

# Validation of a Science Adapted Identity Model

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**Abstract.** The research project aims to validate an adapted identity model that combines a socio-psychological and a sociological concept of identity. The synthesis of the two perspectives offers a comprehensive insight into learners' engagement with and their positioning towards science. The adapted identity model proposes four multidirectional identity dimensions to analyse the science identity of learners, namely autobiographical, discursal, authorial, and sociocultural available identity. Narrative interviews with learners in their first two years in science education (with a focus on physics and chemistry) are used to validate the adapted identity model.

## Theoretical framework and research questions

According to the international science education research, educational choices can be understood in relation to identity [1, 2]. The identity construct is chosen as a multi-perspective approach to analyse students' engagement with and positioning towards science. From a holistic perspective it focuses on the students themselves, rather than on individual or isolated educational constructs [3, 4]. As students' science engagement declines, educational actors face the challenge of learners rejecting science as "not for me", although they see science as interesting and socially relevant [5]. From an identity perspective, this challenge can be understood as a tension between "doing science" and "being a scientist" [5]. Looking at and engaging with science is influenced by significant others and school experiences [6] and is exacerbated by the male-dominated image of science, especially when this image does not match the young people's self-image [7].

The identity construct used in international research in the field of science education spans socio-psychological and sociological perspectives. Identity is defined and empirically examined differently from and within these perspectives. Studies from the field of mathematics education show that in many cases the methodological approach does not match the (previously defined) identity construct [8, 9]. The identity construct comprises a person's image or perception and knowledge of themselves, whereby this self-perception can only represent a section of a person's identity and remains provisional. Identity has a processual character, is both individual and context-related, uniform, and yet contradictory, orientated towards the past (visible in coherence) and a possible future [1-5].

The multidimensional and multidirectional identity model developed by Ivanič for the study of writing identity encompasses these fundamental aspects in the dimensions of autobiographical, discursal, authorial, and sociocultural available identity [10, 11]. Fellus has used Ivanič's identity model for a literature review on conceptualizing identity in mathematics education [9]. The model is further sharpened for the study of science identity regarding the socio-psychological and sociological perspective. The identity dimensions autobiographical identity (personal experiences, beliefs, and interests) and sociocultural available identities (experiential and imaginative space of individuals) can be assigned to the socio-psychological perspective, whereas the discursal identity (signs and symbols) and authorial identity (ideas, expressions, and statements) are sociologically orientated due to their negotiating character and possible inconsistency.

The research project aims to answer the following research questions:

- Is the identity model developed by Ivanič adaptable for researching science identity in a socio-psychological and sociological perspective?
- Can empirical evidence be found to support the validity of the adapted model?

## Methods and measurement tools

Narrative interviews are used to validate the adapted identity model and to give insights into learners' science identity. The interview data are collected at fifteen grammar schools in years six to nine in Germany (N=52, 48% female). The interviews with individual students focus on specific situations, interests, and experiences that the learners associate with science (physics/chemistry) or the respective lessons. They can clarify their attitudes and positions towards science and science lessons, science activities and extracurricular science programmes. In addition, the learners are also asked about significant others and with whom they talk about science and science lessons, and how they experience the subject teachers in the classroom. The interviews are analysed using qualitative content analysis [12]. The findings are assigned to the outlined identity dimensions.

## Summary

In the first part of the presentation the theoretical framework and the adapted identity model will be presented and in the second part the model will be applied and discussed in greater depth using the interview analyses as examples.

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