



The aims and meaning of teaching as reflected in high-impact reviews of teaching research^{☆, ☆ ☆}



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HIGHLIGHTS

- Overviews which analyse influential research reviews are of key interest.
- Different kinds of aims in research reviews are reflecting dominant paradigms.
- The paradigmatic struggle between Dewey and Thorndike on teaching is still discernible.
- Aims of education can widen the discussion about the role of teaching as a societal activity.
- Democratic aims/goals are beyond the radar of very many top-cited researchers of today.

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ABSTRACT

The aims and meaning of education and teaching are contested. This article empirically explores the aims that dominate present research about teaching as reflected in high-impact reviews of research about teaching ($n = 75$). Four types of aims are discerned: knowledge/cognitive aims, social aims, aims encompassing the development of personal characteristics and democratic aims. With some exceptions, the reviews analyse teaching with regard to knowledge and cognitive aims only and do not explicitly attend to the aims of schooling or guiding documents. The implications of these empirical findings are discussed in light of the educational philosophies of Dewey and Thorndike.

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1. Introduction

The aims of education and teaching are of critical and enduring human concern. Yet, there have been few attempts to elucidate and approach empirical research with the aim of education within research about teaching. This issue is the focus of the present paper. More precisely, high-impact reviews of teaching research, that is, reviews that are highly cited in the Web of Science (WoS), are analysed with regard to the aims of education and teaching conveyed in the reviews. We regard this as an issue of uttermost importance given the fact that the aims of human activities, including teaching, profoundly influence all aspects of those activities, including the forms they take, how they are evaluated and how they acquire legitimacy. To put it differently, there is always an ideological aspect of education and teaching that is expressed in

what is taken to be the aim of teaching, a point that we will develop later in the paper. The purpose of this article is to generate knowledge about the aims of education as expressed in reviews about teaching and to interpret the ideological implications of such aims. The following research questions have guided the investigation:

- 1) What are the aims of education and teaching as conveyed in the reviews, and are they explicitly attended to by the review authors?
- 2) Are key policy documents (education acts or ordinances, curricula and syllabi) attended to in the reviews?
- 3) What are the ideological implications of the findings?

Before providing a background to the empirical investigation, it should be made clear that we have conducted an overview – that is, a review – of reviews. Our rationale for analysing high-impact reviews is that these can be seen both as central to the research field and as integrating many original studies (Román et al., 2021). However, it should be noted that we have not studied whether the aims of education and teaching are addressed in the original studies included in the reviews. Rather, in our overview, we focus on how the reviews reflect these aims and which aims they pay attention to.

The Web of Science (WoS) database has been used for the choice of reviews since a) it is one of the few databases that provides citations, b) it covers many influential educational journals and c) it has explicit and rigorous quality criteria. However, WoS is not uncontested and the present study approach should be used with other databases such as Scopus (see Discussion). The framework for analysing the empirical corpus takes its point of departure from a discussion about the educational philosophies of John Dewey and Edward Lee Thorndike (Tomlinson, 1997) and is further elaborated with the support of Michael Schiro's (2013) distinctions between different educational ideologies. Before turning to the historical discussion, the study is briefly situated within the contemporary context.

1.1. The contemporary context

Education in the 21st century is distinctive from the world in which mandatory mass education was initially formed and manifested. Nation states and educational institutions today are firmly embedded in a global arena that emphasises the importance of education in the knowledge society and in the competition between regions in a global market. Professionals as well as institutions and states are made formally accountable through audits, evaluations and quality assurances. When international organisations like OECD (Organisation for Economic Co-operation and Development) and EU (European Union) develop policies, programmes and tests, they become key actors in considering what kinds of aims, curricula and knowledge are considered most valuable. The shift towards competence-based curricula with measurable and comparable learning outcomes are some current examples of (new) standardisations. In order to maximise outcomes and advance in the educational race, the request for research reviews has been stressed to give a scientific answer to 'what works' (Biesta, 2007).

This move towards evidence-based policy and practices in education can be linked to the social efficiency movement in the early 20th century, in which Thorndike and Dewey, two of the most intellectually dominant figures in the field during the first decades of the century, participated (Pinar, 2008). Both emphasised 'social improvement, but their visions of social change and the methods employed to realise these visions differed' (Pinar, 2008, p. 117).

Social efficiency referred to both a narrow utilitarian approach propagated also by David Snedden and to a broad liberal humanitarian point of view. While the first implies something negative and instrumental, the latter means social empowerment (Knoll, 2009). The differences and tensions present in those days can qualify our analysis of the relation between ends and means when we address research reviews and how they attend to the aims of education and teaching.

Later critical scholars like Michael Apple, Peter McLaren and Henry Giroux argued that the aims of teaching risk becoming fixed and taken-for-granted background variables. Instead, they emphasised reflection, student voice, resistance, (progressive) change and empowerment as both means and ends for education (Pinar, 2008). Scholars situated within the social efficiency, critical pedagogy and evidence-based movements can all be found within a discourse of change, such as in research on emancipation, a specific reform or more modest improvements. This is a teleological and hopeful discourse (Smeyers & Depaepe, 2008).

In this paper, we will empirically investigate which aims and means are to be found in present-day influential reviews on teaching. Thus, in order to explore the how aims of education are conceptualised in such reviews, we will return to the divisions exemplarily outlined by primarily Thorndike and Dewey, two key figures in education science history.

1.2. Dewey and Thorndike – A historical and ongoing paradigmatic struggle in research on education

We will now describe two key figures and the struggle between two fundamentally different takes on the aims of education and teaching. We take our point of departure in the educational philosophies of Edward Thorndike and John Dewey because they are two of the main figures in the Anglo-American research on teaching that dominates the WoS. Both Thorndike and Dewey were occupied with the question of how schooling could be built on science (Tomlinson, 1997). Thorndike viewed schooling from a technological perspective, trying to mirror what he considered to be methods that had proven successful in the natural sciences (Thorndike, 1913a, 1913bbib_Thorndike_1913b). To find the most efficient means to reach the goals of schooling, he thought, one should turn to science. In Thorndike's hierarchical society, it was the experts who both knew what schools and teachers should aim for and how they were to reach those aims. The scientific method would ensure that the most effective means were found and employed (Thorndike, 1931). Thus, today's quest for effective schooling and evidence-based teaching echoes Thorndike's ideas, a point we will return to later.

Dewey, on the other hand, had an opposite view regarding these matters:

Dewey was well aware of the dehumanizing effect of such instrumental rationality and repeatedly warned against the drive to mechanize and manage all areas of social life. People, he argued, cannot be treated as malleable components that may be fashioned for some fixed, externally determined social goal: they are themselves planners with the power and moral right to construct their own ends. (Tomlinson, 1997, p. 367, p. 367)

Focused on here are the humanistic aspects of Dewey's approach to teaching and learning (see, e.g., Dewey, 1916, 1920, 1925). Dewey viewed teachers and learners as responsible subjects with the moral right to define the means and goals of teaching. In fact, Dewey was critical of goals being imposed from the outside, suggesting that regulations, inspections, methods and curriculum plans would hinder a fruitful teaching approach to pupils and

content (Dewey, 1925; see also Biesta, 2007, 2014a, 2014b, 2017). Dewey advocated a child- and community-centred curriculum and suggested that the goals and means of education must be negotiated in the educational process itself (Dewey, 1902).

Moreover, Dewey underscored the close connection between the two; that is, goals should not be defined in isolation from their means and vice versa. Dewey shared Thorndike's commitment to science, but Dewey's science was of a different kind. Thorndike believed that educational scientists would uncover the universal laws governing teaching and learning, which could then be used by educational administrators and others to make the educational system as efficient as possible. Thus, teachers were to be governed from the outside. Dewey, on the other hand, did not believe in such eternal laws. Indeed, much of Dewey's philosophical effort was devoted to criticising what he judged to be a fallacy inherited from Greek philosophy: the idea that science would mirror reality (cf. Rorty, 1980). Instead, Dewey took his point of departure in the concept of 'transaction', which implies that humans always stand in relationship to the world. The world is not something outside of such transactions but is always an aspect of the transactions themselves. Dewey's take on social efficiency and education is therefore not a total rejection, but a restriction on its impact and general application for improving education.

A central impetus for development is the notion of a 'problem'. People encounter problems in their transactions, and the central role of science is to aid in overcoming such obstacles. According to Dewey, the scientific method is not qualitatively different from how people gain knowledge in general. He believed that the ultimate test of a theory about teaching, for example, is whether the theory would be useful for teachers as curriculum makers and for overcoming the problems they encountered in their practice.

In terms of the means–ends relations of education, we have so far presented Dewey as the pragmatist, for whom the means–ends relation of teaching was an inside relation built upon the professional reasoning of the teacher and student. While science can help teachers in their mission, the problems teachers face should be the focus of joint reflective work. Yet, the overriding aim of education, according to Dewey, is to develop democracy. On the other hand, Dewey has been interpreted by some, not quite correctly, as a forerunner of progressivism. Progressivism has further tended to depart from Dewey's theorising about aims and instead makes what Dewey considered to be the means of education – most often understood as detached child-centredness, activity and cooperation – into the aims of education (Dewey, 1929; Tomlinson, 1997).

As already hinted at, we can see clear traces of Thorndike and Dewey in current ideas about education and teaching, for example, in the evidence movement. Schiro (2013), from the perspective of curriculum theory, discerns four distinct ideological positions with regard to education and teaching: the academic position, where the aim of education is to transfer knowledge developed in the scientific disciplines; the learning-centred position, where the aim is the development of the learner; the social-efficacy position, where the aim is firmly related to the needs of the labour market; and the social-reconstruction position, where democracy and its development are the ultimate aim of education. Schiro (2013) suggests that each

ideology represents different views on purposes of education and embodies distinct beliefs about the type of knowledge that should be taught in school, the inherent nature of children, what school learning consists of, how teachers should instruct children, and how children should be assessed. (Schiro, 2013, p. 2, p. 2)

We can thus discern traces of Thorndike primarily in the

academic and social-efficacy positions, whereas Dewey, the pragmatist, is closely connected to both the academic and reconstructionist positions, and the progressivist interpretation of Dewey is expressed in the learner-centred ideology. We will use the work by Thorndike and Dewey and the positions outlined by Schiro (2013) as a framework for the interpretation of our empirical findings. In a similar vein, Lagemann (1989) uses the paradigmatic struggle to explore 'romantic' features of pedagogical progressivism against the crass utility of administrative progressivism (Lagemann, 1989), and Labaree distinguishes the utilitarian vision of Thorndike's and Snedden's progressivism from Dewey's by its exclusion of intrinsic aims and purposes (Labaree, 2010).

2. Methodology

We will first present the rationale and initial steps of our overview. Then we will account for the coding procedure used to distinguish between different types of aims.

2.1. The overview – Rationale and initial steps taken

In a recent article, Polanin et al. (2017) argue for the need to add a level of analysis to original research and reviews of original research. The authors suggest that this third level should be labelled as a research overview. Thus, we have the primary study, the review (second level) and the overview (third level).² As the number of reviews (secondary) has drastically increased, analyses at the overview level have become crucial as a means to synthesise findings and results from reviews. There has been intensive methodological development lately among reviews at the second level. The procedures used to synthesise findings from both qualitative (Barnett-Page & Thomas, 2009; Dixon-Woods et al., 2006; Sandelowski & Barroso, 2007; Thomas & Harden, 2008) and quantitative studies (Gough, 2007) have undergone increased scrutiny and development by a growing number of scholars. Now a discussion is emerging about methodological approaches at the third level, a discussion that tends to be dominated by attempts to develop methodologies to more systematically integrate second-level meta-analyses (Polanin et al., 2017).

In contrast, the route taken in the present overview focuses on conceptual issues, more specifically the aims of education conveyed in the reviews, more or less explicitly, and whether the reviewers explicitly refer to the aims of schooling and/or key policy documents (see below). Influential reviews (i.e., those highly cited) published in journals between 1980 and 2018 in the field of teaching, as found through WoS searches, were chosen for analysis. Altogether, 75 reviews were retrieved and analysed: 10 published during the period 1980–1989, 15 from 1990 to 1999, 25 from 2000 to 2009 and 25 from 2010 to 2018 to represent different periods. Our basic criteria of selection were that the review should be on teaching forms and methods and mainly focus on the ways teaching is framed and performed, though it could also address teachers' thinking and actions, student characteristics as well as aspects of teaching content. The searches were restricted to four WoS categories: 1) Education educational research 2) Education, special 3) Education scientific disciplines and 4) Psychology, educational.

The Web of Science (WoS) database has been chosen as a source for the material analysed, based on its extensiveness and generally acclaimed reputation for measuring impact in different fields of research. It is multidisciplinary in scope, yet also restricted and

² Other alternative terms are also used in the research literature: meta-meta-analysis (Hattie, 2009; Kazrin et al., 1979), meta-synthesis (Gough, 2007), meta-overview (Pieper et al., 2014) and overview of reviews (Cooper & Koenka, 2012).

biased in several ways, such as in terms of publication formats, languages and disciplines covered. Google Scholar would be an alternative as it covers far more results and publications, especially within the social sciences and humanities, but on the other hand, it has other bibliometric shortcomings concerning metadata and making distinctions between peer-reviewed and unauthorised publications (Martín-Martín et al., 2018). One could argue that high citation rates in Google Scholar reflect an impact on higher education and teaching practice, while high citation rates in WoS (or Scopus) to a larger degree reflect scientific impact.

2.2. Coding

Coding the articles was based on our first three research questions:

- 1) What are the aims of education as conveyed in the reviews, and are they explicitly attended to by the authors?
- 2) Are key policy documents (education acts or ordinances, curricula and syllabi) attended to in the reviews?
- 3) What are the ideological implications of the findings?

The second part of the first question, *Are the goals of schooling explicitly attended to by the authors?*, and the second question, *Are guiding documents explicitly attended to in the reviews?*, involved coding only *yes* or *no*. The first part of the first question, *What are the aims of teaching as conveyed in the reviews?*, involved a classification of different types of goals found in the reviews. We discerned four types of aims in the reviews, and for them, we used the codes A, B, C and D, as follows:

- A. knowledge/cognitive aim (e.g., test results, development of meta-cognitive ability)
- B. aims to develop personal characteristics (e.g., engagement, responsibility, creativity)
- C. social aims (e.g., empathy, communication, relation to other pupils)
- D. democratic aims (e.g., knowledge about democracy, preparation for citizenship and development of classroom communities).

Moreover, these aims or goals could also appear in the reviews as means of reaching other ends. For example, in the review by Sadler (2004), the development of knowledge, personal characteristics and communication are subordinated, that is, treated as means, to the goal of fostering democratic citizens, whereas in the review by Cohen et al. (1982), knowledge and attitudes are outcome variables, and instruction is seen as a means to accomplish those aims. Codes 1 and 2 were used together with A–D to code for whether a review receiving the code A, for example, treated that ‘aim’ (1) as an aim/goal or (2) as a means, respectively. (All reviews received a code of at least one of A–D, and many received several.) For example, the article by Sadler (2004) was coded *yes, yes, A2, B2, C2, D1*, because it is explicit with regard to the goal of education/teaching (*yes*), relates to policy documents (*yes*) and treats (A2) knowledge goals, (B2) goals concerning the development of personal characteristics and (C2) social aims all primarily as means to achieve (D1) democratic aims. The codings of all 75 research reviews are displayed in Appendices A and B.

There are different ways to secure reliability in studies like this: (1) to be explicit about the coding procedure, (2) to display all of the categorisations, enabling the reader to scrutinise the coding of each article and (3) to provide figures on inter-rater reliability. We have attended to all three of these. Inter-rater reliability was calculated for a subsample of 15 research reviews (20 % of the articles). The number of identical codings was divided by the total number of

categorisations, yielding an inter-rater reliability of 0.81 across categories. However, there were more divergences for the first coding, explicitness (10 of 15 codings were identical), which were resolved after a discussion between the two coders. Disregarding the explicitness category, the inter-rater reliability was 0.84.

3. Findings

3.1. The manifestation of the aims of education and teaching in the reviews: Research question 1

In reading the reviews, it soon became apparent that the issue of what the aims of teaching are or should be is not explicitly addressed in many of the articles. By explicit we mean that the aims are put forward in formulations such as ‘the goal of schooling is ...’ or ‘teaching aims for ...’. For example, in a review concerning implications from cognitive theory for instruction in problem solving, Frederiksen (1984) states, ‘The primary missions of educational institutions, from elementary to graduate and professional schools, are to impart knowledge and to teach cognitive skills’ (p. 363). Another example is a review about scientific argumentation by Driver et al. (2000), who state:

When it comes to the consideration of contemporary issues and disputes, which we regard as essential for any education about science, then students can be given opportunities to explore their own arguments for different positions and thus develop the confidence and skills in argument that are necessary in making life decisions and contributing as citizens to a democratic society. (p. 300)

Driver et al. (2000) thus explicitly addressed the issue of what is essential in education (concerning science, in this case). In several of the articles, the aims of education are not explicitly addressed but can only be inferred from the choice of the outcome variables discussed (e.g., Golonka et al., 2014). We found that, among the reviews analysed, about one in five (19 %) explicitly addressed questions about the purpose or aims of schooling that the included studies raised. The data indicate that there has been no significant change over time from the 1980s to the 2010s in this respect. Four of the 13 research reviews that belong to that 19 % are described by their authors as meta-analyses, and those include quantitative and statistical analyses. This suggests that meta-analysis does not altogether exclude the possibility of explicitly addressing the telos of teaching. That said, only four of the 26 meta-analyses in the sample actually address wider aims and goals.

A significant example here is ‘A review of research on formal reasoning and science teaching’ by Lawson (1985). Lawson does not describe this review as a meta-analysis, but it includes various qualitative and quantitative studies and is thus labelled a mixed-methods review. Here, the overriding purpose of education is addressed explicitly and extensively:

A central purpose of education is to improve students’ reasoning abilities. The present review examines research in developmental psychology and science education that has attempted to assess the validity of Piaget’s theory of formal thought and its relation to educational practice It provides an important background from which to make substantial progress toward a most significant educational objective. (Lawson, 1985, p. 569, p. 569)

Further, Lawson invokes prescriptions from the US Science Council’s national standards in terms of general aims concerning

formal reasoning in science. This brings us to the next research question.

3.2. *The manifestation of key policy references in the reviews: Research question 2*

This question concerns whether an article was contextualised in terms of key policy references of various kinds, such as educational acts/ordinances, curricula, syllabi or documents from scientific or professional associations (as in the example of the above paragraph; see also [Appendix A](#)). These types of regulations and policies often prescribe, in important ways, the means and ends of education. Because they play such an important role in society's regulation of education, we deemed it important to note whether and how the reviews were oriented towards or explicit about such policies. One example of orientation towards the curriculum is present in [Driver et al. \(2000\)](#), who state, "The dominant view of science, currently portrayed in schools in the UK, is one which has become trapped in a time warp, reinforced by a prescriptive National Curriculum that embodies most, if not all, of Cohen's fallacies" (p. 289). An example of orientation towards guidelines expressed by professional organisations is [Sadler's \(2004\)](#) review of informal reasoning about social–scientific issues: 'Assertions that social–scientific issues form an important component of scientific literacy ([American Association for the Advancement of Science, 1990](#)) demand the exploration of how these issues can be most meaningfully incorporated in science curricula and classrooms' ([Sadler, 2004](#), p. 515). Fifteen of the reviews explicitly attend to policy documents and guidelines, as mentioned above. Altogether, only six reviews were explicit about the goals of schooling and related to policy documents or guidelines.

3.3. *Distinction of the aims of education in the reviews: Research question 3*

The analysis is built on a distinction between different types of aims: (1) cognitive/knowledge, (2) development of personal characteristics, (3) social, and (4) democratic. These distinctions are further elaborated below.

3.4. *Cognitive/knowledge aims*

Most of the reviews in the sample (62 of 75, or 82 %) were based on the premise that cognitive development or knowledge are goals in themselves (not primarily means for other purposes or ends), and only about one out of 10 (9 %) of the reviews treated cognitive development or knowledge as means for other goals and aims. This suggests that research reviews that focus on cognitive achievements are likelier to be cited and have an impact on the research field of teaching. Most of the top-cited reviews use the results of tests on cognitive abilities in different domains (including meta-cognitive abilities) to substantiate and elaborate their knowledge claims. The cognitive goals are explicated in specified teaching and learning objectives. Importantly, many of these studies also address noncognitive dimensions as their outcome variables; however, in most cases, such noncognitive abilities are treated as means for achieving cognitive goals and aims, not as ends in themselves.

Various review methodologies and quantitative research methods are represented in the sample of cognitively oriented studies, including experimental and quasi-experimental designs, survey and correlational methodologies, randomised controlled trials and causal inference methodologies. Most of the studies addressing cognitive goals and aims can be related to a quantitative research tradition, where relations between variables of interest to the researcher are sought. However, there are also qualitative-

oriented reviews representing a hermeneutical and constructivist paradigm. For example, the top-cited review 'Conceptual Change: A Powerful Framework for Improving Science Teaching and Learning' ([Duit & Treagust, 2003](#)) approaches learning science from constructivist perspectives as it explores and elaborates the notion of conceptual change and how that notion has evolved over three decades. The cognitive/knowledge aims are well-explicated and discussed as related to scientific literacy and ways the research can provide a 'powerful framework for improving science teaching and learning' ([Duit & Treagust, 2003](#), p. 671).

3.5. *Aims concerning the development of personal characteristics*

While cognitive outcomes are the primary target for most of the reviews in the sample, other outcomes are also considered and addressed. In fact, nearly one-third of the studies (28 %) addresses the development of personal characteristics (motivation, responsibility, creativity, etc.) as one of the main outcomes. In most of these cases (two out of three), such 'soft skills' are some of the primary targets in the reviews, while about one-third (30 %) consider such goals as means for other (cognitive or social) aims or goals. Soft skills have recently featured prominently in educational and political discourses, such as in the GRIT theory ([Duckworth, 2016](#)). The analyses of the top-cited reviews in the field show that these aspects have been acknowledged, cited and debated since the 1980s and 1990s, but to a lesser degree.

The review 'Research for the Future: Research on Cooperative Learning and Achievement: What We Know, What We Need to Know' is a synthesis by Robert Slavin of his earlier works. In this review, the author updates and extends discussions and research results on the motivational, social cohesion, developmental, cognitive elaboration and student achievement aspects of cooperative learning. The noncognitive aims are made explicit and categorised as individual accountability, and they include aspects such as extrinsic and intrinsic motivation, encouraging groupmates to learn and inclination to collaborate with more capable peers ([Slavin, 1996](#)). Cognitive aims (test results) are considered means for noncognitive and social aims of cooperative learning. There are, however, no references to policies or guidelines with regard to the goals of schooling or teaching.

3.6. *Social aims*

As a possible consequence of the dominating focus on cognitive aspects of students' learning, much less focus is directed towards social aspects. Only 14 % of the reviews explicitly addressed social goals and values such as empathy, communication, cooperation, relationships, creativity in groups and so on as primary outcomes. Importantly, about twice as many (30 %) acknowledged social aims and values as means for other cognitive or democratic aims or goals. Thus, although the relational and interpersonal aspects of teaching are not dominant themes of the top-cited reviews, they still play an instrumental role with regard to individual and cognitive aspects. The findings also reveal an even distribution over time; that is, the share of reviews that explicitly address social goals and values is constant from the 1980s onwards.

Of 22 reviews primarily focusing on social aims, only four are meta-analyses. Although aspects of teaching related to social aims are certainly methodologically challenging, this low proportion may also indicate a tacit paradigmatic assumption that cognitive abilities and achievements are the obvious focus of teaching. One significant example of a meta-analytical review that studies social aims as means for student cognitive achievements, 'The Effectiveness of Games for Educational Purposes: A Review of Recent Research' by [Randel et al. \(1992\)](#), compares the instructional

effectiveness of games to conventional classroom instruction. The review concerns cognitive objectives and focuses on how social aspects and goals contribute to such ends.

3.7. Democratic aims

The paradigmatic struggle between Thorndike and Dewey is quite discernible in the sample of this study, but the sample does not reflect, in the proportion of studies representing one view versus the other, the relative importance or influence of the different paradigms (especially about the fact that the field of education is generally considered to also address broader social values). Only five of the 75 reviews (6 %) addressed democratic aims/goals (e.g., knowledge about democracy, understanding or adopting its values, engagement or developing communities) as the outcome of schooling and learning in classrooms. Of course, this is not the true picture of the struggle, but it says something important about how the democratic aspects of teaching have been marginalised and obscured in the reviews. The five reviews that do reflect Dewey are spread from the 1980s to the 2010s and cover different content topics, from concept maps to scaffolding teacher–student interactions to socio-scientific issues (see Appendix). For example, the research review ‘Establishing the Norms of Scientific Argumentation in Classrooms’ (Driver et al., 2000) clearly addresses the democratic aspect of education. By focusing on the role of dialogic arguments in science as well as in society, the review accounts for the social practice of science and the development of an understanding of the evaluative criteria used to establish scientific theories. The review is a qualitative synthesis of different research contributions in the existing literature. The aims of teaching are made explicit by references to the general purposes of schooling as well as to general national standards of science teaching as expressed in guidelines. The roles of schooling and teaching as ways to develop democracy are foregrounded, and both cognitive and social features are considered contributors to this aim.

In a similar vein, Cavagnetto’s (2010) research review ‘Argument to Foster Scientific Literacy: A Review of Argument Interventions in K–12 Science Contexts’ addresses democratic aims and goals. The purpose of this critical literature review is to synthesise empirical studies that have explored learning outcomes associated with research apprenticeships for science learners. Cognitive (science content), non-cognitive (i.e., general literacy skills and self-efficacy) and social aspects (i.e., teamwork) are considered but treated as means to overall democratic aims of teaching.

3.8. The means and ends of teaching – summing up

An overall analysis of the empirical sample of reviews indicates that the intentional dimension of research on teaching is, to a large degree, invisible. Only 15 of the reviews explicitly attend to policy documents and guidelines as mentioned above. Altogether, only six reviews were explicit about the goals of schooling and related to policy documents or guidelines. Although the investigation calls for cautious claims, the findings suggest that intrinsic aims are increasingly becoming marginalised in the conceptual schemes used by researchers, as the social efficiency approach to teaching has gained momentum.

However, although relational and interpersonal aspects of teaching are not dominant themes of the top-cited reviews, they still play an instrumental role with regard to individual and cognitive aspects. The findings also reveal an even distribution over time; that is, the share of reviews that explicitly address social goals and values is constant from the 1980s onwards. The contemporary quest for measurable knowledge as promoted by the evidence-based approach to teaching is clearly visible; but it is not as

straightforward as sometimes assumed. However, it does seem that the redefinition of knowledge into measurable entities, which to a large extent is associated with evidence-based movement, has gained momentum.

4. Discussion

We will now explore the outcome of the empirical analyses with regard to their implications for future reviews of teaching research and, more broadly, future research on teaching. Finally, in this section, we will discuss the empirical outcome in light of the Thorndike–Dewey debate and educational ideologies.

4.1. The evolution of the research field of teaching

Naturally, the reviews contain much important knowledge about teaching and how to achieve different types of teaching goals. Moreover, they are generally well-written and display high levels of scholarship. However, the outcome of our analysis has important implications for the ways in which the field of teaching research can be further developed. Future reviews about teaching should be explicit about what it considers to be the goals of teaching and how they relate to various kinds of policies and guidelines. There are three major reasons for this. First, the aims of schooling are not uncontroversial; thus, it is important to make clear as a reviewer what one takes these goals to be and to justify that choice and, further, to outline the consequences of such a choice for the review itself. Second, in many countries, there are policies, even laws, that have a bearing on what education and teaching are supposed to achieve, and reviews that try to develop teaching should certainly attend to such overarching and often prescribed goals. Third, an increased focus on the aims of education can widen the discussion about the role of teaching as a societal activity. These three points likely pertain to original research about teaching itself as well. Because we have analysed only reviews of teaching research, it would be premature to judge more specifically how the issues of means–ends relations and the explicitness of the aims of schooling and their relation to policies and guidelines appear in original research about teaching.

4.2. The Thorndike–Dewey debate and educational ideologies

Thorndike’s victory over Dewey seems to endure, based on our analysis of these reviews. From a pragmatist (and Dewey-biased) standpoint, this is problematic because it suggests that research reviewers are less oriented towards the overall purposes and directions of teaching and towards bringing the normative dimension about the aims and the very meaning of education into their research review considerations. When the attention of researchers is concentrated on providing knowledge of what works in the field of teaching, the functioning of the system and its established values and cultural norms often remains taken for granted – unexamined, unquestioned and ignored. Yet, it is important to note that exclusively focusing on the means and on what works is also a valuation. One refers to some selected aspects of the quality of teaching processes but does not say anything about what end the teaching is supposed to bring about. Carr (1992, p. 248) points out that the means we use ‘contribute qualitatively to the very character of the goals which they produce’. The absence of social and democratic aims/goals in research reviews indicates that this dimension is beyond the radar of very many top-cited researchers of today.

As pointed out in the introduction, the different ideologies identified by Schiro (2013) are related to the Thorndike–Dewey debate. We suggest that Thorndike, in viewing science as the foundation of school content, represented partly the academic

rationalistic position. Moreover, his view of science as the answer to how schools should be run effectively also partly corresponds to a social-efficacy position. We argue that both these positions – which together come down to the view that schools should effectively transmit academic knowledge to the students – are clearly reflected in the bulk of reviews. Further, this endeavour could be interpreted as a way of preparing students for democracy. However, if this assumption was made by the researchers in the reviews, it was not made explicit.

Dewey, on the other hand, was associated with both the academic rationalistic and the reconstructive approach. As stated earlier, the reconstructive approach, with its focus on democracy both as means and tools of education, was not a primary focus in the sample of reviews. We note that Dewey has sometimes been interpreted – wrongly, we believe – as a forerunner of progressivism, and there were several reviews that concerned teaching methods or ways of working that are often considered as part of progressivism. However, as could be expected, those reviews were not related to the fundamental tenets of Dewey's approach. More often attending to social aims and aims related to personal development, they did not explicitly attend to notions of democracy.

4.3. Further research

The findings of this study point out the importance and relevance of critically examining influential reviews of research. Despite the fact that the reviews are carefully accomplished, highly cited and published in influential journals, they still to a high degree reproduce an instrumental and technical view of teaching that take goals and aims for granted (Hattie, 2009). This is a highly contestable assumption, as the Dewey–Thorndike debate helpfully highlights. The future research agenda would benefit from considering the historical trends when clarifying the value positions in education research and addressing the challenges of fragmentation, uncertainty, inequality and cultural diversity, as has rightly been suggested by critical theorists (McLaren & Giroux, 1989). Democratic aims cannot be taken for granted; they need to be addressed as primary concerns for educational professionals and researchers alike.

Finally, we want to point out the need for doing similar analyses of both reviews and original research using other databases. Moreover, it is important to analyse regional differences concerning how means and ends are understood in research about teaching. In this way, we will acquire knowledge about the generality of the patterns found in the present overview.

Declaration of competing interest

The authors have no competing interests to declare.

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Appendix A. Supplementary data

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References

- American Association for the Advancement of Science. (1990). *Science for all Americans*. New York: Oxford University Press.
- Barnett-Page, E., & Thomas, J. (2009). Methods for the synthesis of qualitative research: A critical review. *BMC Medical Research Methodology*, 9, 59.
- Biesta, G. (2007). Why 'what works' won't work: Evidence-based practice and the democratic deficit in educational research. *Educational Theory*, 57(1), 1–22. <https://doi.org/10.1111/j.1741-5446.2006.00241.x>
- Biesta, G. (2014a). *Making a difference in theory: The theory question in education and the education question in theory*. London: Routledge.
- Biesta, G. (2014b). Evidence-based practice in education: Between science and democracy. In A. Reid, E. Hart, & M. Peters (Eds.), *A companion to research in education*. Dordrecht: Springer.
- Biesta, G. (2017). *The rediscovery of teaching*. London: Routledge.
- Carr, D. (1992). Practical enquiry, values and the problem of educational theory. *Oxford Review of Education*, 18(3), 241–251.
- * Cavagnetto, A. (2010). Argument to foster scientific literacy: A review of argument interventions in K-12 science contexts. *Review of Educational Research*, 80(3), 336–371 <http://www.jstor.org/stable/40927285>.
- * Cohen, P. A., Kulik, J. A., & Kulik, C.-L. C. (1982). Educational outcomes of tutoring: A meta-analysis of findings. *American Educational Research Journal*, 19(2), 237–248. <https://doi.org/10.3102/00028312019002237>.
- Cooper, H., & Koenka, A. C. (2012). The overview of reviews: Unique challenges and opportunities when research syntheses are the principal elements of new integrative scholarship. *American Psychologist*, 67(6), 446–462. <https://doi.org/10.1037/a0027119>
- Dewey, J. (1902). *The child and the curriculum*. Chicago: The University of Chicago Press.
- Dewey, J. (1916). *Democracy and education*. New York: Free Press.
- Dewey, J. (1920). Reconstruction in philosophy. In J. A. Boydston (Ed.), *John Dewey: The middle works, 1899–1924* (Vol. 12). Carbondale: Southern Illinois University Press, 1982.
- Dewey, J. (1925). Experience and nature. In J. A. Boydston (Ed.), *John Dewey: The later works, 1925–1953* (Vol. 1). Carbondale: Southern Illinois University Press, 1981.
- Dewey, J. (1929). The sources of a science of education. In J. A. Boydston (Ed.), *John Dewey: The later works, 1925–1953* (Vol. 5). Carbondale: Southern Illinois University Press, 1984.
- Dixon-Woods, M., Bonas, S., Booth, A., Jones, D. R., Miller, T., Sutton, A. J., & Young, B. (2006). How can systematic reviews incorporate qualitative research? A critical perspective. *Qualitative Research*, 6(1), 27–44. <https://doi.org/10.1177/14687941060058867>
- * Driver, R., Newton, P., & Osborne, J. (2000). Establishing the norms of scientific argumentation in classrooms. *Science Education*, 84(3), 287–312. [https://doi.org/10.1002/\(SICI\)1098-237X\(200005\)84:3<287::AID-SCE1>3.0.CO;2-A](https://doi.org/10.1002/(SICI)1098-237X(200005)84:3<287::AID-SCE1>3.0.CO;2-A).
- Duckworth, A. (2016). *Grit: The power of passion and perseverance*. New York: Scribner/Simon & Schuster.
- * Duit, R., & Treagust, D. F. (2003). Conceptual change: A powerful framework for improving science teaching and learning. *International Journal of Science Education*, 25(6), 671–688. <https://doi.org/10.1080/09500690305016>.
- * Frederiksen, N. (1984). Implications of cognitive theory for instruction in problem solving. *Review of Educational Research*, 54(3), 363–407. <https://doi.org/10.3102/00346543054003363>.
- * Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2014). Technologies for foreign language learning: A review of technology types and their effectiveness. *Computer Assisted Language Learning*, 27(1), 70–105. <https://doi.org/10.1080/09588221.2012.700315>.
- Gough, D. (2007). Weight of evidence: A framework for the appraisal of the quality and relevance of evidence. In J. Furlong, & A. Oancea (Eds.), *Assessing quality in applied and practice-based research in education: Continuing the debate*. London: Routledge.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Oxon, England: Routledge.
- Kazrin, A., Durac, J., & Agteros, T. (1979). Meta-meta-analysis: A new method for evaluating therapy outcome. *Behaviour Research and Therapy*, 17(4), 397–399. [https://doi.org/10.1016/0005-7967\(79\)90011-1](https://doi.org/10.1016/0005-7967(79)90011-1)
- Knoll, M. (2009). From Kidd to Dewey: The origin and meaning of 'social efficiency'. *Journal of Curriculum Studies*, 41(3), 361–391. <https://doi.org/10.1080/00220270801927362>
- Labaree, D. F. (2010). How Dewey lost: The victory of David Snedden and social efficiency in the reform of American education. In D. Tröhler, T. Schlag, & F. Osterwalder (Eds.), *Pragmatism and modernities* (pp. 163–188). Sense Publisher.
- Lagemann, E. (1989). The plural worlds of educational research. *History of Education Quarterly*, 29(2), 185–214. <https://doi.org/10.2307/368309>
- * Lawson, A. E. (1985). A review of research on formal reasoning and science teaching. *Journal of Research in Science Teaching*, 22(7), 569–617. <https://doi.org/10.1002/tea.3660220702>.
- Martín-Martín, A., Costas, R., van Leeuwen, T., & López-Cózar, E. D. (2018). Evidence of open access of scientific publications in Google scholar: A large-scale analysis. *Journal of Informetrics*, 12(3), 819–841. <https://doi.org/10.17605/iosf.io/k54uv>
- McLaren, P. L., & Giroux, H. A. (Eds.). (1989). *Critical pedagogy, the state and cultural*

- struggle*. Albany: State Univ. of New York Press.
- Pieper, D., Antoine, S. L., Morfeld, J. C., Mathes, T., & Eikermann, M. (2014). Methodological approaches in conducting overviews: Current state in HTA agencies. *Research Synthesis Methods*, 5(3), 187–199. <https://doi.org/10.1002/jrsm.1107>
- Pinar, W. (Ed.). (2008). *Understanding curriculum: An introduction to the study of historical and contemporary curriculum discourses* (New York: P. Lang).
- Polanin, J. R., Maynard, B. R., & Dell, N. A. (2017). Overviews in education research: A systematic review and analysis. *Review of Educational Research*, 87(1), 172–203. <https://doi.org/10.3102/0034654316631117>
- * Randel, J. M., Morris, B. A., Wetzel, C. D., & Whitehill, B. V. (1992). The effectiveness of games for educational purposes: A review of recent research. *Simulation & Gaming*, 23(3), 261–276. <https://doi.org/10.1177/1046878192233001>.
- Román, H., Sundberg, D., Hirsh, A., Forsberg, E., & Nilholm, C. (2021). Mapping and analysing reviews of research on teaching, 1980–2018, in Web of Science: An overview of a second-order research topography. *The Review of Education*, 9(2), 541–594. <https://doi.org/10.1002/rev3.3258>
- Rorty, R. (1980). *Philosophy and the mirror of nature*. Princeton University Press.
- * Sadler, T. D. (2004). Informal reasoning regarding socioscientific issues: A critical review of research. *Journal of Research in Science Teaching*, 41(5), 513–536. <https://doi.org/10.1002/tea.20009>.
- Sandelowski, M., & Barroso, J. (2007). *Handbook for synthesizing qualitative research*. New York: Springer.
- Schiro, M. S. (2013). *Curriculum theory: Conflicting visions and enduring concerns* (2nd ed.). Thousand Oaks, CA: SAGE Publications.
- * Slavin, R. E. (1996). Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology*, 21(1), 43–69. <https://doi.org/10.1006/ceps.1996.0004>.
- Smeyers, P., & Depaepe, M. (2008). *Educational research: The educationalization of social problems*. Dordrecht: Springer Netherlands.
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8, 45–52.
- Thorndike, E. L. (1913a). *Educational psychology* (Vols. 1–3). New York: Teachers College Press.
- Thorndike, E. L. (1913b). *An introduction to the theory of mental and social measurements*. New York: Teachers College Press.
- Thorndike, E. L. (1931). *Human learning*. New York: Century Press.
- Tomlinson, S. (1997). Edward lee Thorndike and John Dewey on the science of education. *Oxford Review of Education*, 23(3), 365–383. <https://doi.org/10.1080/0305498970230307>