# Introduction

How to include attitue-behavior gap? Big framing and then Campbell?

Why not necessary to look at knowledge? Knowledge-behaviour gap?

Big framing? Idea for education, especially emancipatory approaches to sustainability to foster human agency

Participatory approach - leave out?

Emancipatory vs instrumental BNE?

**Big framing: actual Behavior??**

**Big framing: Measurement of self-efficacy beliefs is important!**

* **What to measure and why? Individual and then collective behavior? (within framing of defining and measuring ESD outcomes?)**
  + **Why is it relevant to measure self-efficacy**
    - **Whole-institution**
    - **Better goal/ outcome (moral side) out education intervention(goal desirability)**
    - **Better predictor of behavior?**
    - **Importance of collective as well? Agencies!**
    - **To counteract negative climate emotions**
    - **Discussion: actual shift of power**
    - **Useful in terms of context sensitivity?**
    - **Method of project corresponds to recommendations methods Riess (importance feedback environment!)**

## Topic sentences to lead upto RQs:

## General intro

* Education as crucial element in the shift towards more sustainability
* Educational efforts for this summarised under Education for sustainable development (ESD)
* ESD at the centre of the 2030 SD Agenda, key enabler of SD
* Important role ESD but also criticism
* Input level: Polics level on intl, national, local levels: how succesful were those/ desired effect?
* Not easy to measure, but important – if we want ESD to make real contribution to urgently needed changes in society
* Focus on micro-level and how to measure learning outcomes
* General importance BNE and controvery
  + Def ESD on local level (see EWM p.2)
  + Output orientation: achievement of these goals? – competencies which enable the learners to contribute to real-world change
  + Measurement instrument, which has proven to be predictive of real-world behaviour impact
* SCs, their development, sustainability and educational governance through policy-making 🡪 appropriate evidence-based recommendations for development of ESD research and implementation of ESD in school practice
* No goals/ methods defined 🡪 without operationalisation, no existent mesauring instruments, needs for ESD and effects of ESD-related interventions cannot be defined empirically
* Objectives and competencies not empirically verified 🡪 impedes effective development of ESD
* Focus of article?

## Theory part?

* According to goals (behavioural, motivtional-affectional dimensions)
  + Need for goals and operationalisation! Recourse to exisintg disciplines
  + Goals should be structured and related to each other (Frame model from Riess)
  + Based on three dimensions (Rieckmann, Waltner)
    - Regional education plans or
    - International framework SDGs (Agenda 21), but no operationalisation ESD output, but normatively well founded
  + Definitions
    - Based on Weinert’s concept of competency [[**25**](https://www.mdpi.com/2071-1050/11/6/1717#B25-sustainability-11-01717)], we determine “sustainability competencies as the overarching goal of ESD. Sustainability competencies compromise the entirety of cognitive abilities and skills as well as related motivational, volitional and social readiness in order to solve sustainability-related problems and to shape sustainable development in private, social and institutional contexts” ([[**14**](https://www.mdpi.com/2071-1050/11/6/1717#B14-sustainability-11-01717)], p. 299). This is largely consistent with the following understanding of sustainability competencies: “Sustainable development and social cohesion depend critically on the competencies of all of our population—with competencies understood to cover knowledge, skills, attitudes and values”, defined by the OECD Education Ministers [[**26**](https://www.mdpi.com/2071-1050/11/6/1717#B26-sustainability-11-01717)] and other literature on (E)SD competencies (see for example [[**27**](https://www.mdpi.com/2071-1050/11/6/1717#B27-sustainability-11-01717),[**28**](https://www.mdpi.com/2071-1050/11/6/1717#B28-sustainability-11-01717)]).
  + Behavioral dimension absent! (Lambrechts et al)
  + Model: That’s why three dimensions of model (+ allows allows daaptivity for specific contexts) + counteracts the prominent dominance of cognitive dispositions
    - Level of model?
    - At each level, a distinction is made between cognitive (a), affective-motivational (b), and behavioral (c) aspects, and additional subcompetencies (d).
    - Description of each dimensions? See EWM development
    - Differentiation from non-sustainability related competences
    - 🡪
* Operationalising ESD outcomes (Measurement and Sustainablity competences)
  + - Well established measurement procedures facilitate the itnegration of already operationalised facets of competencies (e.g. attitude) into the larger contruct of sustainablity competences
    - Cognitive/ knowledge dimension:
      * knowledge scales are already available. only specific parts of sustainability knowledge (e.g., environmental knowledge) as a significant subset of sustainability knowledge (e.g., Frick et al., 2004; Maloney & Ward, 1973; McBeth et  al., 2011; Roczen et al., 2014).
      * However, although environmental knowledge is found to be consistently and positively related to environmental attitudes, the relationship is not especially strong (e.g., Arcury, 1990).
      * Behavior prediction through knowledge quite low (Frick 2004), but also indirect (Kaiser, 2003). 🡪 knowledge basis for behaviour, but missing relevant motivational factors
    - Affective-motivational dimensions and behaviroal
      * Close connection
      * No behaviour if costs are perceived too high (Campbell paradigm)  
        🡪 behavioral self-reports used as indicators for a person’s attitudes
      * Operationalisation of attitude and behaviour dimensions in various scales (see Waltner p.2)
  + Campbells paradigm vs TPB
* Methods for measuring goal dimensions:
  + Research exists for goals. But not for adequate measurement instruments
  + Operationalisatoin attempts availale from other research disciplines (+ exisint qualitative data)
  + Exising examples (and also using frame-model)
    - Knowledge covered in article
    - Affective-motivational domain
      * Greenpeace Sustainability Barometer [[**60**](https://www.mdpi.com/2071-1050/11/6/1717#B60-sustainability-11-01717),[**61**](https://www.mdpi.com/2071-1050/11/6/1717#B61-sustainability-11-01717)], the Sustainable Development Values-Scale [[**62**](https://www.mdpi.com/2071-1050/11/6/1717#B62-sustainability-11-01717)], the 2-MEV scale (or also the Preservation and Utilization-Scale) [[**63**](https://www.mdpi.com/2071-1050/11/6/1717#B63-sustainability-11-01717),[**64**](https://www.mdpi.com/2071-1050/11/6/1717#B64-sustainability-11-01717),[**65**](https://www.mdpi.com/2071-1050/11/6/1717#B65-sustainability-11-01717),[**66**](https://www.mdpi.com/2071-1050/11/6/1717#B66-sustainability-11-01717)]. Items from earlier measurement tools emerging from environmental science or environmental psychology may be helpful in the search, especially for the environmental dimension of SC, for example Kaiser et al.’s scale for Environmental Attitude or Connectedness to Nature [[**57**](https://www.mdpi.com/2071-1050/11/6/1717#B57-sustainability-11-01717),[**67**](https://www.mdpi.com/2071-1050/11/6/1717#B67-sustainability-11-01717),[**68**](https://www.mdpi.com/2071-1050/11/6/1717#B68-sustainability-11-01717)] or on environmental values, beliefs, and concerns, or environmental literacy [[**69**](https://www.mdpi.com/2071-1050/11/6/1717#B69-sustainability-11-01717),[**70**](https://www.mdpi.com/2071-1050/11/6/1717#B70-sustainability-11-01717),[**71**](https://www.mdpi.com/2071-1050/11/6/1717#B71-sustainability-11-01717)]; see also the revised New Ecological Paradigm (NEP) Scale [[**72**](https://www.mdpi.com/2071-1050/11/6/1717#B72-sustainability-11-01717)].Empirical data and self-reported
    - Behavioral dimension
      * In a societal context, it is first and foremost about promoting the ability to act. This is exemplified in the work undertaken mainly by researchers from environmental psychology [[**73**](https://www.mdpi.com/2071-1050/11/6/1717#B73-sustainability-11-01717),[**74**](https://www.mdpi.com/2071-1050/11/6/1717#B74-sustainability-11-01717),[**75**](https://www.mdpi.com/2071-1050/11/6/1717#B75-sustainability-11-01717),[**76**](https://www.mdpi.com/2071-1050/11/6/1717#B76-sustainability-11-01717),[**77**](https://www.mdpi.com/2071-1050/11/6/1717#B77-sustainability-11-01717)], for example, the General Ecological Behavior (GEB)-scale [[**67**](https://www.mdpi.com/2071-1050/11/6/1717#B67-sustainability-11-01717),[**68**](https://www.mdpi.com/2071-1050/11/6/1717#B68-sustainability-11-01717)].
    - Mention subcomepetencies?
    - Additionally, an important theoretical background for the test construction in the framework of our study, as well as for hypothesis formulation, were studies emerging mainly from environmental psychology that dealt with the interconnections and influence patterns of environmental knowledge, environmental attitudes, and environmental behaviors (see for example [[**57**](https://www.mdpi.com/2071-1050/11/6/1717#B57-sustainability-11-01717),[**64**](https://www.mdpi.com/2071-1050/11/6/1717#B64-sustainability-11-01717),[**65**](https://www.mdpi.com/2071-1050/11/6/1717#B65-sustainability-11-01717),[**66**](https://www.mdpi.com/2071-1050/11/6/1717#B66-sustainability-11-01717),[**67**](https://www.mdpi.com/2071-1050/11/6/1717#B67-sustainability-11-01717),[**68**](https://www.mdpi.com/2071-1050/11/6/1717#B68-sustainability-11-01717),[**69**](https://www.mdpi.com/2071-1050/11/6/1717#B69-sustainability-11-01717),[**70**](https://www.mdpi.com/2071-1050/11/6/1717#B70-sustainability-11-01717),[**71**](https://www.mdpi.com/2071-1050/11/6/1717#B71-sustainability-11-01717),[**72**](https://www.mdpi.com/2071-1050/11/6/1717#B72-sustainability-11-01717),[**73**](https://www.mdpi.com/2071-1050/11/6/1717#B73-sustainability-11-01717),[**74**](https://www.mdpi.com/2071-1050/11/6/1717#B74-sustainability-11-01717),[**75**](https://www.mdpi.com/2071-1050/11/6/1717#B75-sustainability-11-01717),[**76**](https://www.mdpi.com/2071-1050/11/6/1717#B76-sustainability-11-01717),[**86**](https://www.mdpi.com/2071-1050/11/6/1717#B86-sustainability-11-01717),[**87**](https://www.mdpi.com/2071-1050/11/6/1717#B87-sustainability-11-01717),[**88**](https://www.mdpi.com/2071-1050/11/6/1717#B88-sustainability-11-01717),[**89**](https://www.mdpi.com/2071-1050/11/6/1717#B89-sustainability-11-01717),[**90**](https://www.mdpi.com/2071-1050/11/6/1717#B90-sustainability-11-01717)]).
  + Ideal would be observational data
  + Reality:self-reports more frequently used
    - Advatanges: easier to obtain, especially large qunatities, broader assessment of different behaviours (aggregrated measurements of behavioral classes)
    - BUT Gap between self-reported behaviour and objective behaviour 🡪 indicators mesaure outcome of ESD have tob e validated as to their congruence with real-life outcomes (as real-life relevant for shift to more sustainable socieety/ decision)
    - Underlying: behaviour outcome can and should be goal of ESD??!
  + Long-term (longitudinal) data (from input to output orientation!)
    - Some effects (teaching, whole school approach) only visible long-term + commpexity of interaction of many variables
  + Comparision of design/ form of intervention (involvement of students), compared to research that just looks at development through a year
  + Measuring relevance
    - Bottom-up approach thorugh students and teachers and their decision of what is relevant – backing up through empirical data
    - Interdisciplinary SC
  + Validation (through connection to established indicators)
    - Conceptual examination
      * Newly developed measurement project and established ones
      * Campbell paradigm and the type of questions used! See Waltner p.213
      * For me: Validated through simililarity in questionnaires with validated „new“ measurement tool EWM?
    - Through other scale
      * Using other already validated scale
      * Competency differences which were assessed by mesaurement instrument could point toward differences between students
      * When using two scales (as I did, report r) 🡪 the two scales measure the same latent construct
    - Support for Campbell paradigm: attitudes can be derived from verbal acts and self-reports. Not necessary those specific ones, but could be any well-phrased ones 🡪 higher priority of specific objectivity within validation criteria for measurement in general
  + Validation through prediction of impact-relevant behaviour
    - Joining group as behavioral manifestation (in EWM case FFF participation)
    - Proxy for actual behaviour
    - Use joining group as actual behaviour in my case??
* Self-efficacy beliefs
  + Strong and urgent need to pursur large-scale social and ecological aims
  + Need for collective agents! Human agency as motivating people toa ct. Agency based on self-efficacy beliefs
  + Def: belief in ones capabilities to organise and and execute the courses of action required to produce given attainments
  + Field lacks commprehensive framework, but important to understand how individuals and collectives can experience more self-efficacy and act together against social and ecological crisis
  + Theory based on Bandura and being capable of agentic actions
  + Various personal and collective approaches to motivation
  + TPB, as one theory featuring notions of (individual) self-efficacy
    - Especially percieved behavior control
  + Clear guidelines missing on how to operationalise self-efficacy in the context of collective social and ecological aims
  + Can be organised along the lines of agents, actions, aims
    - Agent
      * Personal self or group (based on person’e self concept due to social and emotional group membership)
      * Signals possibility of being able to affect changes
      * Allows for shift between group and self-efficacy
    - Intentional action
      * Intentionally creating and altering the world around them
      * Acttion as any behavior that is time-a dn space bound, measurable, observable, ready tob e performed intentionally
      * Intentional, directed towards aim
      * Actual intentionality or imagined intentionality („if I want to“
      * Can be characterised by their level of self-determination, abstraction, their content
    - Desirable aim
      * Cognitive representation of desired personal or collective outcome
      * Chracteristics: long-term, abstract, purpose.driven
      * Aims direct people’s attention, produce motivational energy, create persistence, foster skill development (Locke, latham, 2002)
      * Self-efficacy and aims influence each other in complex bidirectional ways
      * Importance of desirablity of aim!
  + Linking three As
    - * Distinguishing three self-efficacy links (agent-action, agent-action-aim, agent-aim) – all different types of self-efficacy, see Table 4!
      * Reflected in our definitions and examples is the idea that self-efficacy theory is a theory of beliefs about self-regulated action and aim achievement ([Schwarzer & Schmitz, 1999](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr295-10888683231178056), as cited in [Homburg & Wagner, 2007](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr160-10888683231178056)). This is incorporated by the marker word “can,” combined with a self-categorized agent, an intentional action, and a desirable aim.
      * 3 links can diverge or align, depending on context of interest
      * Almost no empirical data on links + personal/ collective
      * One study reporting very high correlations between efficacy links on both levels (CHECK REESE AND JUNGE)
      * Predictive power for behaviour/ behavioural intentions:
        + Agent-action link and agent-action-aim link have independent predictive power
        + Regarding their predictive power for behavior and behavioral intentions, most studies find that self-efficacy with an agent-action link and an agent-action-aim link have independent predictive power ([Doherty & Webler, 2016](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr98-10888683231178056); [Hunter & Röös, 2016](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr168-10888683231178056); [Y.-J. Lee, Haley, & Yang, 2017](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr219-10888683231178056); [Y. Li & Zhong, 2017](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr222-10888683231178056); [Truelove, 2009](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr347-10888683231178056)). One study also found both self-efficacy with an agent-action and agent-aim link to predict behavioral intentions ([Perrault & Clark, 2018](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr261-10888683231178056)). However, there were also two studies showing that only agent-action self-efficacy and not agent-action-aim self-efficacy ([Lam & Chen, 2006](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr209-10888683231178056)) or only agent-action-aim self-efficacy but not agent-action self-efficacy ([Kautish et al., 2019](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr187-10888683231178056)) continued to be a significant predictor when entered into models simultaneously. One study indicated that none of the efficacy links was predictive of behavioral intention when other variables such as subjective norms were included ([Choi & Johnson, 2019](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr75-10888683231178056)).
        + Interestingly, we found no study reporting agent-aim and agent-action-aim self-efficacy as different predictors in one model. Yet, the study by [Reese and Junge (2017)](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr270-10888683231178056) suggests that correlations with behavior might be very similar and might depend on the level of abstraction, with agent-action-aim self-efficacy potentially being a little more predictive of concrete (plastic consumption) intentions, and more general agent-aim self-efficacy being more predictive of a more general intention. In sum, our review of discriminant and predictive validity indicates that agent-action self-efficacy is distinguishable from agent-aim and agent-action aim self-efficacy. Yet, some inconsistent findings suggest that the results are not conclusive either. As only one study allowed us to make an agent-aim and agent-action-aim comparison, we cannot yet draw conclusions about their empirical distinctiveness nor can we know which characteristics of agents, actions, and aims led to stronger or weaker interdependence between these links
    - 3 advantages triple A
      * Self-efficacy as self-categorised efficacy belief
        + Allows distinction self/ collective, clears
        + Individuals can flexibly shift from categorising themselves as individuals to members of groups (Coking, Fritsche, Tajfel) (different social identity underlying)
      * Includes intentional actions and desirbale aims: laying ground for categorising aim content
        + Collective efficacy was better predictor of pro-evironmental behaviour than self-efficacy ((M-F Chen, 2015)
        + Adding to this, [Hornsey et al. (2006)](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr162-10888683231178056) found that, depending on aim content, members and non-members of a protest group differed in how self-efficacy predicted their action intentions. Several studies included aims in their efficacy measures that were not directly targeting social or environmental issues (e.g., saving money or being healthy, see [Table 7](https://journals.sagepub.com/doi/10.1177/10888683231178056#table7-10888683231178056)). Ignoring the different natures of the aim contents might lead to seemingly incoherent findings and mask the driving principles ([Koletsou & Mancy, 2011](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr202-10888683231178056)).
        + Desirability of aim! If an aim is not desirable but rejected, a self-efficacy measure may trigger defensiveness and capture only the value of the aim (see also [Castiglione, 2021](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr58-10888683231178056)).
        + Therefore, according to [Williams and Rhodes (2014)](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr387-10888683231178056), it might be necessary to add the component “if you want to” to action-focused self-efficacy items to make sure that participants are thinking about an intentional action and as a way to avoid predicting behavioral intentions with another construct capturing intention.
      * Includes aim-focussed self-efficacy
        + Field of collective social and ecological aims is especially prone to aim-fiocussed understanding of self-efficacy because it fits complex nature of collective crisis (Zomeren,2019)
        + For collective aims, the hardest part is not performing an action as such (e.g., going to a protest) but creating social change *with* this action. Individuals only have a very limited amount of control over collective outcomes ([Hornsey et al., 2021](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr163-10888683231178056); [Jugert et al., 2016](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr183-10888683231178056)). Moreover, many barriers lie outside of the individual and are informed by the actions of powerful others; feedback is much more difficult to receive as aims are rather distal (e.g., the impact of an awareness campaign on people’s opinions is difficult to detect; [Hornsey et al., 2021](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr163-10888683231178056)).[3](https://journals.sagepub.com/doi/10.1177/10888683231178056#fn3-10888683231178056)
        + Many actions could (or not) lead to one aim
        + Disctincion aim-focused and action focused self-efficacy
      * Operationalisation
        + I/ relevant ingroup – interesting for education aim!
        + Action should refer to capability in the present moment, so people do not judge future abilities
        + Pilot-studies to test desirable aims
      * Most useful for behavioral predictions
        + Include both agents as social identity is central tot he context oft he study

Personal more strongly related to private action, ingroup with activism

* + - * + Actions and aims should be adapted to outcome variables (which is the category of interest?)
        + Distinguish action- and aim links

Combining actions that are very concrete

With very abstract collective aims

With ingroup no agent-action

* + - Limitations
      * Furthermore, we propose the distinction of three efficacy links (agent-action, agent-aim, agent-action-aim) based on operationalizations and labeling decisions. However, strong empirical evidence for such a distinction and possible moderators of the relation between various efficacy links is still missing. It remains a task for future research to investigate how interdependent these facets of self-efficacy actually are under which circumstances. Therefore, the triple-A framework should be understood as a theoretical proposition that conceptually fleshes out what is already practiced, highlights previously overlooked research questions, and helps researchers make more strategic decisions in the study of efficacy beliefs.
      * Constraints to generality
    - Integration
      * For example, the explanatory power of the theory of planned behavior ([Ajzen, 1991](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr6-10888683231178056)) could benefit from considering agent-aim efficacy beliefs, as in a study by [Bamberg et al. (2015](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr24-10888683231178056), see also [Huijts et al., 2013](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr166-10888683231178056)). As the theory of planned behavior typically focuses on a precise behavioral outcome, an agent-action-aim efficacy may be most appropriate according to the triple-A framework.
      * Efficacy agents
        + While correlational studies typically find that self-efficacy predicts private behaviors and participative efficacy predicts activist behaviors ([Hamann & Reese, 2020](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr143-10888683231178056); [Morton et al., 2011](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr243-10888683231178056)), experimental studies suggest that ingroup efficacy interventions outperform personal self-efficacy interventions in influencing actions (e.g., [Jugert et al., 2016](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr183-10888683231178056)). Causal investigations of their relations are needed for both theorizing and drawing practical conclusions. These investigations could, for example, test whether the path from collective to individual self-efficacy to private behavior, as proposed by [Jugert et al. (2016)](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr183-10888683231178056), is causally replicable (see also [Cocking & Drury, 2004](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr82-10888683231178056); [Reese & Junge, 2017](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr270-10888683231178056)).
        + Moreover, self-projection might cause personal self-efficacy and ingroup efficacy scales to overlap strongly. It could be valuable to test under which conditions our assumption holds that behavior is better predicted when including both personal and collective agents.
        + Second, research could focus on which ingroup efficacy agents are more or less important in specific social and ecological crises. Social identity theory ([Tajfel, 1978](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr330-10888683231178056)) provides a basis for characterizing and systemizing various ingroup *efficacy agents*. Therein, ingroup norms and group size might (interactively) influence the effects of self-efficacy.
      * Actions and aims
        + The theory of planned behavior ([Ajzen, 1991](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr6-10888683231178056)) is a promising foundation for distinguishing action characteristics. Researchers could investigate whether self-efficacy is more strongly related to behavior if efficacy actions are concrete (vs. abstract), located in the public sphere (vs. private sphere), single-time behaviors (vs. routines), and if action-aim contingencies are strong (vs. weak, [Bandura, 1997](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr28-10888683231178056), p. 134).
        + Thus, specific efficacy aims should be more or less associated with long-term collective action tendencies
        + The triple-A framework could also be used for reconsidering agents, actions, and aims to build and maintain a sense of self-efficacy in practical work for social and ecological causes. For example, if someone feels personally helpless, they can reconsider their current group memberships and look for agentic groups that help them regain self-efficacy ([Fritsche et al., 2018](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr126-10888683231178056)). When faced with collective action failure, activists might reconsider their aims so that they can maintain a sense of agency (e.g., “The action failed but we managed to build a network”; [Barr & Drury, 2009](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr37-10888683231178056)). Another option would be reconsidering their actions, and possibly choosing another type of collective action in the future (e.g., non-normative action when confronted with corruption; [Thomas & Louis, 2014](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr340-10888683231178056)). This way, the triple-A framework can also serve as a practical framework of (re)evaluating collective action from a psychological perspective.
      * **Dinstinguishing links between the As**
        + Similarly, the question arises whether these types of efficacy beliefs share the same relation to other constructs (predictors, outcomes, or moderators of relationships). We hypothesize that agent-action self-efficacy might be more connected to actual behavioral costs, socioeconomic circumstances, and impactful behavior, whereas agent-aim self-efficacy might be more closely related to attitudes, goals, visions, and intentional behavior (see [Bain et al., 2013](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr19-10888683231178056); [Bamberg & Rees, 2015](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr23-10888683231178056)). As perceived behavioral control in the theory of planned behavior ([Ajzen, 1991](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr6-10888683231178056)) predicts intention but also moderates intention-outcome relations, we suspect that the same might be true for action-focused self-efficacy. Action-focused self-efficacy is therefore likely to capture actual constraints such as time, money, or social resources that may prevent a person from following through on their intention. However, aim-focused self-efficacy is less related to these constraints and more involved in the formation of an intention. Thus, a key difference between action- and aim-focused self-efficacy may be that the former moderates intention-behavior relations while the latter does not. Connected to this, future research could also explore whether aim-focused self-efficacy is based on less rational thought and more emotional reaction than action-focused self-efficacy, which would explain why analytic interventions have been rather unsuccessful in manipulating it (see [Hornsey et al., 2021](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr163-10888683231178056)).
        + Finally, we believe that distinguishing efficacy is also relevant from a more practical perspective. Distinguishing links between agents, actions, and aims enables better predictions about which characteristics of self-efficacy make it more or less predictive of relevant social and environmental outcome variables. Such detailed knowledge is needed, for example, in campaign design, political decisions, and team building in groups working against social and ecological injustice. Then again, in our own practical work with environmental and social rights activists (e.g., in workshops, lectures, counseling), we noticed that it is not intuitive for practitioners to make the above-mentioned distinctions. Responding to this, researchers could use the triple-A framework to practically integrate self-efficacy links into one overarching framework that simultaneously allows for a more nuanced research overview when it comes to practical counseling and advice.
      * While self-efficacy theory strongly focuses on the need for efficacy (competence), self-determination theory ascribes equal importance to all basic psychological needs (i.e., competence, autonomy, and relatedness), assumes that meeting these needs is intrinsically satisfying ([Elliot et al., 2001](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr109-10888683231178056)), and emphasizes the important role of autonomy for human agency ([Chirkov et al., 2011](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr73-10888683231178056)). Rather than looking at aim strength, self-determination theory distinguishes different qualities of motivation (e.g., [Ryan & Deci, 2017](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr282-10888683231178056)). Based on this, we define perceived agency as the belief that a self-categorized agent can perform a *self-determined* action toward an *autonomous* aim.
      * Thereby, it raises the question of where actual agency for collective social and ecological aims is situated ([Louis, La Macchia, et al., 2016](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr227-10888683231178056)). At this point, our reasoning reaches the boundaries of self-efficacy theory and the triple-A framework and enters the realm of actual (and not only perceived) agency that we believe [Bandura (1997)](https://journals.sagepub.com/doi/10.1177/10888683231178056#bibr28-10888683231178056) also wanted to call attention to. In terms of the triple-A framework, agency thus would not only include agent-action-aim *perceptions* but embrace actual agent-action-outcome *influences*.
  + Link through
    - behaviour or
    - emancipatory ESD
    - wirklich etwas bewirken können (s. Klima-Emotionen!)
  + As predictor for behaviour? Link to other framework and should be used for validation?
  + Methods aspect: Theory: Validation with other scale (see
  + Concepetual aspect:
    - importance environment (whole institution approach)
    - self-efficacy beliefs as goal?
  + Self-efficacy as outcome or as predictor?
* RQ part here
* Overview over following thesis:
  + In order to answer these questions, we resorted, as described above, to existing measuring instruments for the assessment of sustainably significant knowledge, attitudes, behavioral readiness, and subcompetencies to solve partial problems of sustainable development. Finally, items on such facets of sustainability competencies for which we could not find any operationalization in the literature were newly formulated. In the following section, the procedure of the construction of the test and novel data of the results from the first assessment period will be reported. In so doing, we will also investigate whether the test adequately meets important quality criteria of a quantitative measuring instrument. In the discussion of the results, we want to explore the opportunities and limits for the further development of ESD, arising from the use of appropriate assessment instruments.

Important empirical data

* Self-efficacy data?

**Pauli**

Die statistischen Auswertungen lieferten Antworten auf die Teilfragen der übergeordne-ten Forschungsfrage, inwiefern sich der Grad der Teilnahme am KRS-Projekt auf das Klimabewusstsein und -handeln der SuS auswirkt. Die Zusammenhangsmaße Spearmans Rho und Eta-Quadrat zeigen zum zweiten Messzeitpunkt überwiegend positive Korrela-tionen mit mittleren Effektstärken zwischen dem Grad der Teilnahme und den Skalen-werten. Das bedeutet, je mehr die Person an der KRS beteiligt war, desto größer ist ihr Klimabewusstsein bei der Nachher-Befragung. Da zum ersten Messzeitpunkt weniger signifikante Werte und geringere Effektstärken vorlagen, gilt eine positive Wirkung des BNE-Projekts gilt als gesichert. Die Mittelwertvergleiche zeigen, dass vor allem die in-volvierte KRS-Schulgruppe von der Teilnahme profitieren konnte.

**Development and Validation of an Instrument for Measuring Student Sustainability Competencies**

Recalling the research questions of the study, we can state that a tool for measuring sustainability competencies (applicable for students in secondary schools in Baden-Wuerttemberg) could be developed and tested using four subdimensions of sustainability competencies: *Sustainability related knowledge* (I), *Affective-motivational beliefs towards sustainability* (II), *Sustainability-related behavior* (III), and *Intentional sustainability knowledge applied* (IV). When constructing an instrument to measure sustainability competencies, social desirability can be a pitfall making it difficult to state whether the given indications correspond to the actual sustainability related convictions or behaviors. Being aware of these pitfalls, we conscientiously formulated the items accordingly to avoid social desirability as much as possible. Nevertheless, difficulties of high discrepancies between the self-reported convictions, affective-motivational beliefs and behavior related to sustainability and the actual behavior remain. In this regard, Kagawa states that “[*t*]here are multiple factors which influence the process of behavioral change and further investigation of dissonance between students’ perception of sustainability and their individual actions needs to be explored” [[**106**](https://www.mdpi.com/2071-1050/11/6/1717#B106-sustainability-11-01717)]. See, for example, research on the attitude–behavior gap [[**103**](https://www.mdpi.com/2071-1050/11/6/1717#B103-sustainability-11-01717),[**107**](https://www.mdpi.com/2071-1050/11/6/1717#B107-sustainability-11-01717),[**108**](https://www.mdpi.com/2071-1050/11/6/1717#B108-sustainability-11-01717)] or cognitive dissonance [[**109**](https://www.mdpi.com/2071-1050/11/6/1717#B109-sustainability-11-01717),[**110**](https://www.mdpi.com/2071-1050/11/6/1717#B110-sustainability-11-01717)]. Further implications for future research and an outlook will be given in the concluding section of this article.

Over and above that, other important stakeholders of ESD in schools, such as the teachers, the principals, or variables such as, for example, institutional aspects in the sense of the whole institution approach, should be taken into account as well. The question of if and how a policy has been successfully implemented on the international, nationwide, or local level is an essential domain of (political) science. Neglecting the critical success questions involved in implementing a policy means that the lacks and weaknesses of the implementation process go unnoticed. This is equally true in the field of ESD. On a policy level, the development of further indicators (see for example [[**114**](https://www.mdpi.com/2071-1050/11/6/1717#B114-sustainability-11-01717),[**115**](https://www.mdpi.com/2071-1050/11/6/1717#B115-sustainability-11-01717)]), or the evaluation of ESD programs (see for example [[**13**](https://www.mdpi.com/2071-1050/11/6/1717#B13-sustainability-11-01717),[**116**](https://www.mdpi.com/2071-1050/11/6/1717#B116-sustainability-11-01717)]), seem like helpful supplements to foster future steps and crucial insights in the implementation process of programs that aim to promote learner competencies to build a sustainable future.

**BUGEN**

* Zu beiden Messzeitpunkten ließen sich zunächst die folgenden Tendenzen feststellen: Mit steigender Klassenstufe steigt über beide Messzeitpunkte hinweg auch das Nachhaltigkeitswissen statistisch bedeutsam (p < .001). A
* Im Gegensatz dazu konnte jedoch für die Skalen nachhaltigkeitsbezogene Einstellungen und selbstberichtetes nachhaltigkeitsbezogenes Verhalten festgestellt werden, dass die Schüler/-innen mit ansteigender Klassenstufe geringere Werte bei den nachhaltigkeitsbezogenen Einstellungen (p < 0.01). und selbstberichteten nachhaltigkeitsbezogenen Verhaltensskalen (z.B. für die Skala Nachhaltigkeitsverhalten p
* Auch die beiden klassenstufenspezifischen Auswertungen für die Skala IV nachhaltigkeitsbezogenen Problemlösen und Verhaltensintentionen zeugen von einer statistisch bedeutsamen Zunahme in der kognitiven Dimension der Nachhaltigkeitskompetenz im Verlauf des Schuljahres der Klassen 5 und 6 (F(1, 648) =21.75, p < .001).
* Zusammenfassend kann daher konstatiert werden, dass die kognitive Dimension für alle Schulformen statistisch bedeutsam zunahmen (s. Abbildungen 4, 8, und 9), während die affektive Dimension während eines Schuljahres leicht zurückging, das selbstberichtete Verhalten dagegen eher konstant blieb. Diesbezüglich gilt es noch tiefergehende Gruppenanalysen anzustellen, um aufzuklären für welche Gruppen innerhalb des großen Samples diese rückläufigen Trends zutreffen. Jedoch entspricht die festgestellte Entwicklung der Nachhaltigkeitskompetenzfacetten (der Anstieg des Wissens und der Abfall der Gelingensbedingungen für die Entwicklung von Nachhaltigkeitskompetenz 23 Einstellungen/Verhaltensintentionen mit höheren Klassenstufen) internationalen und nationalen Befunden aus vergleichbaren Studien (Grund & Brock, 2018; Krettenauer, 2017; Liefländer et al., 2013). Sie werfen jedoch auch die Frage auf, welche Dimensionen der NK verstärkt im Schulunterricht fokussiert oder priorisiert werden sollten.

Link Sustainability competences and self-efficacy

From deepl

Empirical studies, particularly in the realm of environmental psychology, support this paradigm. Research has shown that environmental attitudes are predictive of corresponding behaviors like recycling or energy saving when the costs associated with these behaviors are considered. This highlights the practical applications of Campbell’s paradigm, suggesting that interventions aimed at changing behaviors can be more effective if they reduce the perceived costs of those behaviors, thereby making it easier for individuals’ attitudes to align with their actions.

Additionally, this approach to attitude-behavior studies illuminates the dynamic nature of attitudes and their expression in behavior. By focusing on the costs associated with behaviors, this paradigm provides a framework for understanding how different environmental and personal factors can influence the strength and directional flow of attitudes into behaviors. It challenges researchers and practitioners to rethink how attitude change interventions are designed and implemented, emphasizing the reduction of behavioral costs as a key strategy for promoting sustainable behavior change.

From Pauli

Das kann daran liegen, dass die TPB mit der PBC in gewissem Maße kontextuelle Fak-toren und vor allem Selbstwirksamkeitsüberzeugungen mit einbezieht (Fishbein & Ajzen, 2010, S. 18). In den ursprünglichen VBN- und NAM-Modellen fehlt die Komponente der tatsächlichen Fähigkeiten für das gefragte Verhalten. Es gibt jedoch durchaus weiterent-wickelte Modelle, in denen neben AC und AR unter anderem auch die Fähigkeit, die für das Verhalten notwendig ist, als Bedingung für die Aktivation von persönlicher Norm einbezogen werden (Klöckner, 2013, S. 1030).

## Frame model for sustainability competencies (heading from EWM paper!)

Text from chatgpt – check!

The theoretical framework of the study centers on the development of sustainability competencies within the context of Education for Sustainable Development (ESD). Key sources highlight the necessity for well-defined ESD objectives, as evidenced in international agreements such as Agenda 21 and the World Decade of ESD, which emphasize the transformation of attitudes towards sustainable development. Despite these comprehensive goals, there exists a critical gap in the operationalization of these objectives, which hampers the empirical measurement of ESD outcomes. Existing educational research has attempted to address these shortcomings by suggesting the integration of empirically tested measurement tools from related fields such as environmental psychology and educational sciences. These tools aim to operationalize sustainability competencies by encompassing environmental knowledge, awareness, and behavior, thereby enhancing the efficacy of ESD interventions.

To further structure ESD learning goals and competencies, the Frame-Model for Sustainability Competencies has been proposed, drawing upon empirical educational research and the competencies model outlined by Weinert. This model categorizes sustainability competencies into three broad domains: cognitive, affective-motivational, and behavioral. Each domain is further divided into subcompetencies that detail specific cognitive abilities and skills necessary for addressing sustainability-related challenges across personal, social, and institutional contexts. The framework emphasizes the importance of integrating knowledge, skills, attitudes, and values to foster sustainable development and social cohesion. Moreover, the model allows for adaptability to different educational levels and contexts, ensuring that the competencies remain relevant and applicable to various sustainability challenges. This approach addresses the prevailing critiques in competency-based education by providing a structured yet flexible framework that encompasses a comprehensive set of sustainability competencies.

A diagram of a diagram

Description automatically generated

## Approaches for measuring

Also from ChatGPT

The section on "Approaches for Measuring Sustainability Competencies" delves into the development of measurement instruments essential for effectively gauging the impact of Education for Sustainable Development (ESD). This is particularly crucial for the more advanced levels of sustainability competencies (Levels 2 and 3), where existing operationalizations are sparse. To fill this gap, the section suggests utilizing established tools and tasks that reflect the subject-specific effects of ESD, particularly in school settings. It acknowledges the existing endeavors across various research disciplines that have started to define and measure the cognitive, affective-motivational, and behavioral dimensions of sustainability competencies. For instance, detailed instruments already developed for specific sustainability areas provide a foundation for measuring cognitive aspects, while qualitative approaches, such as those employed in certain regional studies, contribute to the field by offering preliminary operational frameworks.

The discourse extends to the operationalization of the affective-motivational and behavioral dimensions of sustainability competencies. For affective aspects, several scales like the Greenpeace Sustainability Barometer and the Sustainable Development Values-Scale are highlighted as instrumental in evaluating attitudes and values related to sustainability. These tools, initially derived from environmental psychology, help in understanding the intricate relationships between environmental attitudes, values, and behaviors, thereby supporting the broader spectrum of sustainability competencies. Similarly, for the behavioral dimension, scales such as the General Ecological Behavior (GEB)-scale have been pivotal in capturing sustainable practices and conservation behaviors. These measurement tools are vital for promoting actionable competencies in societal contexts, facilitating a comprehensive understanding and enhancement of sustainable behaviors.

Furthermore, the section underscores the importance of integrating existing tools from related fields to develop robust measurement instruments that can address the diverse facets of sustainability competencies. This approach not only enriches the empirical basis for ESD but also ensures that the measures are adaptable and relevant across various educational and social contexts. By leveraging interdisciplinary research and proven tools, the field of ESD can advance towards a more structured and effective evaluation of sustainability competencies, essential for fostering enduring sustainable development.

## Self-efficacy theory block

Also ChatGPT

The Triple-A Framework presented in the discussed article offers a structured approach to enhance the somewhat fragmented field of self-efficacy research, particularly in the context of collective social and ecological aims. This framework is essential for addressing social and ecological crises more effectively through targeted interventions. Structured around three core components—agent, action, and aim—the framework builds on the foundational theories of self-efficacy, including Ellen Skinner's agents, means, and ends of control, and self-categorization theory by Turner et al.

A diagram of action and action

Description automatically generated

**First Component: Self-Categorized Agent**  
The Triple-A framework starts with the notion of a "self-categorized agent," which can be an individual or a collective group (an ingroup), where the group is part of an individual’s self-concept influenced by social and emotional group memberships. This distinction allows for the exploration of both personal self-efficacy and collective efficacy within the same framework. Collective efficacy specifically refers to the capabilities of a group, termed "ingroup efficacy" when considering self-categorized collective agents. This dual perspective facilitates the integration of personal and collective action research, providing a comprehensive view of efficacy across different contexts.

**Second Component: Intentional Action**  
The second aspect of the framework, intentional action, highlights that self-efficacy involves deliberate, measurable actions aimed at achieving specific outcomes. These actions are defined not just by their intentionality but also by their self-determined nature and their contextual relevance to collective social and ecological objectives. This component underscores the proactive nature of self-efficacy in influencing and altering environmental and social conditions.

**Third Component: Desirable Aim**  
Finally, the Triple-A framework focuses on the aims, which are cognitive representations of desired outcomes, whether personal or collective. Aims are essential as they direct attention, motivate, and foster persistence and skill development. The framework stresses the bidirectional influence between self-efficacy and aims, where efficacy perceptions influence the selection of aims, and conversely, the nature of these aims affects the development and sustenance of self-efficacy beliefs.

Overall, the Triple-A framework not only clarifies the structure of self-efficacy beliefs but also enriches the theoretical discourse by linking these beliefs explicitly to both personal and collective contexts. This approach promises to advance the practical application of self-efficacy theory in addressing broader social and ecological challenges, emphasizing the interconnectedness of beliefs, actions, and objectives in achieving sustainable change.