



Argumentative patterns in students' online discussions in an introductory philosophy course

Micro- and macrostructures of argumentation as analytic tools

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Abstract

Online discussions are commonly used as learning activities in higher education. One of the rationales behind their use is to enhance students' competence in critical thinking and rational argumentation. In the research field, several approaches to critical thinking and rational argumentation are suggested, and several frameworks for analyzing online educational discussions are employed. In this article, online discussions from an introductory philosophy course are analyzed. The microstructure of arguments (how arguments are backed) and the macrostructure of argumentation (how arguments are linked together in chains of arguments and counterarguments) are used as analytic tools. The categories for analysis are based on Toulmin's argument model. The aim here is twofold. First, the article explores what occurs in online discussions in an introductory philosophy course where competence in argumentation is a specific learning objective, analyzed using the categories of the microstructure of arguments and the macrostructure of argumentation. Second, the article discusses how suitable the categories from Toulmin's model are for such analysis. The analysis reveals that the students eagerly discussed the topic, showed an understanding of the topic, and employed subject knowledge. Yet, their discussion posts tended to be associative and unaddressed. The categories of the microstructure of arguments and the macrostructure of argumentation proved powerful tools for analysis. The analysis coincides with the students' and teachers' own evaluation of argumentation in the discussions, yet it provides a more justified, detailed picture of the strengths and weaknesses in the students' argumentation. Nevertheless, important qualities of the discussion are not revealed by these categories. One recommendation for teaching and facilitation is to provide students with an elaborated conception of rational argumentation.

Keywords

Argumentation, Online discussions, Arguments' micro-structure, Argumentation's macro-structure, Toulmin-model

Introduction

Online discussion is a common learning activity in higher education (Wise & Paulus, 2016). Typically, students discuss topics asynchronously on discussion boards set up in learning management systems (LMSs) or other platforms. In this study, discussions were set up as a mandatory learning activity in an introductory philosophy course to enhance students' competence in argumentation.

How did the students construct and place their arguments in the online discussions? Moreover, what are suitable categories to analyze argumentation in online discussions? In this article, these questions guide the analysis of discussion transcripts using the categories

of the microstructure of arguments and the macrostructure of argumentation. The first question derives from an urge to understand how online discussions contribute to students' learning and a desire to better facilitate online discussions for enhanced learning. The second question derives from theoretical and methodological discussions in the research field about how to analyze argumentation in educational online discussions.

In education, online discussion serves different purposes—from socialization to the dissemination of information to the development of new knowledge (Salmon, 2013). Developing new knowledge, scrutinizing established conceptions, and contrasting conflicting views all require the ability to reflect and think critically, propose sound arguments, and evaluate the tenability of arguments (Andriessen & Baker, 2014). Deep and higher-order learning require the ability to provide reasons for, evaluate, and justify knowledge claims and not merely the ability to memorize and reproduce knowledge (Biggs & Tang, 2007; Marton & Säljö, 1976). The quality of arguments students are able to articulate reflect the quality of their learning (Andriessen & Baker, 2014). Despite the wide acceptance of critical thinking and rational argumentation as learning objectives, research has shown students do not develop these competencies as desired (Arum & Roksa, 2011; Cahill & Bloch-Schulman, 2012).

There are several approaches to critical thinking and rational argumentation in the research field; consequently, there are several approaches to teaching and assessing rational argumentation and critical thinking. Most studies on critical thinking maintain that the ability to justify, evaluate, and provide reasons for knowledge claims is central (Dewey, 1998; Ennis, 1989; Facione & Facione, 2007; Siegel, 1988/2013; Toulmin, 1958/2003). Therefore, competence in critical thinking and rational argumentation provides students with powerful strategies for independent thinking and deep learning.

The development of students' critical thinking and their ability to argue rationally are vital for higher education, and are commonly stated learning objectives. Participation in discussions provides an opportunity to practice rational argumentation, and to elaborate and contest discussants' views. Online discussions—written and asynchronous—may enable in-depth debate and thoughtful learning. Educators and researchers strive to explore how participation in online written discussions influences students' learning and understanding of subject matter (Kovanović, Gašević, Joksimović, Hatala, & Adesope, 2015; Loncar, Barrett, & Liu, 2014; Schindler & Burkholder, 2014; Tsai & Tsai, 2014; Wise & Paulus, 2016; Zheng & Warschauer, 2015). Expectations about how online discussions may support learning have been high; however, the research includes mixed documentation of the significance of online discussions vis-à-vis learning (Rourke & Kanuka, 2009; Thomas, 2013). Previous research has shown there are challenges with online discussion, such as low activity, students not responding to each other's posts, and surface-level rather than in-depth discussion. Understanding what occurs in the discussions may inform and thus improve how teachers and educational developers facilitate such discussions.

Content analysis—the analysis of discussion transcripts based on a pre-defined framework—has become the most used research strategy in relation to online educational discussions (Biasutti, 2017; Wise & Paulus, 2016). Researchers have suggested several frameworks to analyze how students discuss in online educational discussions. Frameworks focusing on argumentation based on Toulmin's argument model are important in the field (Weltzer-Ward, 2011; Wise & Paulus, 2016). Here, I use and discuss a framework by Weinberger and Fischer (2006) that analyzes online educational discussions by focusing on how students construct single arguments (microstructure) and place them in chains of argumentation (macrostructure). This framework builds on Toulmin's (1958/2003) argumentation model.

Several review articles have pointed to the abundance and weak theoretical grounding of frameworks and the need to critically discuss these frameworks (Clark, Sampson, Weinberger, & Erkens, 2007; De Wever, Schellens, Valcke, & Van Keer, 2006; Weltzer-Ward, 2011). Consequently, a critical discussion of how Toulmin's model functions as a means to analyze students' arguments is needed.

The aim of this article is twofold. First, it explores what occurs in online discussions in an introductory philosophy course where competence in argumentation is a specific learning objective, analyzed using the categories of the microstructure and macrostructure of argumentation. Second, it discusses how suitable the categories from Toulmin's model are for such analysis.

Method and description of the empirical context

Analytic framework

What is an argument and how do we analyze argumentation? In its most basic form, an argument is a linguistic expression consisting of at least one part that expresses a claim or statement of opinion. Ideally, another part (or parts) of the argument serves as backing for the claim and eventually a limitation of the claim (Leitao, 2000; Toulmin, 1958/2003). The *processes of argumentation* involve discussants who present claims they find plausible to convey opinions to their audience. If an opponent contests an adduced claim, she/he may be contesting the claim itself and/or the information backing the claim. Sequences of argumentation thus consist of arguments, counterarguments, and replies. Counterarguments may propose new opinions or address the tenability or relevance of the initial claim(s) or their backing.

Weinberger and Fischer (2006) developed a coding scheme to analyze the argumentative construction of knowledge in online educational discussions. Their model comprises four dimensions¹. The argument dimension—the focus of this article—emphasizes two aspects of argumentation: a) the macro-level of argumentation, based on Leitao (2000), which focuses on sequences of argumentation; and b) the micro-level of argumentation, based on Toulmin (1958/2003), which focuses on the structure of single arguments. In the next section, I present the categories of the microstructure of arguments and the macrostructure of argumentation. In the analysis section, I identify arguments of the different categories.

Analysis of the macro-level of argumentation

The analysis of the macro-level of argumentation focuses on how discussants link posts together as sequences of argumentation. The lack of links between posts shows the discussion lacks a common focus. Table 1 contains an overview of categories of links between arguments and their descriptions.

1. Weinberger and Fischer (2006) include the following in their coding scheme: 1) Participation—both overall activity and heterogeneity of interaction. 2) Epistemic dimension—construction of problem space; conceptual space; adequate relations between problem and concept; inadequate relations between problem and concepts; relations between prior knowledge and problem. 3) Argument dimension—a) micro-level, how arguments are backed by evidence (as described above, based on Toulmin's model); and a) macro-level, how a chain of arguments support or criticize a position (arguments, counterarguments, integration of positions/arguments). 4) Social mode of co-construction—articulating thoughts; questioning; coordinating the discussion; integration-oriented consensus building; conflict-oriented consensus building. This results in a complex scheme where coding according to the four dimensions may overlap.

Table 1 Categories of the macrostructure of sequences of argumentation

Category	Description
Argument	Statement put forward to convey an opinion and convince interlocutors
Counterargument	Argument that opposes the preceding argument and proposes an alternative opinion
Integration (reply)	Statement that aims to integrate two arguments
Non-argumentative moves	Questions, coordination, meta-statements

Based on Weinberger and Fischer (2006)

In this article, links between discussion posts are identified. How posts are linked as starting points, counterarguments, or attempts to integrate may indicate the presence or lack of explicit argumentation.

Analysis of the micro-level of argumentation

Toulmin’s work on informal logic (Toulmin, 1958/2003) is a standard account of the components and structure of single arguments (Andriessen & Baker, 2014; Inch & Warnick, 2011). According to Toulmin, an argument consists of advancing a *claim*, a proposition the utterer holds true and wants to defend. The claim needs support to be justified and accepted as true. *Data* works as evidence for claims. In many cases, we need something that connects the data to the claim and guarantees the data really gives evidence for the claim. Toulmin calls the premise that guarantees the inference from data to evidence as *backing*. Backing may need some kind of support, called the *warrant*. However, the data, backing, and warrant may support the claim with varying degrees of certainty. The claim may follow with necessity or some degree of probability. Estimating the probability of the claim is part of the line of argument and is called the *qualifier*. The circumstances under which the claim is not true is the *rebuttal*. Figure 1 illustrates the model.

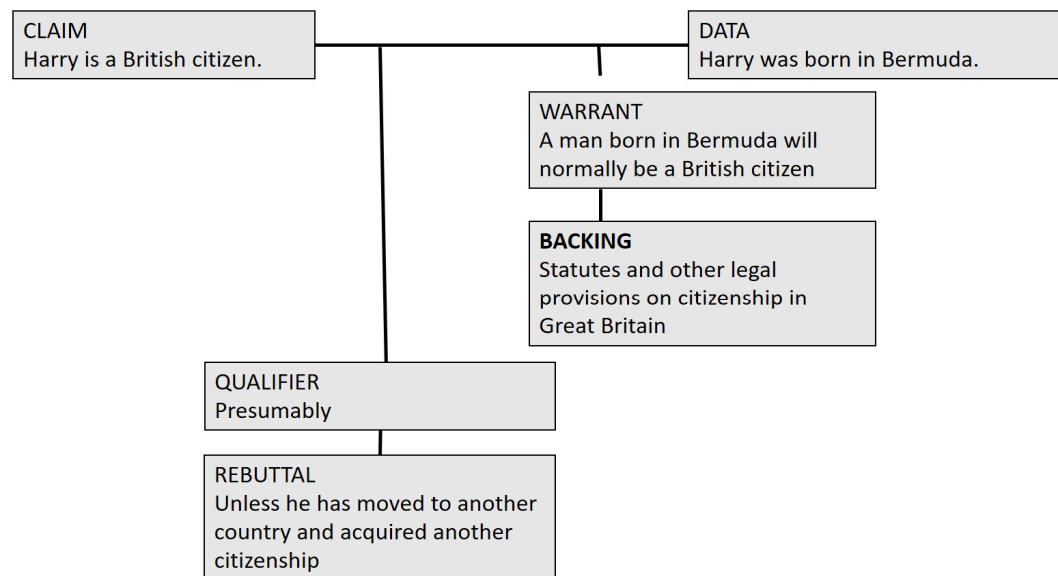


Figure 1 Toulmin’s argument model (Based on Toulmin, 1958/2003)

Weinberger and Fischer (2006) based their coding scheme for the microstructure of arguments on a simplified version of Toulmin’s model. In the simplified model (Figure 2), data, warrant, and backing are merged under the heading *backing*. The rebuttal and qualifier are merged under the heading *qualification*.

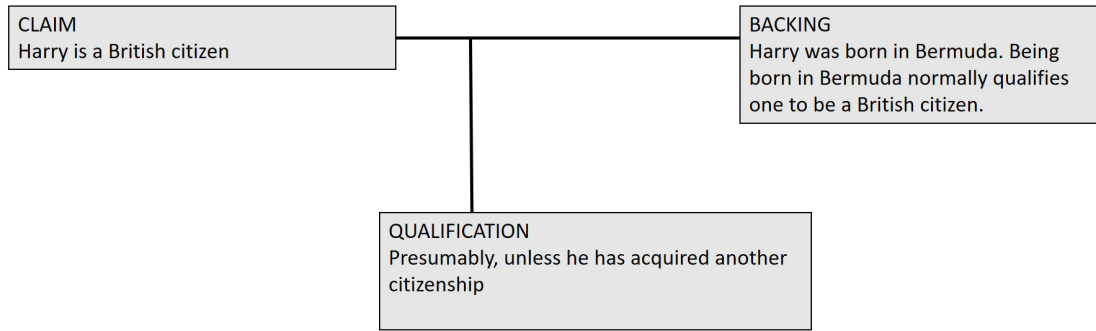


Figure 2 Simplified Toulmin model

The simplified model provides categories to determine whether an utterance contains a claim, whether the claim is supported with backing justifying the claim, and whether the limitations of the claim are explicated. The frequent occurrence of posts and arguments lacking these components indicates weaker argumentation.

Table 2 presents an overview of the categories of the microstructure of arguments.

Table 2 Categories of the microstructure of single arguments

Category	Description	Component
Simple claim	Statement that raises a claim without providing any evidence or limiting the context of where the claim is asserted to be valid and true	CLAIM
Grounded claim	Statement that raises a claim and provides evidence proving the claim but lacks a limitation of the context wherein the claim is valid	CLAIM BACKING
Qualified claim	Statement that raises a claim and limits the context where it is true and valid but lacks evidence proving its truth	CLAIM QUALIFICATION
Grounded and qualified claim	Statement that raises a claim, provides evidence proving the truth, and demarcates the context wherein the claim is valid	CLAIM BACKING QUALIFICATION
Non-argumentative moves	Posts that do not raise a substantial claim about the topic discussed, including questions, suggestions on how to proceed with the discussion, etc.	

Based on Weinberger and Fischer (2006)

Material and empirical context

The analyzed discussions were collected from an online introductory philosophy course. As competence in argumentation was an important learning objective in the course description and the teachers considered the online discussions to be vital in achieving this objective, the material is suitable to investigate students' argumentation.

The primary data source is transcripts from discussions in the LMS. Students were informed about the research on their contributions to discussions, and consent was obtained. At the end of the semester, transcripts of LMS discussions were made and put into a spreadsheet. Posts from non-consenting students were removed, and all names were replaced with aliases. The steps in the analysis of the discussions are described at the end of this section.

In addition to the discussion transcripts, course materials (course readings, video lectures, and instructions) and course descriptions (including a description of the learning

objectives) were collected as secondary data and used to describe the context of the discussions, thus enabling an understanding of the topics discussed. Interviews with the teachers provided the background and further information about the rationale for online discussions as a learning activity and the teachers' evaluation of how such discussions worked as a learning activity. Two researchers conducted a semi-structured focus group interview with the two responsible teachers based on an interview guide disseminated to the interviewees in advance. In the interview, online discussions in similar courses were discussed based on the teachers' experience. The interview was recorded, and some parts were transcribed.

The course was offered as part of the first semester of a BA program in philosophy and as an elective for students from other programs. The course covered an introduction to selected philosophical topics. The teaching and learning activities were video lectures, mandatory course readings, individual written assignments, and mandatory participation in online discussions. All teaching and learning activities occurred via the LMS. Twenty-five students enrolled in the course. The analyzed material is from a discussion in week three of the course. The students were split into two discussion groups of 12 and 13. Each student had to contribute at least two posts and was encouraged to post more.

The topic for the analyzed discussions concerned "questions about the meaning of life." This was chosen to appeal to students in an introductory philosophy course. The central issues were the distinction between objective and subjective criteria for meaningfulness and problems with establishing objective criteria for a meaningful life when the basic foundations for such criteria (such as God) are contested. The instructions for the discussion required the students to:

[D]iscuss the following assertion: *There are only subjective criteria for a meaningful life.* [...] (Excerpt from instructions in LMS)

Two examples followed the assertion: "Blob" watching brainless TV shows and drinking beer and Sisyphus being forced to push a stone uphill only to see it inevitably roll down (in this example, he was given a pill that made him feel happy). The examples showed lives that could commonly be considered meaningless; however, both characters claimed their lives to be meaningful due to their subjective criteria. The assertion in the instructions closely related to an article (Wolf, 2009) on the reading list and rephrased examples from the article and video lectures. However, the assertion raised a claim that contradicted the article's primary claim. The instructions encouraged students to use concepts and ideas from the article to focus "how you place your arguments" and to find "relevant distinctions between the two examples."

Altogether, 18 students wrote more than 10,000 words (equivalent to 20 standard pages) over a six-day period. This is far more than the mandatory requirement and demonstrates students participated in the discussion enthusiastically. The mode of the discussion was asynchronous. Discussants were not logged on at the same time, and there were time lapses between postings. Some posts are rather long; they address more than one topic and contain several arguments. The discussions stayed focused and did not go off topic. Students employed subject terms, demonstrating a good understanding of the discussed topic. This indicates the students read the course readings and watched the video lectures. Almost all posts were well written on a surface level; the language was clear and readable. Even though the topic may have provoked high-flown thoughts, the discussants maintained a balanced, sober approach in their writing.

In the interview, the teachers confirmed that argumentation and critical thinking were objectives of the course as a whole and particularly of the discussions. The teachers aimed to stimulate: a) activity and dynamics (all participating students engaged in the discussions); b) use of subject terms and knowledge from the course material; and c) reflexivity (providing and evaluating reasons for claims). The teachers claimed that discussions functioned as opportunities to practice using subject concepts and knowledge from the course. The teachers' experience was that in these kinds of discussions in similar courses, students succeeded with rational argumentation only to a limited degree. One interviewee summed it up this way:

[. . .] one might say that they [the discussion posts] are rich, and that they have a philosophical content. People [students] are sitting there, writing up posts that are more individual reflections than contributions to a discussion, meaning that much of a post is not addressed towards a discussant. (Teacher, introductory course in philosophy)

Nevertheless, even if the teachers found the discussions useful learning activities in terms of practicing subject terms and using knowledge from course readings, they noticed the students succeeded with rational argumentation only to a limited degree. This made it interesting to analyze how students actually constructed their arguments according to the categories of the microstructure of arguments and the macrostructure of argumentation.

Analytic procedure

The analysis of the discussion transcripts comprised several steps. First, macrostructures of argumentation were analyzed. How students referred to the assignment, the initial assertion, and previous posts was identified and visualized. Second, the microstructure of the arguments was identified and categorized. Posts were condensed and paraphrased to make the argumentative structure more transparent. Words and phrases that may indicate a relationship between a claim and backing (conclusion and premises), such as *therefore*, *because*, and *so*, were read with extra caution. Finally, the students' meta-comments about the discussion were carefully read to compare and triangulate their evaluations with the analysis and with the teachers' evaluation stated in the interview.

Analysis

Analysis of the macrostructure of argumentation and students' responses to the assignment

Macrostructures of argumentation describe how discussants link posts together in chains of arguments, counterarguments, and attempts to integrate arguments and counterarguments. According to Leitao (2000), opposition and contrasting opinions are core characteristics of argumentation processes. Figure 3 illustrates how students linked their posts to previous posts. Posts where discussants directly address other discussants by name are categorized as explicit references. Posts where discussants take up specific points without using the name of those they address are categorized as implicit references.

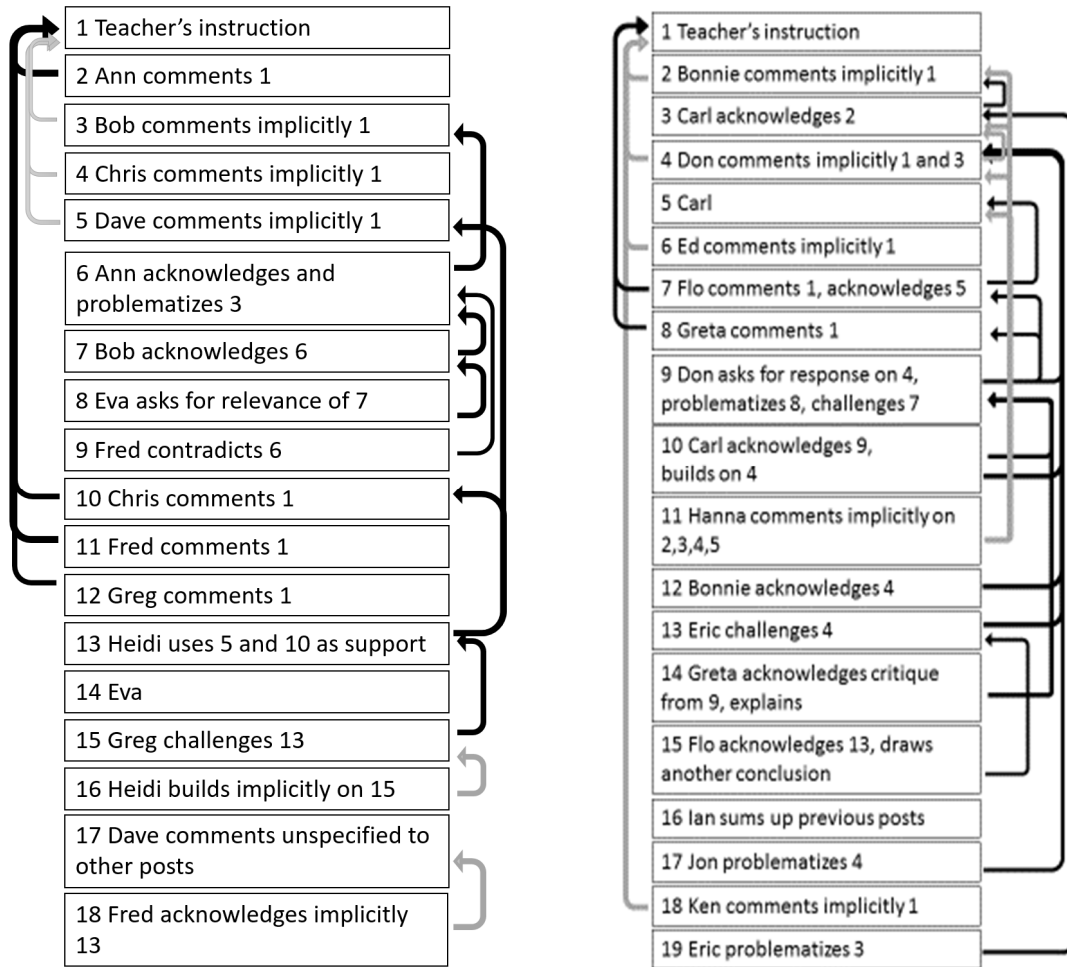


Figure 3 Discussants referring to other posts, groups 1 and 2. Arrows on the left illustrate references to the teacher's instructions; arrows on the right illustrate references between students' posts; black arrows indicate explicit references; and gray arrows indicate implicit references (referring to an argument without mentioning who posted it).

In discussion 1, six posts refer explicitly to posts by other students. Seven posts do not refer explicitly to other posts at all, although they relate to the discussion topic. Four posts refer explicitly to the initial post by the teacher. Discussion 2 shows a somewhat different pattern. Only two posts refer explicitly to the initial post by the teacher. Eleven posts explicitly address posts by other students. Seven posts do not refer explicitly to other posts at all, although they relate to the discussion topic.

How do students place their arguments in relation to previous posts? How do they indicate whether their posts represent counterarguments or attempts to integrate opposing claims? Challenging claims and backing claims are vital for argumentation to achieve improved understanding. According to Littleton & Mercer (2013) and Wegerif (2015), a focus on reasons and justification, challenging and problematizing other views, and asking for clarification, are hallmarks of explorative discussions.” Such discussions are suitable to develop new knowledge and better understanding. The examples below show how students referred to each other's posts critically and exploratively.

- “Ann, I do not completely agree with your claim that . . .” (Fred, post 9, group 1)
- “To Heidi, what if we look at the example from a different angle: . . .” (Greg, post 15, group 1)
- “Greta, I do not understand your argument [. . .] To Flo who writes that [. . .]. How is this possible? I would claim that [. . .] (Don, post 9, group 2)

About half of the posts have such characteristics. The other half have explicit references to other posts and consist of acknowledging, supporting, or building upon previous posts rather than critiquing or offering contrasting views:

- “Wolf argues, as you, Ann, comment, that . . .” (Bob, post 7, group 1)
- “. . . as Chris and Dave say . . . (Heidi, post 13, group 1)
- “Exciting to read your post, Bonnie.” (Carl, post 2, group 2)
- “I think the same as Carl . . .” (Flo, post 7, group 2)
- “Don points to something important here” (Carl, post 10, group 2)

This illustrates the potential for argumentation, as opposition and contrasting (Leitao, 2000) and explorative discussions (Littleton & Mercer, 2013; Wegerif, 2015) were utilized only to a limited degree.

Analysis of students’ responses to the instructions for the discussion/discussion task

Thirteen posts refer to the initial post by the teacher stating the discussion topic, the assertion that “[t]here are only subjective criteria for a meaningful life.” The assertion relates closely to and contradicts the main message in an article from the course readings.

What does it mean to “discuss an assertion,” and what are the criteria to successfully complete such an assignment? “Discuss an assertion” is a commonly used phrase for assignments. Interpreted loosely, it means “elaborate on the topic” or “exchange some ideas” about the topic. A more narrow and analytical interpretation of the task demands that discussants focus on the initial assertion, propose several arguments for and against, evaluate and weigh such arguments, and eventually evaluate the tenability of the initial assertion.

How did the students relate to the initial assertion (“There are only subjective criteria for a meaningful life”)? Only a few of the discussion posts related explicitly to the initial assertion. Four posts pointed out that the assertion is contrary to the message in the article (Wolf, 2009) to which the assignment refers. A few posts took an explicit stance regarding the assertion, claiming the assertion is untenable and pointing to its problematic implications. Posts that did not refer explicitly to the initial assertion discussed the more general question about meaning and life. Some of these argued in favor of subjectivity as primordial, implicitly supporting the initial assertion. Other posts discussed the examples and the distinctions between them.

An evaluation of how the discussants discussed the assertion—in the sense of presenting arguments for and against it and of its tenability—indicates the discussion as an assignment failed, as only a few posts addressed the tenability of the initial assertion. However, the discussion was successful as an arena for students to practice using subject terms and to discuss knowledge from course readings by exchanging ideas with peers.

Analysis of the microstructure of arguments

The previous paragraph focused on how discussants related their posts to other posts. Next, we look at how discussants constructed their arguments—that is, the microstructure of arguments. According to established theory (Toulmin, 1958/2003; Weinberger & Fischer, 2006), arguments consist of a *claim* that expresses the utterer's intention or belief he/she wants to convey, the *backing* of the claim that provides the reason to accept the claim, and the *qualification/limitation* of the claim that states the limitations of the claim's validity.

According to Weinberger and Fischer (2006)'s coding scheme, the most sophisticated posts contain an explicit claim, a backing or justification of the claim, and a qualification that limits the claim's validity. Successful argumentation depends on the discussants' ability to put forward such arguments. Therefore, arguments that lack *backing*, *qualification*, or both represent weaker modes of argumentation.

After condensing the material, all the argument types described in Weinberger and Fischer (2006)'s coding scheme were identified. Examples of several types of arguments are shown below.

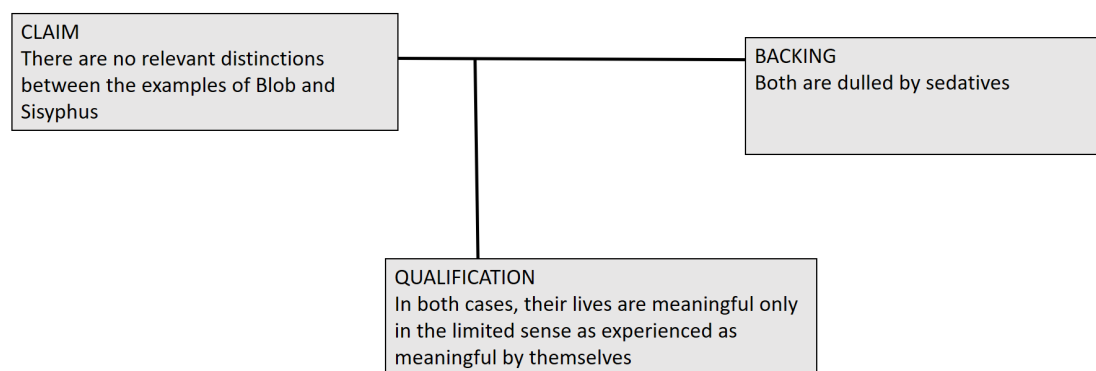


Figure 4 Claim with backing and limitation

Figure 4 illustrates a complete argument containing a claim, backing, and rebuttal. The utterer responds to a question raised in the teacher's instruction about whether the two examples, Blob and Sisyphus, are the same in terms of meaningful lives or whether there are relevant distinctions. The utterer's main claim is that there are no relevant distinctions. This is backed by pointing to what the two examples have in common. Further, the utterer draws attention to the limitation of what can be deduced from the examples. Even if the examples of Blob and Sisyphus have no relevant distinctions between the meaningfulness of their lives, their lives' meaningfulness is limited only by the degree to which they experience them as meaningful. However, this last component of the argument may also be interpreted as a separate claim responding to the more general discussion about subjective versus objective criteria for meaningful lives. According to this interpretation, other parts of the post may serve as backing and/or qualification.

However, this kind of argument containing a *claim*, *backing*, and *qualification* is atypical for the material. This category of argument represents fully developed, complete arguments and thus the ability to practice argumentation, are rare in the material. More incomplete variants and less-developed arguments are more frequent. Examples of such arguments contain a claim but lack qualification and/or backing. Below are examples of these categories.

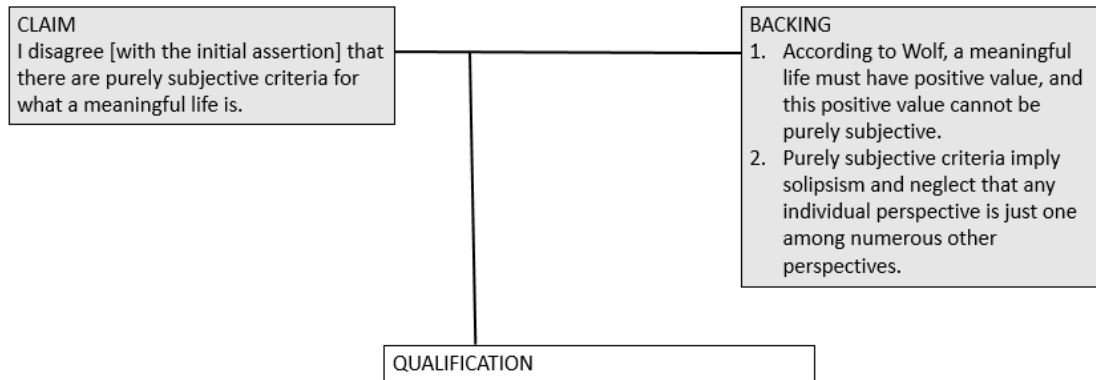


Figure 5 Claim with backing but without qualification

The utterer disagrees with the initial assertion. As backing for this claim, she/he presents arguments based on the course readings. The first backing is that Wolf (2009) states positive value is a prerequisite for a meaningful life and that such value cannot be purely subjective. The second is that purely subjective criteria imply solipsism, thus neglecting other perspectives. No limitation of the claim or the specific circumstances under which the claim or backing is valid are specified. For the first part of the backing, a limitation may be that one needs to accept Wolf's argument as authoritative if this backing is to have any weight. If a discussant does not accept Wolf's line of reasoning, she/he will probably be unconvinced by the first utterance in the argument's backing. The lack of an explicated qualification in the argument may indicate the utterer does not see the limitation of the backing or recognize how the argument may be refuted.

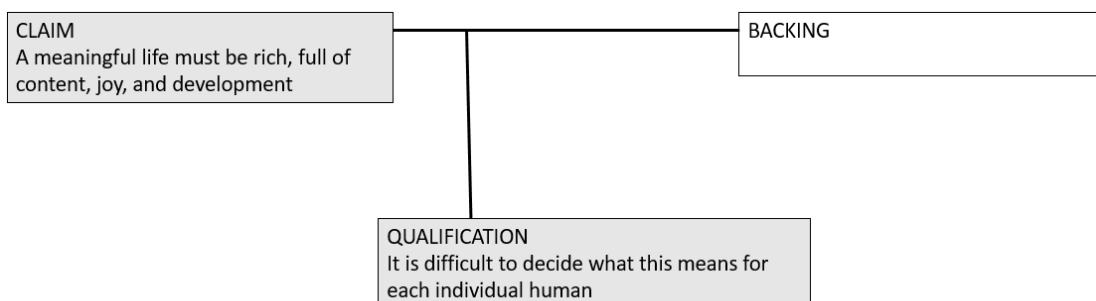


Figure 6 Claim with qualification but without backing

Figure 6 illustrates one among several variants of incomplete arguments. The utterer claims that a meaningful life must contain some specific elements. The post contains no attempts to back or justify this claim. Perhaps the utterer takes the claim to be self-evident or intends to build on something that was previously backed in the discussion. Because the utterer did not explicate how she/he intends to back the claim, we as the audience (fellow discussants or evaluators of the discussion) have no opportunity to consider any backing, but observe that backing is omitted. Nevertheless, in this post, the utterer explicates a limitation to the claim. Again, it is not made explicit by the utterer whether this represents a qualification and thus a limitation of the claim's extension, or a problematization of the claim and thereby a counterargument to the claim.

A category of arguments that Weinberger and Fischer (2006) described as less advanced and that consequently contribute the least in a discussion are arguments that raise a claim

without providing justification or backing or any qualification that limits the validity of the claim. Such arguments are quite common in the material. Figure 7 illustrates a claim that lacks both backing and qualification.

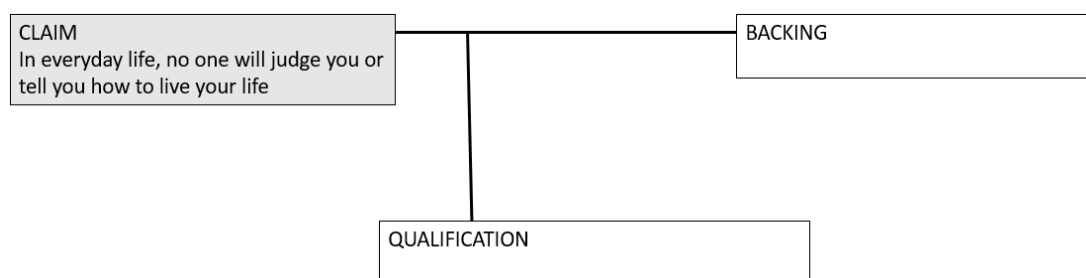


Figure 7 Claim without backing or qualification

One example is shown above. One discussant states that (normally) people do not judge or tell others how to live their lives. In the post, the utterer continues by uttering that *no one will tell you whether or not you have a meaningful life*. The context of this statement is a sequence in the discussion where another discussant claimed that judging each other's life implicitly indicates that some kind of (objective or at least common) criteria for meaningful lives are available. This statement functions as a counterargument. However, concerning the microstructure of arguments, this claim stands out as an unsupported and unjustified claim.

In summary, condensing students' posts and categorizing them according to Weinberger and Fischer (2006)'s microstructures of arguments showed that all types of arguments are found. Most frequent are arguments that raise a claim without providing backing or limitation. Complete arguments (containing an explicit claim, backing, and qualification) are underrepresented. This coincides with previous research (Noroozi, Weinberger, Biemans, Mulder, & Chizari, 2013; Tsai & Tsai, 2014; Wise & Hsiao, 2018).

Students' meta-comments about argumentation

Posts where students explicitly commented on the discussion or their own understanding were read with extra caution. Typically, such passages contained apologies for their problems understanding the topic and described difficulties with clearly articulating their ideas. In some passages, students also commented on how the discussion took form:

Just a little objection: Can we be better at discussing WITH each other and using one another's points, either criticize/slaughter them or back them up? With some exceptions, this discussion is mostly our own posts with our/some opinions about the topic; however, without addressing the disagreements between us, we can't argue our points well.

Interestingly, the student cited here recognized that the discussants' comments on each other's posts remained on a surface level, even when they addressed each other explicitly. However, without addressing each other's claims or arguments, no real discussion occurred. Another student responded, explaining that he found it demanding to take a stance on the questions discussed:

We want . . . first and foremost to convince ourselves about what we mean about these things. Therefore, maybe for some of us, it is enough to say something about where you place yourself in relation to the text, rather than having strong opinions against (or strong support for) what the other discussants say.

A third student entered the conversation. His comment may be interpreted as stating that he found the topic challenging and that discussions with peers are stimulating and inspire his own thinking:

It is easy (at least for me) to get entangled in such thoughts, and so I understand why philosophy is best done in the company of others ;-).

This passage is a view into the students' difficulties understanding the discussed subject and their quest to master discussing these topics. The students' reflections show both understanding of challenges according argumentation and challenges according understanding of subject topics. Yet, analyzed by using microstructures of arguments, such posts will be classified as "non-argumentative moves" (posts that do not raise a substantial claim about the topic discussed, including questions, suggestions on how to proceed the discussion, etc.; see Table 2). This may indicate a deficiency with Weinberger and Fischer (2006)'s coding scheme focusing on the micro- and macrostructure of arguments—namely that students' self-reflection is disregarded. These reflections are interesting, valuable parts of the material. Yet, it is interesting to note that students identify similar shortcomings in the discussions, as identified by analyzing according to the macrostructure, namely that the discussants did not address each other. The coinciding between students' meta-comments on this theme and the analysis of the discussion transcripts represents a form of informant validation of the analysis, which is also supported by the teacher interview.

Summing up and implications

According to the first research question of how students construct and place arguments in an online educational discussion, analyzed by the categories of the microstructure of arguments and the macrostructure of argumentation, the analysis of the macrostructure of argumentation showed that even though the students showed good knowledge of course readings, they commonly wrote posts without clear reference either to other students' posts or to the initial assignment. Instead of constructing lines of argumentation consisting of arguments, counterarguments, and the integration of arguments, students posted their thoughts without any clear and explicit link to other discussants' arguments. Thus, the potential for expanding understanding by contrasting points of view is fulfilled only to a limited degree. Further, responding to the assignment "discuss the following assertion . . .", the students seem to interpret "discuss" as an invitation to write whatever they thought about the topic. More elaborated responses to the assignment are rare, such as the presentation of arguments for and against the initial assertion, or taking a stand regarding the initial assertion based on some kind of evidence or argument, or critiquing other discussants' stands regarding the initial assertion by scrutinizing the backing they offer. Further, the arguments students constructed tended to be incomplete according to Toulmin's model, lacking backing and/or limitation of the claim's validity.

The potential for generalization based on a small amount of material is limited. Yet, previous studies had similar findings—students' argumentative level in online educational discussions is commonly weak. Interestingly, the students' meta-comments and the teachers' general impression of online discussions coincide with the analysis in this article; even if the argumentative level is weak, the discussions are both interesting and in some ways are worthwhile learning activities. Nevertheless, the analysis performed with the categories of the arguments' micro- and macrostructure provide a more detailed, profound picture of what occurs in such discussions than was found in the teachers' evaluation or in the students' meta-comments.

This leads to the second research question: How suitable are the categories used in the analysis? As shown above, a more profound picture of what occurs in the discussions is possible based on the categories. The categories are powerful lenses with which to identify the strengths and weaknesses in argumentation. Yet, analyzing the microstructure of arguments requires careful interpretation and involves reconstructing more or less disguised argumentative structures in students' writings to see how these structures fit into the established classification. It might be tempting to over-interpret and take a far too charitable approach, which might result in adding too much sophistication to the argumentation. Another risk is employing too little sensitivity, thereby missing some of the argumentative qualities. This difficulty is identified in previous research (Erduran, Simon, & Osborne, 2004, p. 919) and relates to clarifying which parts of a linguistic expression count as a claim, backing, or qualification. In natural language, like the students' posts, it is rather implicit which parts (are meant to) serve as a claim, backing, or qualification, and the components of arguments (claim, backing, and qualification) are presented in contingent order. Further, a statement in the discussion may function as a claim or as a backing for a recently posted claim. The discussants wrote without any attempt to fulfill the argument pattern prescribed by Toulmin. Therefore, categorizing their writings according to this model was not straightforward. In some cases, the relationships between posts or between argument parts might have been rather implicit. These demanded careful interpretation when analyzing and categorizing the argument structures. Therefore, even if this argumentation framework represents a sound approach to analyzing argumentation, careful consideration is necessary when using the framework to analyze natural language. Moreover, it is worth noting that students' self-reflection, as presented above and which may be important for students' development of argumentative and substantial competence, is not acknowledged by Weinberger and Fischer's categories.

In summary, students participated in the online discussion enthusiastically, yet the quality of their argumentation is weak according to this model. Micro- and macro-levels of argumentation are useful categories to analyze what occurs in discussions. Analysis based on the categories provides a richer, more detailed picture of students' argumentation than teachers' and students' evaluations. Nevertheless, analysis using these categories is not straightforward and demands careful interpretation.

What can be learned from this analysis of the transcripts of online discussions among students in an introductory philosophy course? It is striking that the students demonstrate a weak understanding of what "argumentative coherence" means. In the discussion, they fail to back their claims and to address their arguments to discussants' claims. This is probably because they need to elaborate an understanding of the qualities of argumentation related to the micro- and macrostructures of argumentation. The students seem to be busy trying to grasp the concepts used in the course literature to discuss "subjective and objective criteria for a meaningful life". Of course, this is worthwhile; however, it seems too daunting a challenge to both manage complex subject knowledge and subject terms and simultaneously explore how to argue coherently.

For teachers who set up online discussions as learning activities to promote deeper learning and/or competence in rational argumentation, the micro- and macrostructure of argumentation may be elusive categories. To request that students explicate what their claim is, how it is backed and limited, and which of the discussants' arguments they address, may enhance the quality of their postings. Without explicitly understanding basic features of rational argumentation, students are left to discover the craft of argumentation by themselves. Learning is therefore a result of osmosis—knowledge and skills transmitted by being

in a salient milieu or due to serendipity. Learners grasp the craft and categories of argumentation by stumbling upon them or inventing them themselves. Learning something inductively and implicitly by osmosis or serendipity may work; however, by learning in such ways, students miss understanding explicit and precise concepts about argumentation and consequently lack precise instruments to evaluate and discuss argumentation with their peers.

In the introduction, I sketched the idea that students' comprehension of a subject is reflected in the quality of the arguments they are able to present about that subject. Mastering the craft of argumentation is thus a powerful tool to learn a subject. In mastering the ability to identify claims, the backing and limitation of claims are key competencies that enable learners to scrutinize and evaluate the tenability of knowledge claims.

References

- Andriessen, J., & Baker, M. (2014). Arguing to learn. *The Cambridge Handbook of the Learning Sciences*, pp. 439–460 Cambridge University Press.
- Arum, R., & Roksa, J. (2011). *Academically adrift: Limited learning on college campuses*: University of Chicago Press.
- Biggs, J., & Tang, C. S.-k. (2007). *Teaching for quality learning at university: What the student does*. Maidenhead: McGraw-Hill/Society for Research into Higher Education & Open University Press.
- Cahill, A. J., & Bloch-Schulman, S. (2012). Argumentation Step-By-Step. *Teaching Philosophy*, 35(1), 41–62. <https://doi.org/10.5840/teachphil20123514>
- Clark, D., Sampson, V., Weinberger, A., & Erkens, G. (2007). Analytic Frameworks for Assessing Dialogic Argumentation in Online Learning Environments. *Educational Psychology Review*, 19(3), 343–374. <https://doi.org/10.1007/s10648-007-9050-7>
- De Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education*, 46(1), 6–28. <https://doi.org/10.1016/j.compedu.2005.04.005>
- Dewey, J. (1998). *How we think : a restatement of the relation of reflective thinking to the educative process*. Boston: Houghton Mifflin.
- Ennis, R. H. (1989). Critical thinking and subject specificity: Clarification and needed research. *Educational researcher*, 18(3), 4–10.
- Erduran, S., Simon, S., & Osborne, J. (2004). TAPping into argumentation: Developments in the application of Toulmin's Argument Pattern for studying science discourse. *Science Education*, 88(6), 915–933. <https://doi.org/10.1016/j.compedu.2005.04.005>
- Facione, P. A., & Facione, N. C. (2007). Talking Critical Thinking. *Change: The Magazine of Higher Learning*, 39(2), 38–45.
- Inch, E. S., & Warnick, B. (2011). *Critical Thinking and Communication: The Use of Reason in Argument*. Boston: Allyn & Bacon.
- Kovanović, V., Gašević, D., Joksimović, S., Hatala, M., & Adesope, O. (2015). Analytics of communities of inquiry: Effects of learning technology use on cognitive presence in asynchronous online discussions. *The Internet and Higher Education*, 27, 74–89.
- Leitao, S. (2000). The potential of argument in knowledge building. *Human Development*, 43(6), 332–360. <https://doi.org/10.1159/000022695>
- Littleton, K., & Mercer, N. (2013). *Interthinking: Putting talk to work*. London: Routledge.
- Loncar, M., Barrett, N. E., & Liu, G.-Z. (2014). Towards the refinement of forum and asynchronous online discussion in educational contexts worldwide: Trends and investigative approaches within a dominant research paradigm. *Computers & Education*, 73(0), 93–110. Retrieved from <https://doi.org/10.1016/j.compedu.2013.12.007>
- Marton, F., & Säljö, R. (1976). On qualitative differences in learning: I – Outcome and process. *British Journal of Educational Psychology*, 46(1), 4–11. Retrieved from <https://doi.org/10.1016/j.compedu.2013.12.007>

- Noroozi, O., Weinberger, A., Biemans, H. J. A., Mulder, M., & Chizari, M. (2013). Facilitating argumentative knowledge construction through a transactive discussion script in CSCL. *Computers & Education*, 61(0), 59–76. doi:<http://dx.doi.org/10.1016/j.compedu.2012.08.013>
- Rourke, L., & Kanuka, H. (2009). Learning in Communities of Inquiry: A Review of the Literature. *Journal of Distance Education*, 23(1), 19–48. <http://www.jofde.ca/index.php/jde/article/view/474>.
- Salmon, G. (2013). *E-tivities: the key to active online learning*. New York: Routledge.
- Schindler, L. A., & Burkholder, G. J. (2014). Instructional Design and Facilitation Approaches That Promote Critical Thinking in Asynchronous Online Discussions: A Review of the Literature. *Higher Learning Research Communications*, 4(4), 11–29. <https://doi.org/10.18870/hlrc.v4i4.222>
- Siegel, H. (1988/2013). *Educating reason*: London: Routledge.
- Thomas, J. (2013). Exploring the use of asynchronous online discussion in health care education: A literature review. *Computers & Education*, 69(0), 199–215. Retrieved from <https://doi.org/10.1016/j.compedu.2013.07.005>
- Toulmin, S. (1958/2003). *The uses of argument*. Cambridge: Cambridge University Press.
- Tsai, P.-S., & Tsai, C.-C. (2014). College students' skills of online argumentation: The role of scaffolding and their conceptions. *The Internet and Higher Education*, 21, 1–8. Retrieved from <https://doi.org/10.1016/j.iheduc.2013.10.005>
- Wegerif, R. (2015). Toward Dialogic Literacy Education for the Internet Age. *Literacy Research: Theory, Method, and Practice*, 64(1), 56–72.
- Weinberger, A., & Fischer, F. (2006). A framework to analyze argumentative knowledge construction in computer-supported collaborative learning. *Computers & Education*, 46(1), 71–95. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0360131505000564>. doi:<http://dx.doi.org/10.1016/j.compedu.2005.04.003>
- Weltzer-Ward, L. (2011). Content analysis coding schemes for online asynchronous discussion. *Campus-Wide Information Systems*, 28(1), 56–74.
- Wise, A. F., & Hsiao, Y.-T. (2019). Self-regulation in online discussions: Aligning data streams to investigate relationships between speaking, listening, and task conditions. *Computers in Human Behavior*, 96, 273–284. <https://doi.org/10.1016/j.chb.2018.01.034>
- Wise, A. F., & Paulus, T. M. (2016). Analyzing learning in online discussions. In Andrews, R & C Haythornthwaite (eds.): *The SAGE Handbook of E-learning Research*. SAGE Publications Ltd
- Wolf, S. (2009). The meaning of lives. In Perry, Bratman, & Fisher (Eds.), *Introduction to Philosophy*. New York: Oxford University Press.
- Zheng, B., & Warschauer, M. (2015). Participation, interaction, and academic achievement in an online discussion environment. *Computers & Education*, 84, 78–89. <https://doi.org/10.1016/j.compedu.2015.01.008>