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Argumentation methods in educational contexts: Introduction to the special issue

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ABSTRACT

The relation between argumentation and education is currently attracting researchers' attention from both argumentation theory and educational practice fields. Although much work has been done in the intersection between methods of analyzing and assessing arguments and their emergence in educational contexts, there is still a lack of clarity regarding how the philosophical and logical tradition can feed educational practice and vice versa. This introduction of the special issue on "Argumentation methods in educational contexts" is aimed at explaining the need for more systematic discussions between the two sub-fields. The paper concludes with an overview of the five articles that form part of this special issue, which separately represent directions for future research in the field of argument in education.

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1. Introduction

Arguing in education has been defined in many ways: as a way of thinking (Kuhn, 1992, 2010), as a way of teaching (Driver, Newton, & Osborne, 2000; Kuhn, 1993), as a way of learning (Andriessen, Baker, & Suthers, 2003; Asterhan & Schwarz, 2009), or even as a way of collaborating (Baker, 2003; Felton, Garcia-Mila, Villarroel, & Gilabert, 2015; Nussbaum, 2008). However perceived, its crucial importance for the development of the critical and democratic thinking of citizens has been widely underlined in the literature (Muller-Mirza & Perret-Clermont, 2009; Kuhn, 2010). Especially in education, a growing number of scholars is focusing on the strategies for implementing argumentative tasks in classroom and analyzing and/or assessing their effects. In particular, argumentation – and more precisely classroom arguing activities – has been found to affect two fundamental dimensions of learning: the students' capacity to argue in different learning contexts, and the students' capacity to learn different curricular contents.

Argumentation is usually conceived as a twofold notion, referring to either a product of discourse – namely the arguments (claims supported by one or more reasons) developed in written or oral tasks – or the process of dialogically presenting different opinions supported by reasons on an issue with the goal of convincing the interlocutor. As such, the traditional goal of argumentation has been that of persuading an audience on the acceptability of an opinion. However, the goals of argumentative dialogues are much more than mere persuasion. In the literature on the dialogue types (Walton & Krabbe, 1995) decision-making, negotiation, information seeking, inquiry, and eristic dialogues have been investigated as having an argumentative dimension.

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In the studies in the field of education, several methods analyzing and assessing argumentation – either as a product or as a process – have been proposed in the literature so far, making thus the concept even more heterogeneous and complex (Rapanta, Garcia-Mila, & Gilabert, 2013). The risk that the developments of these two fields are encountering is to grow separately. The high number of models and theories makes comparisons and all-encompassing reviews extremely complex. However, a tentative to encourage the theoretical field and the applicative one to meet, discuss, and address some common problems can be highly beneficial to both areas of research.

The reason why this special issue was conceived derives from the need to bridge these two areas of research, namely argumentation theory and educational practice, in order to promote the discussion between researchers from the two fields. Our goal is to show how recent philosophical and logical theories can be used for developing empirical research in argumentation and education. By testing new theoretical proposals in practice and facing them with the constraints of their applications to the field of education, it is possible to encourage a twofold effort. On the one hand, practical applications can lead to more practice-oriented developments of philosophical theories; on the other hand, new philosophical approaches to dialogue and argumentation can be used as new instruments for improving and refining empirical research.

2. Overview

This special issue addresses the possibility of deepening the dialogue between theoretical advances in argumentation theory and education studies. In order to understand where these two fields can meet, it is necessary to bring to light the need for such a dialogue, the commonalities between these two areas, and the efforts and developments that have been already made in this direction.

Argumentation is a dialogical activity grounded on two crucial principles, namely common beliefs and defeasibility (van Eemeren & Grootendorst, 2004; Walton, 1990, 2013). Arguments are based on premises that are not necessary, but only commonly shared, such as values, presumptive causal relations, and commonly accepted definitions. Given the endoxical nature of the premises, arguments are inherently defeasible, namely they are subject to default should one of the premises be challenged or refuted (Nussbaum & Edwards, 2011: 444). For this reason, argumentation is essentially bound to the dialogical and dialectical practice of addressing a problematic issue, giving reasons to support and attack a viewpoint (Plantin, 2005). The dialogical analysis assessment of a viewpoint or a claim leads the interlocutors to reconstruct the implicit dimension of discourse (Anscombe & Ducrot, 1983; Ducrot, 1972), detecting possible weak points and defending them by resorting to various types of support (Walton, 2006). Such an analytical and dialectical activity can thus reveal background beliefs and correct them, or develop the interlocutors' reasoning skills or their ability to use available pieces of evidence or knowledge, including the scientific one (Baker, 2009). The essential relationship between background beliefs (or implicit premises) and arguments, and the defeasible nature of argumentative reasoning make argumentation an activity of fundamental importance for unveiling and addressing background knowledge and misconceptions.

Argumentation can be considered one of the fundamental instruments for the “social constitution of knowledge,” (Resnick, Säljö, Pontecorvo, & Burge, 1997, sec. 4). The crucial role of argumentation in teaching and learning, especially in the field of science education, has been underscored in many studies (Erduran, Simon, & Osborne, 2004; Koballa, 1992; Pera & Shea, 1991; Sandoval & Millwood, 2005). Teaching can be considered as an argumentative dialogue, as it is aimed at modifying and developing the students' “private understanding,” showing its limits and building on it in order to account for new phenomena (Chi & Roscoe, 2002; Simons, Morreale, & Gronbeck, 2011). One of the crucial instruments used for achieving such a purpose is the use of arguments. Students' arguments can be encouraged in order to bring to light the background beliefs on which they are based. Such prior beliefs and background knowledge can become the issue of further argumentative exchanges, aimed at providing reasons showing their incompleteness and supporting the scientific viewpoint. For this reason, argumentation tools are fundamental for both enhancing the students' critical thinking skills, and improving classroom interactions, so that students' prior knowledge can be better made explicit, addressed, and developed into more elaborated theories (Carey, 2000; Osborne, Erduran, & Simon, 2004). The advances in argumentation theory can provide useful resources for improving argumentation in classroom interactions, both as argumentative dialogical models (van Eemeren & Grootendorst, 1984, 1992, 2004; Walton & Krabbe, 1995) and as logical argument structures (Hastings, 1963; Kienpointner, 1992a, 1992b; Perelman & Olbrechts-Tyteca, 1969; Walton, Reed, & Macagno, 2008; Walton, 2013).

In recent years, several studies have addressed the crucial issue of introducing argumentation theory in educational contexts (Sampson and Clark, 2008; Schwarz & De Groot, 2007). In particular, the practice of argumentation has been addressed from two distinct but interrelated perspectives: the dialogical one, focused on the activity of supporting claims by means of reasons, and the more structural one, centered on the construction of arguments. On the one hand, the nature of classroom conversations has been investigated considering argumentative practices such as providing evidence to support a viewpoint, or rebutting and questioning other positions (Driver et al., 2000; Duschl, Ellenbogen, & Erduran, 1999; Jimenez-Aleixandre, Rodriguez, & Duschl, 2000; Schwarz & De Groot, 2007). Under this view, dialogical argumentative activities can be seen as instruments for promoting critical reasoning (Erduran et al., 2004; Koballa, 1992; Osborne, 2010; Pera & Shea, 1991). On the other hand, other studies have taken into account a more specific dimension of argumentation, i.e. the construction of arguments. Theories of argument structure have been applied to science education in order to help students better elaborate their written arguments. Analytic models have been developed to improve the articulation of the field-independent relationships, such as between premises and conclusion (Kelly & Takao, 2002), or the field-dependent ones, namely between specific evidence, warrants and claims (Sandoval & Millwood, 2005). In this framework, the Toulmin's

model of argument (Toulmin, 1958) has been mostly used as an educational tool for improving students' understanding of scientific problems and for assessing the quality of argumentation in classrooms including the support of claims and the rebuttals (Osborne, Erduran, & Simon, 2004; Erduran & Jimenez-Aleixandre, 2008).

Educational practice is complex, and the decision of choosing the most adequate method for supporting it is difficult, mainly due to the plethora of variables and goals that co-exist and enrich learning in a specific context. The same complexity applies when it comes to analyzing and assessing students' oral and written argumentation (as shown in the recent review by Rapanta et al., 2013). Argumentation in educational contexts raises an amount of issues including philosophical, psychological, cognitive, and logical aspects, which make are practically impossible to investigate or even address in the limited frame of a special issue. Nonetheless, if one of the main goals of educational research is to inform educational practice, and educational practice needs to be reflective and at the same time grounded on solid and proven theories, then researchers in this field need to be continuously updated on the advances in the theoretical methods they use. To this purpose, by restricting the focus on the pragmatic approaches to argumentation, which combine the dialogical dimension with the logical (argument-assessment one), it is possible to detect specific areas of research and, more importantly, specific methods to which this special issue can contribute. The most important methods in relation to the phenomenon of arguing as an educational practice that can be concerned by this collective study are the following:

- (a) the application and elaboration of dialogical models for analyzing and assessing student-teacher interactions;
- (b) the elaboration and application of coding schemes for the analysis of peer-peer dialogues in face-to-face or computer supported contexts;
- (c) the codification and assessment of argument structures in written communication tasks; and
- (d) the design of structured or semi-structured interventions to support students arguing with the help of external representations (i.e. audiovisual materials, maps, diagrams, etc.).

In all these cases, educational researchers tend to apply methods already established in the field of education, such as Deanna Kuhn's model of argument structure analysis (Kuhn, 1991), Mark Felton's model of argumentative dialogue analysis (Felton & Kuhn, 2001; Felton, 2004), or the popular Toulmin Argument Pattern (Osborne et al., 2004; Toulmin, 1958). From a theoretical point of view, such models have been refined in argumentation theory by several scholars, who developed more thorough analytical instruments, such as the theory of argumentation schemes (Walton et al., 2008; Walton, 2013), of types of dialogues (Walton, 1998), or the model of critical discussion within the Pragma-dialectics theory (van Eemeren & Grootendorst, 2004). Although the influence of these and other argumentation theorists, such as Perelman and Olbrechts-Tyteca (1969) and Plantin (2005), has been crucial in shaping educational research in argumentation, the connection between theory and practice is rarely made explicit as a background justification of the methods used.

The specific goal of this special issue is to bring together the approaches in the field of education that implement tools developed in argumentation theory, and the models proposed in argumentation that are or can be applied to the field of education (Rapanta et al., 2013). Our purpose is twofold. On the one hand, we aim at providing scholars in education with the recent theoretical developments in argumentation, and suggesting ways in which they can be used for teaching and assessment purposes. On the other hand, we will present some recent argumentative approaches to education, providing new ideas for empirical and methodological studies and applications. Some of the research questions we will endeavor to answer are the following:

1. What types of argument dialogues or structures are the most effective in educational contexts?
2. How can educators effectively assess their students' arguments?
3. What are some emerging argumentation methods and educational contexts that still need to be researched both separately and in combination?

3. Foundational concepts and areas of research

The advances in the field of argumentation theory and the research in the area of education are increasingly becoming interconnected (Erduran & Jimenez-Aleixandre, 2008; Muller-Mirza & Perret-Clermont, 2009). On the one hand, education is the natural and traditional application of argumentation studies. Since Plato's times, dialogue, and dialectical reasoning, has been regarded as a crucial component of education (Kretzmann, Kenny, & Pinborg, 1982). On the other hand, interest in argumentation studies is constantly increasing in the field of education. Argumentative, collaborative dialogues and the argumentative structures of discourse have been shown to be extremely effective teaching strategies for improving students' critical skills (Erduran, 2008) and addressing background knowledge, including misconceptions and the roots of deep disagreements (Andriessen et al., 2003; Asterhan & Schwarz, 2009). This principle is at the basis of the idea of teaching as an argument, i.e. the view that education should help learners construct their knowledge through argumentative interactions (Garcia-Mila, Gilabert, Erduran, & Felton, 2013; Kuhn, 1992, 1993, 2010). Through the use of arguments, students have been shown to acquire not only the knowledge of concepts, but the grounds on which such concepts are based, revising their prior knowledge and enhancing their epistemological understanding (Weinstock, 2006).

Below we present some of the most important areas in which argumentation theory and educational practice meet, as shown by research so far.

3.1. Identification of fallacies

The term “fallacy” is an ill-defined term, as no commonly accepted theory of fallacies exists. Thus far, the most predominant theories of fallacies have been the pragma-dialectical theory and the pragmatic theory (Tindale, 1997). More precisely, for the pragma-dialectical theory (van Eemeren & Grootendorst, 1987), a fallacy is a derailment from the rules of a critical discussion, a speech act that hinders somehow the resolution of a dispute within an ideal model (van Eemeren, Grootendorst, & Snoeck-Henkemans, 2002). In the pragmatic theory of fallacies proposed by Walton (Walton, 1995, 1998), a fallacy is rather an argument or an argumentation scheme (Walton et al., 2008) that can be acceptable and reasonable in some contexts, but in others can be deceptive. More recently, the pragmatic theory of fallacies was combined with the already expanded idea of argumentation schemes to give place to what is called “paraschemes” theory of fallacies (Walton, 2010, 2011). The persuasive effect of fallacies is explained by combining the “logic” of the fallacies with their psychological, heuristic dimension. On this view, the mechanism of heuristics is presented as the crucial process mediating between the two notions of fallacy and valid argumentation scheme (Walton, 2010). In other words, someone can opt for a rapid inference leading to a tentative conclusion (providing arguments that only look better than they really are) rather than advancing a carefully assessed opinion based on duly collected and weighted evidence, which is one of the main requirements in any educational system.

In education, fallacies have been treated by education researchers mostly in terms of identification and assessment of bad arguments. Researchers have mainly focused on:

- (a) detecting the fallacies in written texts produced by students (Jungwirth, 1987; Weinstock, Neuman, & Glassner, 2006), or
- (b) encouraging students to identify them in order to assess their argument comprehension and evaluation skills (Neuman, Glassner, & Weinstock, 2004; Neuman, Weinstock, & Glassner, 2006; Neuman, 2003; Weinstock et al., 2006; Weinstock, Neuman, & Tabak, 2004).

Fallacies are very important in education as they represent flawed structures of reasoning or biases that can be commonly found in students’ oral and written justifications of their viewpoints. However, the concept of fallacy is controversial in argumentation theory (Hansen & Pinto, 1995), and can be addressed from different perspectives. For example, they are usually regarded from a pragmatic perspective as strategic arguments under specific conditions (Walton, 1995), while from a cognitive point of view they can be regarded as grounded on heuristics that underlie any human reasoning (Walton, 2010). The awareness of these distinct approaches and dimensions and the adoption of an adequate theory for analyzing and assessing students’ fallacies are of fundamental importance for developing accurate research and teaching practices.

3.2. Dialectical tools

Dialogue theory is one of the most important approaches and trends in argumentation theory. On this perspective, arguments unfold dialectically as an exchange of argumentative speech acts between two or more parties. Such speech acts have also been described as dialogue moves, following the metaphor of a language game in which every actor contributes to the common goal of the interaction (Hamblin, 1970; Walton & Krabbe, 1995; Walton, 1989a). In this approach, two elements are of crucial importance in order to understand and assess the nature of an argumentative process. The first one is the defeasible character of arguments, implying that every proposition may be refuted by the proponent thereof or by other interlocutors (Nussbaum & Edwards, 2011). The second one refers to the typology of the dialogical macrostructure defined by the type of communicative goal to be achieved. Walton (1989b, 1998) identifies seven types of dialogue that can be considered as argumentative depending on the quantity and quality of argumentation structures (schemes). More recently, Walton and colleagues have added the dialectical principle of critical questions to argumentation schemes, so that each argumentative inference can be evaluated dialogically. To this purpose, several argument diagramming or mapping tools have been designed, which bring to light the internal structure of an argument and support the dialogical assessment thereof (Rowe, Macagno, Reed, & Walton, 2006).

From the point of view of educational research, several methods have been proposed that analyze argumentation either as peer-peer dialogues or as classroom interactions. However, very few authors have paid attention to the dialectical aspects of such dialogues, distinguishing between argumentative and non-argumentative moves and sequences and characterizing the former according to their pragmatic qualities. One of these authors is Michael Baker (Baker, 1999, 2003, 2009), who applied dialectical analysis, as initially proposed by Barth and Krabbe (1982), to explain shifts in students’ attitude when engaged in collaborative problem solving tasks. In another study, de Vries, Lund, and Baker (2002) proposed a list of argumentative dialogue moves that tend to appear in computer-supported collaborative interactions in science education. These moves are: thesis, attack, defense, concession, compromise, and outcome. Similarly, Felton and Kuhn (2001) proposed a more comprehensive list of dialogue acts used to codify argumentative discourse. Some of these are: add, advance, agree, aside, clarify, counter-argue, disagree, and dismiss.

The view of classroom discourse as a dialogical activity between students and teachers has attracted researchers' interest for years. Argumentation practice introduces a crucial new aspect, consisting in emphasizing the importance of peer dialogues, while placing the position of teacher's authority in the background of the classroom scenery. The analysis and assessment of classroom communication as a goal-oriented activity requires the adoption of a theoretical stance regarding the effectiveness of such an activity and the components thereof.

3.3. Epistemic negotiation

Many argumentation theorists, among whom the pioneers [Biro and Siegel \(1992\)](#), follow an epistemic approach that views argumentation as “a fundamentally epistemic affair” or in Goldman's ([Goldman, 1994](#)) terms, a “social epistemic enterprise.” On this view, the focus is placed on the cognitive aspects of argumentation, especially in regards to a common dialectical goal, such as reaching consensus. This approach has been extremely helpful for Artificial Intelligence (AI) scientists who developed models of argumentation based on meaning negotiation among agents ([Beauch-Capon & Dunne, 2005](#)). The same view has also found applications in education, especially within the “learning to argue” ([Chinn, 2006](#)) approach. In this area of research, the predominant interest is not the acquisition of curriculum knowledge, but rather the process of interpreting collaboratively complex constructs that reconstruct the epistemic nature of an issue, problem, or task. This may be achieved by several discursive strategies such as:

- broadening the space of debate ([Baker, Quignard, Lund, & Séjourné, 2003](#));
- attitude change ([Andriessen et al., 2003](#));
- critical questions ([Nussbaum & Edwards, 2011](#)); or
- hints ([Berland & Reiser, 2009](#); [Sampson, Grooms, & Walker, 2011](#)).

In any case, the interaction is co-constructive when it results in changing the epistemic status of the conversation, namely in an “epistemic effect.” According to Baker ([Baker, 1999](#)), epistemic effects “are concerned with the status of representations from the point of view of individuals, their attitudes with respect to them” ([Baker, 1999](#)). The increase of epistemic effects has been also found to result in conceptual changes and subsequently better content learning ([Asterhan & Schwarz, 2009](#); [Felton, Garcia-Mila, & Gilabert, 2009](#)). Nonetheless, the argumentative quality of the representations used in such epistemic negotiations has not received sufficient attention. Both when the students argue to learn or learn to argue, it is necessary to define what stands for a good, relevant, and evidence-based argument.

3.4. Where the two ends meet (or can meet)

Overall, the connections between argumentation theory and educational research are evident. All the types of classroom interactions – including all forms of communication (oral, written, or electronic) – can be analyzed as complying with rules of epistemic and dialogical negotiation, aiming at the main task of knowledge building. It is thus expected that argumentation and education researchers engage in a continuous exchange of ideas. On the one hand, argumentation scholars could find meaningful applications for their theories in classroom activities, testing and improving them. On the other hand, education researchers could benefit from the insights from argumentation theory in the analysis and assessment of knowledge and arguments advanced by both students and teachers.

The purely theoretical dimension of philosophical approaches to arguments and reasoning tends to make the two fields grow separately, whereas the interaction between them would result in advances in both areas. On the one hand, argumentation scholars are not familiar with the state of the art in educational research, but they are aware that the implementation of the theoretical tools and the social impact of theoretical research are becoming of fundamental importance ([Muller-Mirza & Perret-Clermont, 2009](#); [Rigotti & Greco-Morasso, 2009](#)). On the other hand, an increasing number of education scholars are trying to develop more contextual and applied approaches based on new theoretical and philosophical models ([Felton & Kuhn, 2001](#); [Kuhn, 2010](#); [Mayweg-Paus, Macagno, & Kuhn, 2015](#); [Nussbaum & Edwards, 2011](#); [Nussbaum, 2011](#)), although the big majority of them still applies Toulmin's model proposed in 1958 ([Rapanta et al., 2013](#)), mostly due to its simplicity and applicability. Recent advances in argumentation theory can potentially provide education researchers with more sophisticated tools of analysis and assessment of students' (and teachers') argumentation practices.

4. Some future directions

As argued above, the topic of argumentation in education has been broadly studied not only because of the natural connections between teaching and arguing, but also due to recent reforms introduced all over the world in both science curricula and general education. Nowadays, at all levels of instruction, students are expected to know how to think, while teachers are required to know how to teach students to be independent, rational, and critical in choosing a theory and advancing evidence to support their ideas. Argumentation plays a crucial role, as engaging in argumentative activities develops a set of cognitive, meta-cognitive, and epistemic skills that are the core of any type of scientific and self-motivated reasoning.

Although the field of research of argumentation in education is interdisciplinary per se, very rarely do scholars from the two sub-areas meet. The two communities tend to grow, publish, and meet separately from each other, without many opportunities to address common topics from different methodological perspectives. Only recently, some individualized efforts have been made in the form of forums or special interest groups that have brought researchers from the two areas together. The papers presented in this special issue are the result of one of these efforts. More precisely, they were presented in a forum specialized in the area of argumentation theory and its implementations in educational practice as part of the first European Conference in Argumentation held in Lisbon, Portugal, from the 9th until the 12th of June 2015. The authors were invited considering their capacity to represent what may be some future directions of research in the field of argumentation methods in education. Some of the authors come from the field of education, whereas others are scholars working in argumentation theory. However, all of them have one thing in common: their strong commitment to both theory and practice and to the strategies and methods for constructively build on each other.

The special issue starts with a general overview of the research and development regarding science argumentation, a field that has received great attention in relation to how to enhance students' reasoning skills. Lazarou, Sutherland, and Erduran show how argumentation, seen from an activity-theoretical perspective, can be considered as a collective activity existing in primary science education practice. To this purpose, they examine the sociocultural practices that facilitate it, in a number of primary schools in Cyprus through appropriate methodological and analytical tools from Cultural-Historical Activity Theory (CHAT). They show how this approach can be used for reconstructing argumentation as an activity in science education, but also for employing a methodology for researching the societal character of this activity.

In the second paper, Garcia-Mila, Felton and Villarroel describe their research on combining evidence-based reasoning with online argumentative dialogue and different argumentation goals. More precisely, they show how the persuasion or consensus condition of an argument dialogue among peers may affect their confirmation bias regarding the selection of evidence in a post-test essay.

The third article is focusing on the method of coding adolescent students' dialogues and more precisely the quality of the argumentative use of evidence advanced to support a given claim. Although such a method has been used broadly in the past, little is done regarding the relevance of the evidence spontaneously used by the students in such dialogues. Macagno combined two methods of coding, one focusing on argument as a product and the other on argument as a process. This approach can allow reconstructing and assessing the students' arguments and argumentative practices, and is applied to the analysis of two distinct argumentative modes, the dialogical and the monological one. This paper shows that adolescent students tend to use evidence more relevantly and in a more sophisticated fashion in dialogues than in their written essays, displaying in the dialogical mode higher understanding and more careful elaboration of the given pieces of evidence.

The fourth paper by Mayweg-Paus, Jucks, and Thiebach focuses on the influence of perspective taking on the quality of argumentation among pre-service teachers during their online search for information on a science-related task. The main question was whether agreement or disagreement can have more positive impact on the quality of argumentative discussions. The authors found that focusing on differences may be more beneficial for the quality of reasoning, whereas focusing on similarities may be better for the social aspects of interaction.

Rapanta and Walton conclude this special issue with an attempt of "marriage" between a broadly used tool in the field of Artificial Intelligence, namely argument maps, and a recently emerged tool that helps identifying informal logic fallacies, that is, the theory of paraschemes, and their application on a higher education instructional task about arguing on everyday reasoning topics. Although argument maps have been broadly used for assessment reasons in other fields rather than education, their use in the latter area of studies is limited to visualization of students' premises with the implicit aim to improve their reasoning. The authors propose a thorough method combining various tools from the argumentation field, aimed at reconstructing arguments as instantiation of schemes or paraschemes and assessing them accordingly. The applicability of this method in education by scholars not working in the field of argumentation is discussed.

Overall, the five articles of this special issue address the common topic of mutually inform the argumentation and education fields and researchers with recent knowledge and advances in each one of them. At the same time, concrete answers are given to some crucial questions such as the ones we proposed in Section 2 above. For instance, regarding the effectiveness of argument structures or types of dialogues, the authors of this special issue give the following answers: disagreement is more effective than agreement as a condition for high quality argumentative discourse (Mayweg-Paus et al., [this issue](#)) among teachers, and confirmation biases are more possible in the persuasion goal condition among young adolescents (Felton et al., [this issue](#)). As far as the assessment of students arguments is concerned, Macagno ([this issue](#)) found that dialogues are a better context to assess arguments than essays, given the greater relevance of evidence used. However, adult students in written argumentation tasks, even the ones using visualization tools, still tend to perform a series of critical thinking fallacies related to heuristics (Rapanta & Walton, [this issue](#)). Finally, some emerging methods in the field of argumentation theory, which still need to be explored in education, relate to the identification of fallacies and the epistemic relevance of evidence and theories used by the students. These and other methods need to be further validated in different educational contexts including the emerging video discussions or online chats that many teacher-students communities currently implement as their main communication tool.

5. Conclusion

As mentioned above, the philosophical and the educational fields of research in argumentation hardly overlap and interact. However, there are some topics of great interest in educational research in argumentation that cannot be studied in depth without considering the recent contributions in argumentation theory. Educational researchers interested in argumentation have been so active in the recent years that a systematic feedback on and evaluation of their methods is an emerging need, in order for their research to be meaningful and reliable. From the perspective of argumentation scholars, educational studies, assessments, and tests can be the litmus test for the applicability, usability and social usefulness of the ideas developed.

By focusing on argumentation methods in education as a starting point, we aimed at covering a range of issues that are still ill-defined in the field of argumentation in education. An in-depth consideration from both argumentation theory and educational practice is then necessary for these issues to be addressed. Considering the value of interdisciplinary systematic research for education to develop, we hope to open up the path for more attempts of collaborative discussion between areas that bring innovation and creativity in the ways people think, learn and teach. Such discussions may contribute to the design of argument-based curricula and teachers' professional development training in argumentation.

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