STEMIO Proposed "Identity" Definitions

Context: An identity includes both what makes someone unique and what makes them the same as others

"For Hegel, nothing simply is; everything is also what it is not and has its identity in what negates it" — author and professor (U. of Vermont) Todd McGowan in *Emancipation After Hegel: Achieving a Contradictory Revolution*

In STEMIO, we have to distinguish the philosophical definition of identity as sameness (i.e., numerical identity (defined below)) from its sociological definition regarding how one is perceived

**Identity** (sociology) = def. a cognitive representation of some entity [B in the mind of some entity A]

* Uses "cognitive representation" from the Mental Functioning Ontology
* The ending in brackets is implied and may be redundant and thus optional
* We can only identify entities that we are aware of (i.e., that we have a cognitive representation of)
* An entity may have more than one identity
* As a cognitive representation, an identity is subjective
* An entity's identities aren't necessarily consistent with each other
* An identity may change over time

**Identity** = def. (alternative) a set of properties — qualities, roles, and dispositions — of an entity A by which A is compared and contrasted with other entities [i.e., a set of properties that characterize A]

Depending on the level of granularity considered, an identity may be shared (e.g., two students may be known only as A-students to someone else)

**Qualitative identity** = def. the relation that entities A and B stand in if they both bear some property P

* Different entities may be less or more qualitatively identical, or qualitatively identical in some specific sense, depending on how many or which properties they share
* "Poodles and Great Danes are qualitatively identical because they share the property of being a dog, and such properties as go along with that, but two poodles will (very likely) have greater qualitative identity" — *Stanford Encyclopedia of Philosophy* > Identity

**Numerical identity** = def. the relation that entities A and B stand in iff A = B — i.e., iff they are one and the same thing

* Numerically identical entities have maximal/perfect qualitative identity

**Personal identity** = def. the unique numerical identity of a person over time

**[To] Identify** = def. to assign/attribute/ascribe an identity to an entity

* Different entities may identify an entity A differently
* Entity A may identity entity B differently at different times or in different contexts
* Which of an entity A's identities are relevant at time t depends on the domain with which A is associated at t by whichever entity is identifying A
* If no entity ascribes a particular identity to an entity X at t, then that is not one of X's identities at t

**Self-identity** = def. an identity that an entity A ascribes to itself

**Personal identity** = def. a self-identity as a separate entity that persists over time

* Personal identity arises from what you think sets you apart from other entities
* Personal identity is the unique numerical identity of a person over time — i.e., what makes a person the same person at any time

**Ego identity** (aka The Self) = def. a stable, conscious self-identity that's manifested by awareness of one's enduring characteristics and relationships

* Ego identity is the perception of continuity and coherence in one's self-identity
* Ego identity is a strong sense of self
* Ego identity is developed through social interaction and self-reflection

**Narrative identity** = def. a self-identity that evolves as one integrates their life experiences into an autobiographical story about their life

* A narrative identity derives from a reconstructed past, perceived present, and imagined future
* Dan P. McAdams, Kate C. McLean (2013). "Narrative Identity." *Current Directions in Psychological Science*, *22*(3), 233–238

**Participative identity** = def. an identity that an entity acquires by participating in a particular process

* Participative identities are often associated with roles

**Discursive identity** = def. a (participative?) identity constructed from the domain-specific spoken or written interactions that one participates in

* "In every discursive exchange, participants co-construct meaning through interactions that position them as particular types of people (e.g., scientific, literate, competent, oppositional, etc.)"
* Kristiina Kumpulainen, Antti Rajala (2017). "Dialogic teaching and students’ discursive identity negotiation in the learning of science." *Learning and Instruction*, Vol. 48, 23-31
* Discourse offers ways to use language to signal one's identity in the form of group affiliations and cultural membership
* A discursive identity depends on one's prior history, assumptions, and cultural knowledge

**Relational identity** = def. a self-identity based on one's perception of their roles in their association with another individual or group

* A relational identity is made up of both role-based and person-based identities

**Role**[**-based**] **identity** = def. a self-identity based on the acquisition of some social role

* An entity's role identities follow a hierarchical structure; higher-ranked identities are more likely to persist over time
* RC Morris (2013). "Identity Salience and Identity Importance in Identity Theory." *Current Research in Social Psychology*

**Person-based identity** = def. an identity based on the properties of the role-bearer that affect how a role-based identity is realized

* "Person-based identity shapes how role-based identity is enacted as relational partners interact"
* Escribano PI (2022). "A relational identity approach to study the antecedents of family supportive supervision." *Frontiers in Psychology*

**Performative identity** = def. a [participative] identity that an entity acquires by participating in communicative actions

* A performative identity seems more participative than role-based because it's defined by the communicative act, rather than by one's role as communicator

**Group identity** (aka collective identity) = def. an identity based on a shared sense of belonging to a group, especially in intergroup contexts

**Social identity** = def. a self-identity based on one's group memberships

**Professional self-identity** = def. a self-identity based on the degree to which one identifies with their professional group

* One's professional self-identity is the extent to which they feel like a true member of their profession and community of practice

**Science identity** = def. a role identity constructed via 1) participation in scientific activities and 2) one's self-categorization as a member of particular scientific communities or as a bearer of scientific roles

* Science identity comprises both how much one perceives themselves as a "science person" and to what degree they are socialized into the "norms and discourse practices of science"
* Science identity is driven by 1) a sense of community and affiliation, (2) consistent extrinsic and intrinsic attitudinal factors—primarily, an interest in science—and 3) a match between school science and real science
* Vincent-Ruz, P. and Schunn, C.D (2018). "The nature of science identity and its role as the driver of student choices." *International Journal of STEM Education*
* "An individual assumes and nurtures a science identity by developing scientific competence in one's own mind and in the eyes of others, by having the skills and opportunities to act like a scientist, and by obtaining recognition from oneself and meaningful others as being a scientist"
* National Academies of Sciences, Engineering, and Medicine; Policy and Global Affairs; Board on Higher Education and Workforce; Committee on Effective Mentoring in STEMM; Dahlberg ML, Byars-Winston A, editors. *The Science of Effective Mentorship in STEMM*. Washington (DC): National Academies Press (US); 2019 Oct 30. Ch. 3, "Mentoring Underrepresented Students in STEMM: Why Do Identities Matter?"

**Math identity** = def. a role identity based on the dispositions and beliefs one develops about their ability to participate and perform effectively in mathematical contexts

**Engineering identity** = def. a role identity that one acquires during their experiences in engineering, typically in college

* One's engineering identity arises from one's beliefs of their interest in the subject, their performance/competence, and recognition within the field of engineering
* Dina Verdin et al (2018). "Understanding How Engineering Identity and Belongingness Predict Grit for First Generation College Students"

**Technology identity** = def. a self-identity based on one's access to technology, one's technological abilities, the role/importance of technology in one’s life, and one’s own motivation to learn more about technology

**Medical identity** (aka professional identity) = def. a role identity based on one's expectations, training, experience, and social treatment as a medical student, teacher, and/or professional

* "A medical identity can be considered healthy when there has been a gradual transition between the student’s ideals and the reality experienced at the end of the internship and in hospital practices or when there is no confusion, feeling of anguish or anxiety related to the physician’s role in the interprofessional teams and in the society"
* "A healthy medical identity consists of characteristics such as sensitivity, empathy, integrity, generosity, tolerance, common sense, intelligence, dedication, ability to consolidate and repair"
* Débora Alves dos Santos Fernandes et al (2023). "Student-related aspects in the construction of the Medical Identity: an integrative review." *Revista Brasileira de Educação Médica*. 47(1)
* Medical identity is currently addressed in contemporary literature on 'professionalism'

**The hidden curriculum** = def. the socialization process that occurs during one's medical education

**Psychoanalytic identity** = def. a role identity based on one's training and practice as a psychoanalyst

* Uses "psychoanalyst" from the BFO-compliant Mental Health Management Ontology (MHMO) on BioPortal
* In the MHMO, "health professional" is a type of role, and "psychoanalyst" is a type of health professional
* "The nucleus of [an analyst's] psychoanalytical identity is the psychic representation of psychoanalysis in the internal world of the analyst—i.e., psychoanalysis as an internal object" — Robert S. G. Wille

**Psychoanalytic identity** = def. (alternate) a role identity based on one's training and practice observing and reflecting on another person's conscious and unconscious mental functioning

**STEM identity** = def. a role identity based on how one thinks about themselves as learners of—and as people who know about, use, and sometimes contribute to—the STEM fields of science, technology, engineering, and mathematics

* "STEM identity may be described as the ways in which individuals fit within STEM fields, and in particular, how individuals make meaning of scientific experiences and how society structures possible meanings for those experiences. STEM identity plays a powerful role in an individual's success or failure, in academic and career environments" — John Beverley in the STEMIO README
* STEM identity is a reflection of one’s relationship to STEM fields—whether in education, research, industry, culture, or society—or to technology itself — Cameron More in dialogue on drafting these definitions
* When people engage with STEM, where they are on a continuum of STEM identity influences their expectations of how interesting and successful the experience will be
* Jamie Bell et al. "Defining and Measuring STEM Identity and Interest in STEM Learning." *Connected Science Learning* October-December 2019 (Volume 1, Issue 12)
* STEM identity is closely intertwined with STEM interest and engagement
* Allen, P.J., Chang, R., Gorrall, B.K. *et al.* From quality to outcomes: a national study of afterschool STEM programming. *IJ STEM Ed* **6**, 37 (2019)
* People who develop stronger STEM identities engage with STEM topics more often and more deeply
* Bell, J., Besley, J., Cannady, M., Crowley, K., Grack Nelson, A., Philips, T., Riedinger, K., & Storksdieck, M. (2018). "The Role of Identity in STEM Learning and Science Communication: Reflections on Interviews from the Field." Washington, DC: Center for Advancement of Informal Science Education.
* A stronger STEM identity increases the likelihood that people will continue to develop science literacy or follow an educational path toward a science career or a profession that requires or benefits from STEM education
* Çolakoğlu J, Steegh A and Parchmann I (2023). "Reimagining informal STEM learning opportunities to foster STEM identity development in underserved learners." *Frontiers in Education* 8:1082747
* In the literature, "STEM identity" may be used as a synonym for "science identity"
* A technology, engineering, or math identity isn't a type of STEM identity; they are each an interdependent aspect of STEM identity

**STEMM identity** = def. a role identity resulting from the synthesis of one's STEM and medical identities

* A STEMM identity isn't a superclass of STEM identity because people's STEM identities may be inextricably intertwined with their medical identities
* Student experiences in STEMM contexts are highly contingent upon their social identities
* Multiple citations in National Academies of Sciences, Engineering, and Medicine; Policy and Global Affairs; Board on Higher Education and Workforce; Committee on Effective Mentoring in STEMM; Dahlberg ML, Byars-Winston A, editors. *The Science of Effective Mentorship in STEMM*. Washington (DC): National Academies Press (US); 2019 Oct 30. Ch. 3, "Mentoring Underrepresented Students in STEMM: Why Do Identities Matter?"

**Identity attributes** = def. a set of properties that, when taken together, distinguish one entity from another

* Identity attributes include both factual and subjective attributes

(Ignore the rest)

**identity affordance** = def.

**identity constraint** = def.

**curiosity** = def. a wanting to learn about something