, 15.

How to support a dialogical learning setting

The Path2Integrity learning cards use dialogical methods to provide an active and sustainable learning environment. The sections marked in pink on the exercise sheets indicate that participants will engage in storytelling, role-playing or reaching an agreement. In these sections, students are challenged in various contexts to provide rational arguments, set common goals and norms, request that someone do something, establish preconditions for a dialogue and weigh both pros and cons of different actions. To this end, participants need to show a certain amount of tolerance for ambiguity, communicate openly, listen actively and trust one another.

It can sometimes be difficult to create an atmosphere in which dialogical methods can be successfully pursued. Holding the lesson in a room that is large enough for interactive sessions and which allows chairs and desks to be removed can provide a supportive surrounding; as well as letting participants sit together (though not in front of one another) and providing everyone with the same materials, e.g. exercise books, pencils etc. It is possible to hold these sessions online. Just use a tool that supports breakout sessions.

If participants are not used to actively contributing, trainers can facilitate a smooth transition into the exercise by allowing the future researchers to choose between being an observer or player during the dialogical exercises, thus giving participants time to adjust. In such sessions the tasks highlighted in pink on the learning cards are conducted by players, while observers closely watch one or two groups and subsequently write down what they learned from the presentations of others with regard to the key message from the heading of the respective card, e.g. *Researchers ensure appropriate authorship and citation!*

In case you notice shortcomings in the dialogues of groups that are struggling to perform the tasks highlighted in pink, you can discuss all or some of the following rules with your students to take a new direction[11]:

1. Be ready to have a dialogue about accepting or rejecting norms.

2. Make sure that everyone can participate in the dialogue.

3. Acknowledge each contribution to the discussion as a noteworthy argument.

4. Share your prior knowledge when required and be prepared to discuss it.

5. Do not call upon someone's prior knowledge when you have rejected it yourself as unacceptable.

6. Do not stick to an opinion in the face of better information; accept stronger arguments.

7. Do not use an ambiguous argument to convince someone.

8. Remember that your social status does not replace making a good argument.

9. Be ready to provide reasons for your statements if asked to do so.

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11   These are nine out of 14 rules on how to conduct a rational dialogue (cf. Klare and Krope 1977, 124).

The dialogical approach to teaching students about what is necessary to produce reliable research results and evidence-based decisions in society: a closer look.

According to Lorenz (2005, 189–191), a dialogue is a verbal discussion between two or more people, characterised by speech and counter-speech with the following specifics: question and answer (to clarify terms), claim and counter-claim (to justify decisions), and proof and falsification (to disclose inferences). A dialogue is a high-quality interpersonal relationship (cf. Widdershoven and Solbakk 2019) and seeks to be an ideal speech situation (cf. Habermas 1990, 43–115) in which the other (›you‹) is recognised as a person, instrumentalisation is renounced, others' right to differing opinions is taken seriously, and an **I** and **you** role can be clearly defined (cf. Lorenz 2005, 189–191). When impartial, unconstrained and non-persuasive acts are respected, a dialogue can be conducted (cf. Gethmann 2005, 191).

A dialogical approach in teaching and learning builds common language and enables participants to answer questions and develop solutions. It can be successful when equal rights and obligations for all parties are ensured and power-driven assertions, threats, deceptions and promises that cannot be fulfilled are eschewed (cf. Janich 2009, 20–21).

A piece of advice from gender expert Katharina Miller:

One challenge within dialogical learning settings can be the lack of eye-level conversations between different genders. Within the Path2Integrity project, the gender dimension has been observed to play a role in interactive sessions. "Storytelling and role play are often gender-mixed interactions in classrooms, incorporating gender-specific interaction patterns. Because women have less speech percentage and more speech interruptions in gender-mixed discussion groups [...]"[12] P2I suggests teachers be aware of these (usually unconscious) power structures. That is why we recommend that you empower men and women to "[...] unfold their different emotions connected to their experiences"[13] by raising their awareness of existing differences and supporting their individual approaches towards participating in the dialogical discussions. This could be accomplished through an awareness training before the use of the learning cards starts. I am happy to accompany your learning experience. You can send an email to miller@3ccompliance.com and I will provide you with more information.

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12   Prieß-Buchheit et al. 2020, 20.
13   Prieß-Buchheit et al. 2020, 20.

How to improve the learning curve

To improve the learning curve, the Path2Integrity project recommends using a **learning journal** after each session. To implement a learning journal in your Path2Integrity teaching, you can follow these steps:

1. Review the learning objectives box on the respective Path2Integrity learning card.

2. Create a writing prompt for your students that requires them to summarise the lesson. Start the prompt with, **"Write between five and ten sentences starting with the words 'how did you…'"**

3. Then list the objectives of the respective card, e.g. from card M5:

   a) *Explain the importance of citation;*

   b) *Weigh criteria for good academic writing;*

   c) *Prioritise appropriate academic writing.*

4. To conclude the prompt, add **"…in our session today? Can you draw any references and links between the actions of the session and theories, findings or methods, you already know? What do you think about when transferring these actions to a broader scale?"**

5. Provide your course with the writing prompt at the end of the session and decide when they need to return their response.

Eight sessions on integrity in research and society

Learning Card M0:
Good research is based on honesty! **(cf. ECoC 2017, p.4)**
https://doi.org/10.5281/zenodo.3383843

Links from learning card M0:

Evaluation of the learning units: https://path2integrity.eu/limesurvey/index.php/714871?newtest=Y&lang=en

This learning card **introduces** future researchers to how important the responsible conduct of research is for society. The exercises introduce research and how reliable research results are produced, and enable an understanding and usage of research results in our knowledge-based society. In six learning steps, participants learn basic values that characterise good research, formulate reasons for reliable research by telling stories and find arguments for trustworthy research results for science and society. **This learning card is best used to start the P2ILC programme.** Using the pre-test linked on the card, you can test for improvement in your courses. Feel free to use the test as an opportunity to discuss where reliable research results are at stake.

Figure 11: M0 learning card
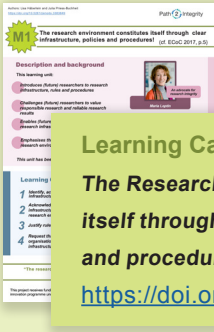
Authors: Lisa Häberlein* and Julia Prieß-Buchheit*   11

Learning Card M1:
The Research Environment constitutes itself through clear infrastructure, policies and procedures! (cf. ECoC 2017, p.5)
https://doi.org/10.5281/zenodo.3383849

Links from learning card M1:

The European Code of Conduct for Research Integrity: https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf

The Research Community Safe-guards: https://ori.hhs.gov/sites/default/files/2018-04/3_Should_You_Trust_Science.pdf
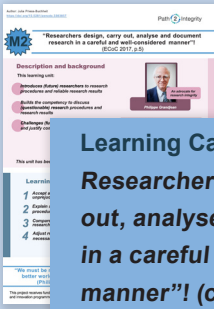
If it works for your course, you can also use the following additional material:

This learning card draws learners' attention to the fact that good research is integrated into a larger environment that is characterised by a clear infrastructure, principles and procedures. Participants get to know the rules and regulations of the broader scientific community in five learning steps. They engage in role play and reflect on how to require a research landscape to provide an infrastructure that promotes honest research.

The lecture "Why do ethics matter?" is a 20-minute video by Shefali Roy, who has spent most of her career in the field of ethics and compliance. It deals with the importance of ethics in practice and was held on a TEDx-event. You can ask learners to watch the video and to reflect on how important ethics is to them. What values do they bring to their institution? https://www.youtube.com/watch?v=yesE4mcv4CM

"Since my teaching experience has taught me that students, even if they already have specific knowledge in their field, are often not yet familiar with the technical terms, I started to introduce them to the terms 'research community', 'funding agency' and 'whistleblower' using the definitions in the infographic from the learning card. This was a good move, because my students were not yet familiar with the idea of a 'research environment' so I tried to actively support learners in making use of the infrastructure of the research landscape."

Figure 12: M1 learning card

Learning Card M2:
Researchers design, carry out, analyse and document research in a careful and well-considered manner"! (cf. ECoC 2017, 5)
https://doi.org/10.5281/zenodo.3383857

Links from learning card M2:

The European Code of Conduct for Research Integrity: https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf

If it works for your course, you can also use the following additional material:

This learning card introduces learners to research procedures that are necessary for careful and well-considered research and for producing reliable results. In five learning steps, participants explain and justify the criteria of responsible research. In role-play they compare research processes in different fields that are important from idea to publication in order to ensure research integrity. They are able to endure other points of view and adapt their own positions while they evaluate different arguments, face dissent and achieve consensus.

The Economic and Social Research Council (ESRC) helps researchers consider ethics issues throughout the complete life cycle of a project. Case studies, listed under a specific ethics issues category, aim to raise awareness of some of the ethics issues that can arise in research: https://esrc.ukri.org/funding/guidance-for-applicants/research-ethics/ethics-case-studies/

"Before we dealt with an example from research practice, we discussed what 'Responsible Research Conduct' and 'Reliable Research Results' actually mean and once again looked at the values and norms mentioned in the ECoC. The yellow box on the M2 learning card was very helpful to remind us of basic knowledge about research integrity beforehand.

The science comic from digital architect Patrick Hochstenbach "Anatomy of scientific bias" illustrates clear messages regarding norms in research procedures. https://hochstenbach.files.wordpress.com/2017/02/scientific_bias_600dpi_rgb.jpg?w=710

Figure 13: M2 learning card

Learning Card M3:
"Researchers comply with their codes and regulations"! (ECoC 2017, p.6)
https://doi.org/10.5281/zenodo.3383860

This learning card introduces learners to guidelines of research integrity and requires criteria for the promotion of good research and the dialogue on it. In five learning steps, participants are asked to take account of the rules by which good research is maintained, switch to help mechanisms to ensure research integrity and establish an open, transparent, logical and reasonable dialogue. In rotatory role play, they recognise that structural violence hinders good research.

Figure 14: M3 learning card

Links from learning card M3:

The European Code of Conduct for Research Integrity: https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf

If it works for your course, you can also use the following additional material:

In the approx. 15 minute video **"Research Integrity and Ethics"**, Wilna Venter, M.A., M.Ed., cluster manager for strategic support in the research office of the University of Cape Town, presents the historical background, the definition and the conduct of responsible research: https://www.youtube.com/watch?v=vxNqGtNHPb0

> For exercise 4, we first discussed the 'Safekeepers of Research Integrity' together, which are named on the learning card in the yellow box; this helped my participants to think about next steps in a situation where a dialogue on research integrity is not possible. They realised that there are ways to get help.

Learning Card M4:
Research groups work as transparently and as open as possible! (cf. ECoC 2017, p.6-7)
https://doi.org/10.5281/zenodo.3384714

This learning card introduces learners to research collaborations and corresponding principles. In five learning steps, future researchers learn what collaborations are and why it's necessary to be able to reach an agreement. Participants relate to their own field of research, express their wishes and needs and practice mutual understanding and respect in a dialogue.

Figure 15: M4 learning card

Links from learning card M4:

The European Code of Conduct for Research Integrity: https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf

Building a Foundation: https://www.path2integrity.eu/teaching-RI/content/collaborative_work
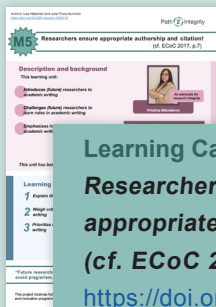
If it works for your course, you can also use the following additional material:

The popular TV series "The Big Bang Theory" is about researchers from various disciplines. This sequence deals with a humorous discussion on research collaboration between the two characters Amy and Sheldon https://www.youtube.com/watch?v=XgrQpLn7Lac

Authors: Lisa Häberlein* and Julia Prieß-Buchheit*

M5

Learning Card M5:
Researchers ensure appropriate authorship and citation! (cf. ECoC 2017, p.7)
https://doi.org/10.5281/zenodo.3384716

This learning card covers the topic of scientific writing and authorship and introduces learners to the rules of research publication in four learning steps. In storytelling, participants explain the meaning of citations and references, weigh criteria of scientific writing and prioritise honest scientific writing over poor research practice and plagiarism.

> " When we worked on the M5 card together, focusing on correct authorship and citation, my students started to ask questions about their seminar papers and final theses. So, I took this opportunity to encourage individual questions on scientific writing.

Links from the learning card M5:

Write ethically from start to finish: https://ori.hhs.gov/sites/default/files/2017-12/8_Ethical_Write.pdf

Tips for Avoiding Plagiarism: https://ori.hhs.gov/sites/default/files/2019-02/Tips%20for%20Avoiding%20Plagiarism_Rasterized.pdf

The European Code of Conduct for Research Integrity: https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf

If it works for your course, you can also use the following additional material:

The document **"Why do we even give sources?"** presents a list of reasons why we give sources. The reasons can be collected by participants. https://www.academicintegrity.eu/wp/materials/why-do-we-even-give-sources-a-list-of-reasons-for-good-practice-maintaining-integrity/

Figure 16: M5 learning card

M8

Learning Card M8:
"Researchers, research institutions and organisations ensure access to data is as open as possible and as closed as necessary." (cf. ECoC 2017, p.7)
https://doi.org/10.5281/zenodo.3965693

This learning card introduces (future) researchers to norms of proper data management and addresses the issue of open access data. In five learning steps, participants engage in role play and choose data practices that respect the rights of others as well as support their own work while comparing and prioritising different handlings of proper data management.

> " I'm a fan of encouraging discussion. Still, I did moderate controversy in the participants' discussions to prevent emotions flaring. I wanted to keep the balance between what Retzmann, an economics education expert, calls "involvement and distance" and decided to provide my students with decision matrixes to help them clarify the advantages, disadvantages and consequences of alternative decision options. It's great that the learning cards allow you to be so flexible.
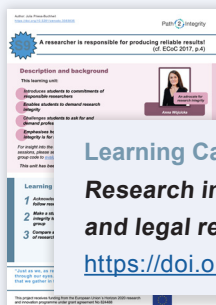
Links from the learning card M8:

FAIR Principles: www.go-fair.org

Figure 17: M8 learning card

M9

Learning Card M9:
Research integrity is a professional, ethical and legal responsibility! (cf. ECoC 2017, p.4)
https://doi.org/10.5281/zenodo.3384720

With this learning card, participants reflect on the professional, legal and ethical importance of research integrity in science and society. In four learning steps, they become aware of their own research integrity, outline values for their research and create their own declarations in favour of honest research. This learning card should be used to conclude your teachings with the Path2Integrity learning cards from the M-series. With the post-test and the request in learning card M9 to send an email to evaluation@path2integrity.uni-kiel.de, you will be able to gain insight into your students' improvement.

> It was great to do the test again at the end of the course with four of the P2ILC and to hear from the students themselves that they felt much more confident in their answers on research integrity questions.

Links from learning card M9:

Evaluation of the learning units: https://path2integrity.eu/limesurvey/index.php/238122?newtest=Y&lang=en

If it works for your course, you can also use the following additional material:

"On being a scientist" is an approximately 60 minute long fictional film that takes up some important topics of questionable research practices. After you have given participants a deeper insight into the topic of research integrity, this film can be used to reflect once again on what has been learned. https://www.youtube.com/watch?v=tCgZSjoxF7c&feature=youtu.be

Figure 18: M9 learning card

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Code of Conduct

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List of links

https://www.path2integrity.eu/ri-materials All Path2Integrity learning cards and accompanying material

https://doi.org/10.5281/zenodo.3383843 Learning Card M0

https://doi.org/10.5281/zenodo.3383849 Learning Card M1

https://doi.org/10.5281/zenodo.3383857 Learning Card M2

https://doi.org/10.5281/zenodo.3383860 Learning Card M3

https://doi.org/10.5281/zenodo.3384714 Learning Card M4

https://doi.org/10.5281/zenodo.3384716 Learning Card M5

https://doi.org/10.5281/zenodo.3965693 Learning Card M8

https://doi.org/10.5281/zenodo.3384720 Learning Card M9

https://www.path2integrity.eu/ Path2Integrity homepage

https://www.youtube.com/watch?v=ft-datvhmfo An introduction video for the use of the Path2Integrity M-series learning cards

https://www.path2integrity.eu/teaching-RI The Path2Integrity roadmap, a categorised collection of existing innovative and traditional educational material on research integrity and research ethics

https://doi.org/10.5281/zenodo.3384746 Graphic: Hannah´s protocol - Is there a need for a research integrity policy?

https://path2integrity.eu/limesurvey/index.php/238122?newtest=Y&lang=en Pre-test to evaluate learning units

https://path2integrity.eu/limesurvey/index.php/238122?newtest=Y&lang=en Post-test to evaluate learning units

evaluation@path2integrity.uni-kiel.de email address of a P2I member to contact after evaluation

https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf The European Code of Conduct for Research Integrity

https://ori.hhs.gov/sites/default/files/2018-04/3_Should_You_Trust_Science.pdf Infographic on "The research community safeguards"

https://www.path2integrity.eu/teaching-RI/content/collaborative_work Path2Integrity comic: "Building a Foundation"

https://ori.hhs.gov/sites/default/files/2017-12/8_Ethical_Write.pdf Infographic on "Write ethically from start to finish"

https://ori.hhs.gov/sites/default/files/2019-02/Tips%20for%20Avoiding%20Plagiarism_Rasterized.pdf Infographic on "Tips for Avoiding Plagiasrism"

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