

Mapping of Safe Uncertainty in the research process

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Abstract:

In many learning spaces in higher professional education, students are required to do research. At the same time they, and many of their tutors, struggle with the doubt, the uncertainty and even the anxiety that often accompanies the research process. Research shows that uncertainty and safety ('safe uncertainty') play an important role in students' experiences of the research process. In order to study this and to answer the question 'how to cope with uncertainty during the research process?', we have designed a tool called 'research mapping'. In a workshop setting, research mapping visualizes first the research process and, secondly, the elements of safe uncertainty within. Subsequently, dialogue between the participants produces generalized insights in the research process and in the role of safe uncertainty in that process. Next to the benefits for students and tutors, also the learning space of doing research can be improved.

Keywords: Safe uncertainty, research mapping, educational tools

Safe uncertainty during the research process

Research as a learning space

In the Netherlands, an important learning space in higher education is formed by the research tasks we ask our students to fulfill. For example when they have to make a product for a client or when they have to write their (graduate) thesis. The Netherlands Association of Universities of Applied Sciences stated that through applied research, high-quality education will be stimulated and that “it is also crucial that graduates with a bachelor's degree from a university of applied sciences have a research competency which allows them to reflect, to engage in evidence-based practice and innovation.” (Hbo-raad 2009). This professional research competency consists of three inseparable parts: a professional research attitude, the ability to use knowledge, and the skills in work-related research activities (Andriessen 2014). As a result of this policy, research has gained importance in the curricula of Dutch higher professional education programs, and forms a significant part of the learning spaces that the students currently dwell in.

Uncertainty during the research process

However, the learning space formed by the research process is not always a comfortable space to be in. In our experience as tutors, we see that many students tend to get lost in the process of doing research, and become too uncertain to find their way out. Although uncertainty can be hampering the students' process, we also see that it can be productive: we see that it can help students to take action, to ask for help, to make decisions, to become creative, etcetera. These kinds of observations led to following questions:

- What makes students uncertain in the research process?
- What creates sufficient safety for the student to be able to engage in this uncertainty and maybe even to make use of it?

Safe Uncertainty

In order to explore these questions, we use the concept of 'safe uncertainty' (Bollinger 2014). Research reveals seven factors that have an effect on whether students

experience their research process as (un)certain or (un)safe (Bollinger & Van Rooijen 2016). These factors are:

- Translation: this is the process of analyzation and sense making that the student deploys when he studies his subject. He has to translate his thoughts and observations of the matter into logical constructs and understandable text.
- Self-disclosure: during a learning process, the student improves his knowledge and skills, and this improvement means change. This change becomes visible in e.g. the decisions he makes during the process and the products that are the outcome of these choices. So, the product reveals some of the change that the student has made and therefor it reveals something about himself.
- Judgement: translation and self-disclosure are, especially in an educational setting, usually followed by assessment that is often experienced as judgement. Tutors (and clients) always give feedback (and grades) on what the student discloses. This often feel for students as judgement upon themselves. Next to this, students also assess their own efforts and results in which self-judgement plays a role. However, judgement can also be positive, for example in the form of praise.
- Risk: in order to successfully complete a research process the student has to be prepared to take certain risks. Risk on judgement on their translations and self-disclosures, but next to this also risk on investment. A student constantly assesses the amount of time and energy that has to be invested in order to finish the research and whether the research is realizable.
- Freedom: every research process brings a certain amount of freedom. This can help students who are autonomous However, too much freedom can be hampering for others. The same is true for the criteria that have to be met. Are they clear enough? Are they too general or too specific? Some students need more freedom than others.
- Ability: all the factors mentioned above are intertwined with students' self-efficacy. Do students feel capable enough? This self-image can be based on previous or current experiences, on self-affirmation, and arise as result of the reaction (judgement) of others.

- The Other: support, affirmation, empowerment, judgement, expectations, feedback. In many of these elements, the other plays a significant role in the experiences of students. This can be friends, study mates, partners, teachers, parents or other significant persons in the students' environment.

In addition to these seven factors of safe uncertainty, students recognize certain 'alarm bells', 'anchors' and 'energizers' in their research process. An alarm bell is an experience of unease, doubt, anxiety, uncertainty, or fear that is triggered by an event, observation, thought or something else during the research process. Often this alarm bell is a cause for delay or action by the student. An anchor is something or someone the student can fall back on, seek support from or can ask for help. For example: a past confirmatory experience, a research buddy or a tutor. An energizer is something that boosts the students' process in a positive way, like positive feedback or a relevant assignment from a client. Alarm bells, anchors and energizers help the students to gain insight in a meaningful moment in the process, and together they can produce a fourth category: action.

Because safe uncertainty can be recognized within the student's research process, it is very useful to know where, how and to what extent these factors play a role. This creates awareness of how these factors are interwoven in the process of doing research and might help students to act upon them. The same applies to tutors. Explication of these factors creates overview of the student's process which can assist tutors in talking about uncertainty with their students and choosing actions during the supervision process. This brings forth the question: How can we make these factors that influence uncertainty explicit in the learning space of the research process?

Educational tool: the research map

Tool as means for creating actionable knowledge

This explication of knowledge can be achieved by means of an educational tool. As Vygotsky stated, an educational tool is an "artificial device for mastering one's mental process" (Markauskaite & Goodyear 2017, p.345) by its mediatory function "between oneself and one's mind" (Markauskaite & Goodyear 2017, p.345). In this case, an

educational tool enables the production of 'actionable knowledge' (Markauskaite & Goodyear 2017, p.355) which can help the individual student (or tutor) in the research process. Additional value of such a tool lies in facilitating the dialogue between students and tutors. This dialogue can result in tutors gaining insight in students' processes and revealing blind spots. Next to being an education tool, it can be a research tool and provide data for researchers. So, what kind of tool can be helpful here?

Map as a tool in research

Comparing the research process with a journey, one can see it as travelling from start to finish with the metaphor of a map as a visualization of this journey. In particular, maps provide a theoretical model "for considering the unknown and they provide means for knowledge exploration and coordination." (Markauskaite & Goodyear 2017, p.354). They can be very helpful for students, because they help to make "the difference between deliberate and accidental voyages" (Markauskaite & Goodyear 2017, p.354). By visualizing the process of research students can gain insight and control over their own journey through the learning space.

As maps are a visualization tool for exploration and coordination of knowledge, additional tools can be used to reach new depth in this effort. If we add a perspective or meaning to the map, new elements may come to the surface and new insights can be produced. For example, if we want to research the place and meaning of safe uncertainty during the research process, we can ask students to map their experienced safe uncertainty into the research map. With this a new layer of information is uncovered and becomes available.

In order to come to this knowledge on safe uncertainty during the research process, we have designed a visualization tool called 'research mapping'.

Mapping of safe uncertainty in the research process

Research mapping is a visualization tool in which an individual student, a tutor or a group of students or tutors, produces a physical map of their research processes with a focus on safe uncertainty. Next to other meaningful elements of the research process, participants are asked to plot the above mentioned elements of safe uncertainty in the map of their research processes. By doing so, they gain insight in the place, form and

intensity of safe uncertainty at certain moments in the process. The overall aims of this activity are:

- Acknowledgement: of the presence of uncertainty during the research process in general.
- Recognition: of safe uncertainty during one's particular process and in that of others.
- Identification: of factors and other elements of safe uncertainty during the process.
- Verbalization and visualization: of safe uncertainty during the process in order to facilitate knowledge sharing and transfer to other learning processes.

Making a research map

In a workshop setting and working on a large sheet of paper, small groups of participants visualize their research process between a self-chosen start and finishing point. Between start and finish the map is filled (linear, iterative, or otherwise) with words/drawings of meaningful elements like incidents or events that appear during the research process. This part of the research mapping activity is supported by participants questioning each other or making suggestions from their own experience. This we regard as an important generative force for the process itself because this dialogue can support visualization.

Plotting Safe Uncertainty

In order to explicate safe uncertainty in the research map, the seven factors of safe uncertainty and the alarm bells, anchors and energizers can be plotted in this map. This can be done by stickers or words that represent these elements. For example, when a certain factor is present at a particular spot on the map, the participant can put stickers on it on a scale of 1 to 10 (1: not much; 10: very much). In order to specify the meaning of a specific moment, keywords can be added.

The result

The result of these two activities is a research map with meaningful elements, speckled with different colors in different places between Start and Finish, accompanied with clarifying keywords.

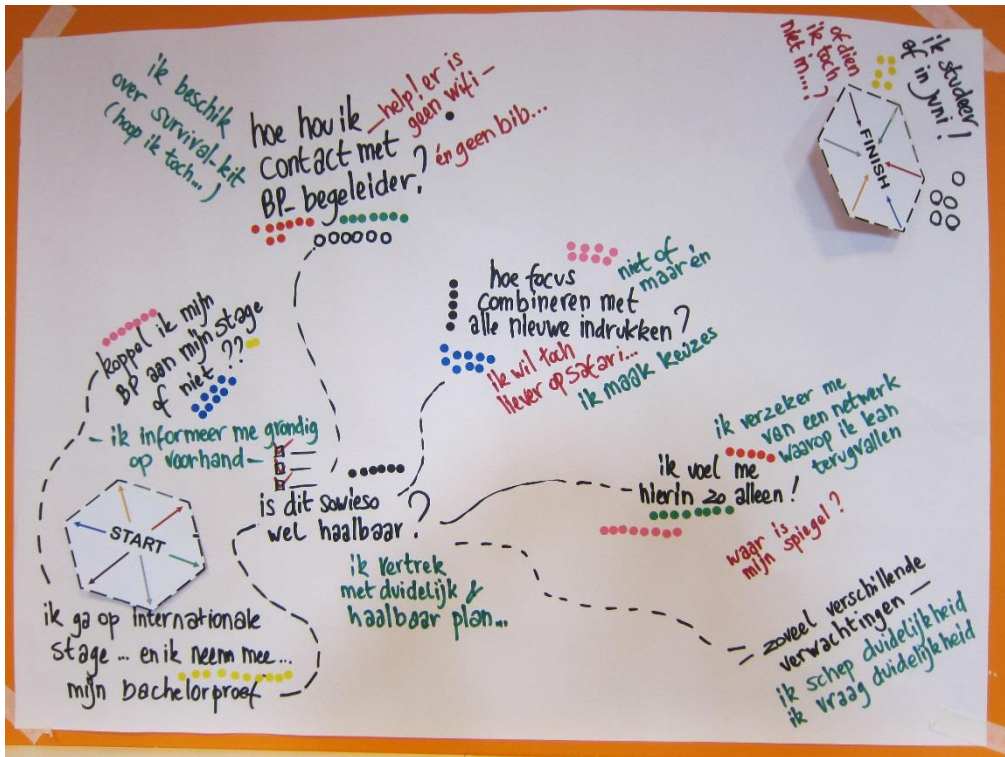


Figure 1. Example of a student map

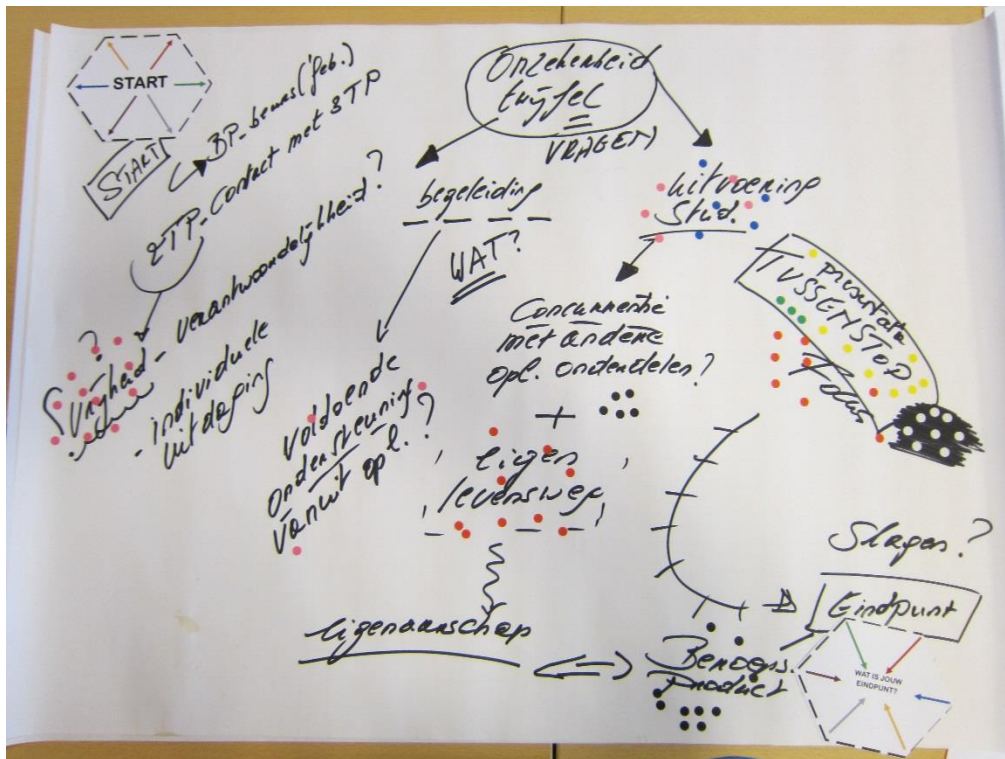


Figure 2. Example of a tutor map

This visualization provides knowledge on where, how and why safe uncertainty plays a role in the research process. This information can be exchanged between the participants by presenting their maps to each other, supporting dialogue on the subject and improving mutual understanding on the subject between the participants.

First experiences and conclusion

Our first experiences with this tool in University College West Flanders in Brugge, Belgium and the master program of Education of the Utrecht University of Applied Sciences, show that mapping safe uncertainty in the research process can produce different outcomes. First, the participants have visualizations and with it specific information of their own process and the meaningful elements within it. Secondly, participants can create a generalized overview of these elements by discussing the different maps and compare different perspectives. Identification of important specific and shared elements by verbalization and visualization acknowledges the presence of safe uncertainty in the process of the participants, creates the possibility for mutual recognition of experiences thereof, and supports engagement in an in-depth co-creation process within different constellations of groups (only students, only teachers or a mix of both). This means that the research mapping tool also generates information for teachers and even researchers, that can be used to improve the learning space and to learn more about safe uncertainty in the research process.

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