



Learning to Link Artifact and Value: The Arguments of Student Designers

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Introduction¹

If design, as Simon (1981) claims, is what people do when they devise courses of action “aimed at changing existing situations into preferred ones” (p. 129), and if preferences are inherently contentious — “the preferable,” Perelman (1982) writes, is one of two kinds of opinion about which people argue (p. 23) — then design is as much about *arguing* as it is about planning and building. It follows that learning to be a designer is, at least in part, learning how to argue in certain ways. Unfortunately, research and scholarship on design have paid insufficient attention to argument and how rhetoricians might intervene to improve it. In this paper, I examine the ways one group of student designers argued on behalf of their work for an actual client. I try to answer the following questions: What claims did the students make when presenting their work to others? What evidence did they offer? What values did they appeal to? Finally, were their arguments any good?

The analysis offered here participates in the more general project of exploring the shape of rhetorical practice in particular social and cognitive contexts. As formulated by Nelson, Megill, & McCloskey (1987), this project rests on two presuppositions: first, that argument is more unified than the division of academic fields implies; second, that it is more diverse than notions of unitary method or reason allow (pp. 4-5). A rhetoric of design, then, is one interested in the particular but recognizable arguments of design practice. My analysis diverges from Nelson, Megill, & McCloskey’s project, however, in two ways. First, the design/rhetoric relationship is here primarily an educational problem (and not, say, an epistemological one). That is, I am looking at the social and discursive activities of expert practice from the point of view of students *learning* that practice. Second, like Leff (1987), I am as concerned with what this research tells us about *rhetoric* as with what it tells us about a special field of knowledge or practice.

By “design,” I mean here the work of architects, engineers, urban planners, and others who plan and build the material world. By “rhetoric,” I mean the arts of planned, social discourse. In examining the relationship between these two, I begin with the following observation: Design appears to involve a

devaluation of rhetoric — a devaluation, that is, of practical deliberation, social identification, and discursive elaboration. This devaluation, it should be noted, is different from the related suppression of rhetoric in science because the ends of design (unlike those of science) are always conditioned by an external audience. As Aristotle noted about architecture, the user of an artifact is a better judge of it than its creator (*Politics*, 3.11 1282a21-22). Designers — by the very nature of what they do — plan and build things *for others*; they are guided by social purpose in a way that scientists are not. A devaluation of rhetoric in design, therefore, would be especially troubling.

How does this devaluation of rhetoric present itself? First, the *process* of design is seen to be inhospitable to rhetoric. Coyne & Snodgrass (1991) have shown how design is typically construed as either a romantic (and therefore mysterious) or technical (and therefore pre-determined) enterprise. Either way, the production of the artificial world, as Buchanan (1989) has argued, is closed to deliberation. But even when the process is seen to involve contingent choice-making, it turns out to be a kind of deliberation unlike that posited in most rhetorical models. Rather than a canvassing of multiple, contemporaneously-available alternatives, as in political reasoning, design often involves the material instantiation and development of a single idea. Rowe (1987), for example, has discussed the “dominant influence” exerted by initial design ideas on the process of idea generation (p. 36); and Lawson (1980) has summarized research on the way designers latch onto ideas early in a design project (p. 34). Goel & Pirolli (1992) have claimed that ideas in design are nurtured and incrementally developed until a final solution is reached, rather than discarded and replaced with new ideas (pp. 406, 420-1); they claim that this is “one of the most robust findings” in the literature on design (p. 420). In sum, the process of design appears to be at odds with most models of rhetorical deliberation.

Second, a devaluation of rhetoric is evident in prominent conceptions of the “built world.” In such accounts, the ideal artifact is autonomous and self-explanatory; the use of language to describe or explain the object is, then, an admission of that object’s failure. In “affordance” theories (e.g., Gibson, 1977), for example, an artifact wears its purpose on its sleeve (thus, a well-designed saw should indicate, by its very form, where it is to be held and how it works — it should *afford* the activity of sawing). Norman’s (1988) “principle of visibility” also associates language with design failure. A door that requires the word “push” or “pull” on its surface is, by this principle, a poorly-designed door. In such approaches, the interface between artifact and use is transparent, and the opening for rhetoric is much reduced. (For helpful discussions of the “self-explanatory artifact,” see Mitchell, 1989; Paradis, 1991; and Suchman, 1987).

Third, a devaluation of rhetoric can be seen in the ways designers characterize their knowledge and skill vis à vis non-designers. If designers are *professionals*, requiring “uncommon” knowledge, then design involves the same tendencies for social demarcation present in other professions (see, e.g., Bledstein, 1976; Schön, 1983). Professionalization, in other words, implies that

the designer is a “knowing” solver of problems; and the client, an “unknowing” bearer of problems. Rhetoric as an art of social identification is irrelevant in such a situation; the only social attitudes needed are distance (on the part of the designer) and deference (on the part of the client). (For anti-social tendencies in design practice and education, see Cuff, 1985; 1989; and 1991.)

We might compare, then, two very different views of design. In one, rhetoric occupies an important role, assisting in discovering and sharing “the preferable” in any particular situation. In the other, rhetoric occupies, at most, a minor role. In this paper, I hope to show that the practice of design, at least as exemplified by the work of one group of advanced student designers, involves significant rhetorical maneuvering. But I also hope to show that these designers handled the rhetorical challenges of their project in a somewhat unsophisticated way and thus might have profited from more explicit attention to the argumentative nature of their work.

Narrative and Methods

In late 1991, the Jewish Community Center (JCC) of Pittsburgh approached the Carnegie Mellon University (CMU) Design Department for help with its printed communications. The JCC is a hundred-year-old religious, cultural, and recreational organization located in an urban neighborhood of Pittsburgh. At the time of the project, it was serving more than 14,000 local members through a variety of programs: assistance for recent Jewish immigrants; daily lunches for senior citizens; preschool and after-school programs for children; a full-service fitness club, swimming pool, and gymnasium; religious activities; theater productions; trips and tours, etc. In support of these programs, the JCC’s three-member Communications Staff was producing more than 20 different publications on a regular basis, including a 50-page seasonal *Program Guide*; an annual report; various quarterly, monthly, and weekly newsletters; and numerous occasional publications, such as flyers and postcards, publicizing programs and events. There were few explicit standards guiding production of these materials; and, as the Director of Communications later explained it, the JCC wanted to upgrade its publications, to make them more “professional-looking” and “user-friendly.”

The CMU Design Department, meanwhile, was looking for “real-world” design projects for its students. CMU is a technologically-oriented, private, urban university in the eastern United States. Its Design Department includes two undergraduate majors — Industrial Design and Graphic Design — leading to the Bachelor of Fine Arts. The Department offered the world’s first design degree in the 1930s and has been a leader in design education ever since. Students in Graphic Design take courses in psychology, Art History, drawing, two- and three-dimensional design fundamentals, photography, design computing, prototype methods, typography, and production. Students also take numerous studio courses. The capstone studio course — the Graphic Design Degree Project — is taken during the Spring semester of the student’s senior

year. The JCC project was one of several Graphic Design Degree Projects offered in the Spring of 1992.

The project lasted approximately four months, from mid-January to the first week in May. Each student in the project developed and produced a set of graphic “standards” for JCC publications. In the project brief written by their design professor, these standards were defined as “concepts” which would unify the JCC’s graphic communication materials; they would include recommendations about typography, color, visual imagery, formats, grids, paper, production methods, and information structure. Also included in the brief was an outline of the stages the students would go through during the project (“visual audit,” “concept phase,” “design development,” “final design comprehensives,” and “documentation”) and a timeline listing four scheduled meetings between the designers and the client during the course of the semester. Although occurring in an educational context, this project involved, then, a real task for a real client who expected artifacts that would actually be used.

Seven students participated in the project. Six were senior graphic design majors; the non-designer, a Master’s student in professional writing, dropped out of the project after two weeks. Of the remaining students, five were female, and one was male, all in their early 20s. There were two professors working on the project, both male. The principal one was an adjunct professor of design at CMU and a practicing professional designer in Pittsburgh. The other was a professor of rhetoric in CMU’s English Department. His participation in the course marked the first attempt by the English Department to offer a special course in writing and rhetoric for design students. Project participants from the JCC included the Director of Communications, two staff assistants, a program director (all female), and the JCC’s executive vice president (male).

The JCC project was complex in many ways. First, the problem confronting the students was a considerable one: the organization itself was large (in addition to 14,000 members, there were more than 150 staff members, not including officers, board members, and volunteers); it produced a large number of publications, many of which were quite complicated (the *Program Guide*, for example); and each needed, at least from the students’ point of view, a great deal of work. Second, the project involved many people: fourteen were directly involved in one way or another. Third, the project was to be completed in four months, a short amount of time given the size of the task and the lack of resources for solving it.

Fourth, the project had, from the beginning, a palpable feeling of uncertainty and unpredictability about it. As with perhaps all design problems, there was no obvious solution to the JCC’s problem, no algorithm, formula, or model that would automatically solve it. There wasn’t even a consensus about what the problem *was*. The JCC presented the students with a vague representation of their objectives and expectations, and the student’s design professor exacerbated this problem by adding additional, and equally vague, objectives and expectations. The result was that the students were often unsure about what they were supposed to do and how they were supposed to do it. It may

be more accurate, then, to categorize the JCC's "problem" as what Dewey (1938) called "an indeterminate situation": an uncertain, unsettled, doubtful, ambiguous, and confused *mess* (cf. Buchanan, 1992).

Finally, the project was complex because it involved students who were inexperienced in working with a "real" client and a client which, as a non-profit community organization, was perhaps less than ideal for cutting-edge designers from a high-tech university. Working on both a "real-world" and an educational project, the students often found themselves with competing goals. They were as interested in producing attractive pieces for their job portfolios as they were in pleasing the JCC. As for the client, it claimed to want a more professional and "user-friendly" look; but, in the end, it lacked the money, technology, and institutional support for radical change. Because of this, relations between the designers and client were often strained; as early as the third week of the project, each group was complaining (to the researcher) about the other. At the end, the students described the JCC as "not serious" about re-designing its publications, and the client described the students' recommendations as "arbitrary." Despite this, the students finished the project on time, and all of them handed over to the JCC comprehensive manuals laying out in both words and pictures a new "look" for the JCC's printed communications. Unfortunately, the JCC was not, in general, pleased with what it got; most of the designs were deemed inappropriate or unsatisfactory for one reason or another, although one part of one student's system — a graphic element based on an architectural feature of the JCC's main building — was adopted in the months following the project.

In this paper, I analyze the students' formal arguments to the JCC on behalf of their designs.² Data come from transcripts of the students' formal oral presentations (20 separate speeches from 7 different speakers on 4 different occasions: January 29, February 12, March 18, and April 27) and their final written manuals (6 books documenting, in both words and images, the designers' different systems, each about 30 pages long and delivered to the client on May 4).

A Typology of Arguments

The students in the JCC project sought, in their speeches and texts, to connect the objects they built with the values, preferences, and goals of their client. They appeared to know that, in public representations of their work, they needed to advance reasons for their proposals; that these reasons needed to be aligned with the "good" and the "useful"; and that such alignments needed to be *addressed* to a particular audience in a particular situation. In other words, rather than simply forcing decisions on the client, or trusting that the value of their work would be self-evident, the students consciously attempted — through discourse — to make their choices seem *reasonable* to the JCC.

As an example of such an attempt, let's look at an oral presentation given on March 18, approximately two-thirds of the way through the project. Here, one of the students describes a graphic element she has developed for use in JCC publications.

(1) [26.98-112] [Mar 18]³

D4: This *Program Guide* that I've been working on, the size is consistent um with D3's, and um the whole structure and organization, classes, activities, services, is the same. um, I was working on trying to pull out the days, times, and dates a little bit more, so, in a different manner, and um going through here, the audiences are broken down into the colors, um you may notice that this sort of rule and square is becoming a graphic element, that it calls to the attention maybe when you're at this general information section or (). um ((laughs)) I've used this um element to to () in the *Program Guide* that is consistent, that's gonna bring to your attention of where the, um what time it's being taken place, what day it's taking place, as well as using color to highlight the event, um being the two important charact- or figures there, um overall, the *Program Guide* um is in that sense I'm using it for organization um and that rule is then consistent throughout, so that wherever you go, you always know where to look for the day, time, or um place, et cetera.

D4 is doing many things here. She is reporting her progress since the last meeting, connecting her work with that of the other designers, verbally indexing objects on display, defining key terms, and rationalizing her decisions. She is using language, in other words, to control the way her work gets "hooked up" with the actions, knowledge, and values of her various "publics." When, for example, she says,

I'm using it for organization

she is presenting her work to others by advancing reasons in support of it. The rule and square, she says, is an object designed for a certain end, i.e., "for organization." She explicitly constructs the artifact she has built, in other words, as tied to audience-relative goals, purposes, functions, and "goods." This is not *just* a thing; it is a tool which accomplishes desired ends for other people. In fact, at various points during this speech, D4 makes explicit the connection between her rule and square and the JCC's goals: the device works to "pull out" days and times; it "calls to your attention" where you are in the publication; it's used "for organization"; with it, the reader "always know[s] where" to find needed information. The artifact is thus made to appear — or at least D4 hopes it will appear — reasonable, intelligent, useful, and valuable. It is good, in other words, because it is associated with the JCC's imputed preference for easily-navigated documents.

In fact, much of the students' work in this project can be seen as an attempt to connect their material creations with the abstract (and necessarily discursive) values of their client. The connection between form and purpose is a common refrain in design theory: Perkins (1986), for example, defines design as the "human endeavor of shaping objects to purposes," and Louis Sullivan's maxim "form follows function" is a commonplace among designers. Rarely, however, is the association between material artifact and human purpose seen to be a *discursive* phenomenon — something constituted through *language*. And yet the association of particular material objects with various "god terms" (Weaver, 1953) ("organization," "unity," "consistency," "distinction," "reader-friendliness," "legibility," and the like) may well be the central social fact of design. As with the technical manuals analyzed by Paradis (1991), design discourse "infuses human purpose into mechanical devices or their equivalents, thus aligning the neutral products of technology with the value-laden ends of society" (p. 258). Design, in other words, is about discursively connecting the material world with "desirability characteristics."⁴

The association of a speaker's or writer's ideas (or products) with the commonly-held assumptions of his or her audience — between, that is, unique and situated beliefs (or artifacts) and relatively stable social values — has long been a central concern of rhetorical theory. Aristotle's "common topics," writes Crowley (1994), included not only questions of *conjecture* (whether a thing has or has not occurred, will or will not occur) and *possibility* (what is or is not possible), but also *value* (whether a thing is greater or smaller than another thing). More recently, Wallace (1963), has claimed that ethical and moral values (at one point described as "popular and probable value axioms" [p. 249] and divided into the desirable, the obligatory, and the admirable or praiseworthy) are the very substance of rhetorical discourse (or "civil decision making"). The values appealed to in the deliberative rhetoric of design are, broadly speaking, the *good* and the *useful*, what (it is thought) a particular audience in a particular situation will find worthy and/or expedient.⁵ Design arguments can be seen, then, as attempts to help a client answer the question "What ought I to do?" And a good designer is someone who can both build good (i.e., worthy, useful) things *and* justify them by appealing to audience-relative values, preferences, and desires.

In the JCC project, the students discursively connected artifact and value in four ways, moves which I have labeled *explaining*, *predicting*, *justifying*, and *warranting*. This typology was developed inductively: in reading the transcripts of the students' speeches and manuals, I apprehended salient patterns and themes therein, gradually built up categories of moves, and refined those categories through additional readings. In this, my analytic method resembled that described by Glaser & Strauss (1967) in their discussion of the development of "grounded theory." Although derived from the JCC data, the typology is presented here at a level abstract enough to be — in principle — generalizable to other design situations. Whether it is in fact transferable remains to be seen; but the following discussion attempts to relate the argu-

ments used by these particular students to features of design practice that are, I believe, cross-situational.

Explaining

In explaining, the students connected their *actions* to rational purposes or generally accepted values. Explanations answered the questions: why was this action taken? Why was this artifact designed this way? They advanced the value of design artifacts by appealing to the purposeful actions that produced them. Such moves were thus less concerned with the goodness or usefulness of end results than with the goodness or usefulness of the processes which led up to them. Of course, to explain *why* something was done often provides only a weak defense of the worthiness or utility of that thing. To say that Medicare was designed to serve the medical needs of the elderly tells us little about whether Medicare is a *good* way — let alone the best way — to achieve that goal. It is for this reason that some theorists have rigidly differentiated argument and explanation.⁶ In design, however, it would seem that associating one's work with the purpose, thought, or intelligence behind it *is* a good reason to value that work, however dangerous might be the apparent collapse of “cause” and “reason.” One result of this kind of logic is that explaining moves turn out to be inescapably *ethical*, the purpose, thought, or intelligence behind a design being primarily a characteristic of the person who created it. When we tell our lover, “I did X because I love you,” we are not so much making an argument about the goodness or usefulness of X as making a statement about the goodness or usefulness of the motive *behind* X, the “thought” that went into it.

The key discursive features of explanation are three: the design artifact itself, the action which produced that artifact, and the purpose or value attributed to and rationalizing the action. The hypothetical example below includes all three features, the artifact underlined, the action in italics, and the purpose or value in bold.

For typography, *we decided to go with Helvetica* **to conserve space.**

Or, expressed more abstractly:

via rational action
Artifact ——— 1 ——— **Value**

We have, then, 1) a design artifact or decision (“For typography . . . Helvetica”); 2) a design action (“decided to go with,” here connected to a particular human agent, “we”); and 3) a design purpose or value, often comprised of two parts, a verb which provides linguistic means for the material object to “afford” an abstract social value and the socially-acceptable value itself: “to conserve

space,” a *desideratum* assumed by this designer to carry weight with this client.

Examples of explanation moves from the transcripts appear below.

(2) [D3, manual, 13]

This *Guide* has been designed to have a friendly tone (for example, as expressed by color and type size), to read easily and to be easily referenced by different audiences.

(3) [38.236-238] [Apr 27]

D1: We based our system pretty much I guess on the graphics, the bold graphics to call out attention and fun and dynamics of the Jewish Community Center.

(4) [D4, manual, 27]

A system of paper has been developed to enhance the integrity of the graphic standards system as well as emphasizing the audience breakdown.

(5) [38.49-51] [Apr 27]

D3: I use this to not only link one document but then to use something to link your whole system.

(6) [D2, manual, 4]

The audience icons were chosen to capture the spirit of each age group, giving each audience a part of the JCC to identify with.

Sometimes the explanation is embedded in a narrative of design progress:

(7) [9.225-230] [Feb 12]

D4: We also worked with different type families, um, Helvetica being one that you have that, you have a lot of, it allows for a lot of flexibility, but we also worked with Times Roman, which is a, a serif typeface. Helvetica is a sans-serif typeface. just to get a little more variety and to see what you could do with it.

Other times, personal agency is obscured, and the explanation becomes “internal” to the object itself:

(8) [26.432] [Mar 18]

D5: The rules are used to highlight information.

(9) [D5, manual, 23]

The *Preschool Press* uses a version of the squiggle on the cover but in drawn childlike form to give the publication a more fun and creative look overall.

The specific values appealed to in these explanations (“to have a friendly tone,” “to call out attention and fun and dynamics of the JCC,” “to enhance the

integrity of the graphic standards system,” “to highlight information,” etc.) provide an indication of what these designers believed persuasive for this client in this situation and how they believed their objects “afforded” those values (by “calling out,” by “having,” by “enhancing,” by “giving”).

To sum up, then, in explaining, the designers presented their actions as rational, purposeful, and intelligent. The object itself was assumed to be stable, even non-controversial; it was the action *behind* the object that was argued for. The design itself was a *fait accompli*, motivated by the goal-directed reasoning of the designer. The focus, then, was the designer him- or herself, a reasonable agent for whom the client’s purposes were foremost.

Predicting

In explaining, the designers connected their past actions to socially-relevant purposes; in predicting, they connected their work to future consequences or effects. Predictions answered the questions: what happens if this design is used, chosen or accepted? How will actual users benefit? What will be the consequences for the client? How will this change people’s lives? Predictions, that is, foregrounded the dominant temporal “order” of design, from present to future. With such a move, the JCC designers didn’t simply associate their work with a socially acceptable purpose or value; they made that connection a temporal one, the present artifact *producing* future benefits and values.⁷

For this reason, predictions may have been the boldest assertions these designers made. When I make a prediction about the future consequences or benefits my design will have, I open myself up to the verification or falsification of that claim. If those benefits do not accrue, my design will be a failure. The riskiness of such claims did not, however, seem to frighten these designers, who consistently sought to make the material world shimmer with future consequences. To understand such arguments, we probably need to know more about what Toulmin (1958) called “type-shifts,” the seemingly illogical bridges between data and claim necessary for non-formal arguments to work. Many of Toulmin’s examples of this phenomenon were, in fact, predictions (e.g., astronomers predict future planetary movements by appealing to past and present positions).

In predictions, the rationality of a design inheres in its imputed consequences. The key discursive features of such argument are 1) the object, artifact, or decision itself; 2) a verb of futurity or projection; and 3) the effect, consequence, or benefit attributed. The prototype would be something like this:

The three-column grid will make the Program Guide easier to read.

Or, expressed more abstractly:

via future consequence

Artifact ———— | ———— **Value**

Unlike arguments of explanation, focused exclusively on the designer him- or herself and his or her thinking, in predicting we begin to hear about actual users. When a designer says, “this guide has been designed to have a friendly tone,” the value inheres in the object itself, built by the designer for that purpose. But when she says “The three column grid will make the *Program Guide* easier to read,” ease of reading is something that happens *to somebody*.

Some examples from the transcripts follow. First are arguments of prediction:

(10) [2.125-130] [Jan 29]

D1: They’ll give you the ability to market your programs more efficiently and successfully to a wide audience . . . With a more organized system of communication, you’ll cut down on the overload of materials you currently send out.

(11) [26.12-14] [Mar 18]

D3: It’s a five column grid system, and that’s just a, when you have a five-column grid, it’ll keep the pages in an organized fashion, um, and yet there’s still variety.

(12) [D5, manual, 7]

Color will help lead the reader through the complexity of the different divisions within the different publications, especially the *Program Guide*, which is a publication for all audiences.

Next come arguments of consequence, where certain desirable qualities are seen to follow from various designs:

(13) [D3, manual, 13]

The new look of the *Program Guide* creates an image of permanence and consistency.

(14) [D2, manual, n.p.]

These black and white elements make the flyer visually exciting and fun to read.

(15) [26.69-71] [Mar 18]

D3: And the identity is also a constant . . . You, um, you always know that, people always know what it is they’re getting and where it’s coming from, know almost immediately.

Finally, we have arguments of ability or affordance:

(16) [26.415-417] [Mar 18]

D5: The colors what they, what they do is they allow the reader to quickly index what, where they are in, in the *Program Guide*.

(17) [26.242-246] [Mar 18]

D1: And then when you open it up, we have, um, tabs with the different audiences represented, so that, uh, you can find what you're, you know, the parents can find what they're, they're looking for for their children, but you can also, it also opens up the user to all the other things that are offered.

We can see how, with predictions, objects are transformed (either through verbs like “create,” or through the future tense: “will unify,” “will keep”) and what those transformations produce, that is, the socially relevant values associated with these artifacts: permanence and consistency, unification and differentiation, organization and variety. Once again, designers are appealing to the good and useful (as situated values) in order to elicit or increase adherence to their work.

To sum up, then, arguments of prediction associated a present material artifact or decision with a desired consequence or benefit. Where explanations were predominantly past-oriented, ethical, and empirically ambiguous; predictions were future-oriented, user-centered, and empirically determinate.

Justifying

In justifying, the designers connected the built world itself with socially-acceptable values or goods. Where in explaining, they associated their work with reasonable past actions; and in predicting, with desired future consequences; in justifying, they appealed to “goods” intrinsic to the objects themselves. As such, justifications answered the questions: why is this a good thing? What valuable qualities are associated with it? Justifications were thus a powerful kind of argument, allowing the designers to *identify* (cf. Burke, 1969) their material work with the established preferences of their audience. Unfortunately, justifications were almost exclusively “positive,” providing little or no access to comparison or criticism. If I press you to buy a new pair of sunglasses because they are “attractive,” I may be making a powerful argument that will increase your adherence to those glasses; but unless my arguments acknowledge affordability and sun protection, or the possible disinterest on your part in looking attractive, or my previously-established bad taste, they may never convince you. The justificatory argument can thus be a powerful one (especially if the values appealed to are carefully chosen). But if the values appealed to are vague, if they are not carefully chosen, or if there are other considerations involved, justifications may have limited effect.⁸

As for their actual discursive structure, justifications tend to work in a less complex way than either explanations or predictions. Where explanations associate artifact with purpose *via* rational action; and where predictions associate object with desired effect *via* a verb of transformation; justifications connect object or decision directly to a value-term. We might take as prototype the following justification:

The good thing about this kind of binding is that **it lays flat**.

Or, to put it more abstractly:

via equivalance
Artifact ———— | ———— **Value**

The object and value are joined here by the copula *is*, suggesting a simple equation or identity between object and value. This very stripping down of the argument may provide a clue both to justification's seductive power and its critical limitations. The argument doesn't work by making one's *actions* reasonable or by claiming empirically-verifiable *consequences*; rather the object itself is just *good*.

Examples from the transcripts should illustrate what I mean here:

(18) [D1, manual, 8]

Blue is suggestive of childhood: carefree and active.

(19) [9.243-244] [Feb 12]

D5: New Century Schoolbook is a nice, kind of light, elegant serif.

(20) [D2, manual, 4]

The icon system is not only fun and inviting, but also solves communication problems.

(21) [D2, manual, 10]

The system is built upon the 8.5 inch standard width for paper, which is a comfortable, user-friendly size.

(22) [D6, manual, 6]

Garamond is a serif typeface that has a warm, inviting feel to it.

Justifications sometimes employed more "objective" reasons:

(23) [26.25-27] [Mar 18]

D3: We've kind of set a foundation color of the Jewish Community Center as blue, the building is mostly blue, the Israeli flag is blue and white, so it is kind of the color um foundation.

(24) [D2, manual, 4]

The audience icons are symbols of trees in different stages of growth. They represent the growth of people. The tree also references the Tree of Life in Judaism.

Often the justification was more like a simple evaluation:

(25) [9.325] [Feb 12]

D4: This is what we think works best for the logo.

(26) [26.83] [Mar 18]

D3: The *Front and Center* four-column grid seems to be working.

To sum up, then, justifications worked by associating an object with a term of value or goodness. The association was effected not through a mediating operation (as indicated by a verb of past or future action) but by transferring the value or good directly to the object through a linking verb like “be” or “seems.” Justifications were the most value-laden of design arguments in this project and, hence, the most emotionally powerful. From a logical point of view, however, we might ask, how can an inert, material object ever really *be* “carefree,” “elegant,” “fun and exciting”?

Warranting

In warranting, the designers connected their work to relevant *knowledge*, either of the problem-situation or of a generative design principle (that is, a social or technical inference-license).⁹ As such, warrants answered the questions: by what reason are you authorized to do this? What principle supports your decision? We offer a warrant whenever we appeal to a law, rule, principle, or logical norm to support our claims or to sanction our directives and proposals: “I chose this car because I needed a large trunk, and it had the largest trunk on the market.” Warrants were the most rule-like arguments used in this project, the most portable, and the most “scientific.” With warrants, the designers did more than make their own actions seem reasonable, predict future benefits, or associate the things they built with various god-terms; they gave their objects an *edifying* reason, connecting them to social “goods” in a way that could be rationally adjudicated, compared, explained, criticized, even taught. In justifying, we say, “those sunglasses are attractive”; but in warranting, “those sunglasses are attractive because they accentuate your cheekbones.”

Although relatively rare in this project, warrants were the strongest arguments encountered in this analysis. But even they failed on some accounts. In the sunglasses argument above, we may still have to worry about unconsidered values (cost, for example, or sun protection) and empirical proof of the connection asserted. But if our primary value is attractiveness, the warranted argument serves not only as a mark of preference but provides us with a portable rule for use in future situations: “attractive” sunglasses may have something to do with the accentuation of cheekbones.

How did warrants manifest themselves discursively? Typically, the students proposed a course of action and then provided a generalizable principle, rule, or reason that sanctioned or guaranteed that proposal. Warrants differed from explanations because the focus was not on the action of the designer him- or herself; they differed from predictions because they provided a reason rather than an empirically verifiable projection; and they differed from justifications because the reason was offered on behalf of a decision or commitment, not the object itself.

*It's important to leave some white space so **the page isn't** so busy.*

Or more abstractly:

via principle or rule
Artifact ————|————— **Value**

Here, then, we have not a material object connected to a social value but an abstract directive associated with a rational criterion. The result is a portable principle that can be used in future contexts. The reason is introduced by “so,” in the same way that explaining moves typically include the purposive “to.”

Below are some examples of warranting moves from the transcripts:

(27) [D3, manual, 7]

Because the quality of the paper effects the reader’s perception of the document, this paper has been recommended for the letterhead: Sundance Linen, 70# text, bright white.

(28) [9.235-237] [Feb 12]

D4: For senior adults, readability’s sake, twelve point, you can’t go smaller than that because of readability.

(29) [9.240-243] [Feb 12]

D5: We went with Helvetica Narrow [?] because in the *Program Guide*, you have a lot of copy, and Helvetica Narrow works very well when you have a lot of copy in conserving space.

(30) [38.245-246] [Apr 27]

D2: We lean a little bit more towards photographs, because it brings a more personable touch to the audiences.

(31) [D5, manual, 16]

Certain audiences need to receive the information by day rather than classes, thus the breakdown of information into weeks.

(32) [D4, manual, 28]

Bright, flashy paper can often be a turn off to readers, and for this reason, lighter, warmer papers were chosen to appeal to the audiences.

These arguments, unlike others we’ve seen, can provide designers and clients alike with a decision rule useful on other occasions. It is for this reason that I have referred to warrants as more “edifying” than explanations, predictions, or justifications. We learn from these examples that: papers should be chosen with an eye to the reader’s perception of the document; overcrowded pages inhibit readability; seniors need typography of at least 12 pts., etc. These are powerful reasons (I’m unconcerned here with whether they are correct) that provide good evidence for design artifacts and can also *teach* non-designers about good design.

Note that in warrants, the reason often precedes the announcement of the design itself:

(33) [D3, manual, 13]

The *Program Guide* is a key link between the Center and the people it serves. It is essential that this publication be easy to read, that the different audiences can access the information they desire with ease. The user must be able to sign up for membership or register for classes without frustration. This new *Program Guide* has been designed specifically to meet all of these needs.

This represents a move away from the *post hoc* arguments encountered in explaining, predicting, and justifying, where the artifact was presented or announced and only *then* connected to some socially acceptable value or purpose.

Design warrants were often used, however, in a way that provided argumentative support for a general design topic but not the specific, material decision itself. That is, a warrant was often a cogent argument for the *use* of a particular design device (i.e., color for highlighting) but not for the specific decision made (blue). We may be persuaded that “quality of paper effects the reader’s perception of the document,” as above, but still be unconvinced about the merits of the particular paper chosen, Sundance #70. To support *that* decision would require an altogether different and subsequent step, a step not provided here and which appears to have been generally neglected by these designers.

To sum up, warrants were the most “rational” arguments offered by these students. The artifact was constituted not through its association with a purposeful past action, empirically-verifiable consequence, or intrinsic value; rather, the design was good because it conformed to a known principle or rule.

Other

The four moves discussed above were, I believe, the main *argumentative* means by which these designers positioned their work for the JCC. There were other ways that they used language, of course: they criticized the client’s current designs; they reported progress; they made unsupported assertions; they specified decisions; they told stories; they reported research findings. Such uses of language were not, however, *argumentative* in the way I am using that term here.

Evaluating Design Arguments

The picture of design discourse presented so far has been one of reasoned productivity. In the excerpt below from her final manual, for example, D5 advances what appears to be a reasonable argument about her typographic choices:

(34) [D5, manual, 2]

The typography needs to be a consistent representation of The Jewish Community Center. The type is what conveys information to the public so it needs to be able to be read easily. Consistency of use of the correct typefaces will allow the reader to access the information quickly. With this in mind, two typefaces were chosen.

The Helvetica family is used for large publications with a lot of information and text to be read. Helvetica Light allows the usage of small print, allowing more copy to be read with ease. Helvetica Oblique differentiates information within text that needs to be pointed out, without interrupting the flow of text. Helvetica Bold is used mainly for titles of text.

The second typeface is Garamond. This type was chosen for its readability and elegance. Garamond can be used for text or title. Garamond Italic has a flowing quality that works well for titles that need a fancy look. Garamond Semibold is good for emphasis of titles in publications.

D5 doesn't just announce or dictate typeface recommendations; she explicitly associates her choices with the JCC's presumed interest in readable and elegant typography. She claims, among other things, that Helvetica Light is *good* (purposeful, effective, desirable) because it allows large amounts of copy to be put legibly in a small space. And Garamond is *good* because it is readable and elegant.

But there's a problem here. Although we have what appear to be plausible solution candidates for the design problem at hand, and although those candidates are associated with a relevant social purpose, the connection between means and end here is quite porous. There is no guarantee that *other* means couldn't *also* be associated with those ends, couldn't in fact, be *superior* to the means proposed. Why, a critical reader might ask, *two* typefaces? Why not one? or three? Why exactly does the JCC need consistent representation, and how does typography provide it? Why is ease and quickness of reading a desired goal for JCC publications, and how does consistent typography lead to such things? Do we know for sure that typography actually produces these effects? Finally, are there other (perhaps easier or cheaper) means of effecting the same ends? In other words, D5 has not adequately considered for her client, through shared discourse, *alternative* solutions to the problem, tested those alternatives against explicit criteria, and proposed for use the best one(s).

D5's argument, then, is missing important considerations. First, she offers for comparison no "counter-designs," i.e., no alternatives to Helvetica and Garamond. Second, she provides no explanation for how the values she promotes are achieved by the choices she has made (e.g., how "elegance" is

effected by Garamond) or how those values might have positive consequences for the client. Third, she fails to consider “counter-values” or side-effects of the stated values; that is, she never publicly *interrogates* the values, purposes, and ends on which she bases this argument, such as the value of packing large amounts of text into a small space or the desirability of having a typeface with a “flowing quality.” Fourth, she provides no empirical evidence for the connection between form and value, i.e., no data suggesting that readers actually value the “flowing quality” of Garamond or that it even has such a quality in the first place.¹⁰ We are not provided, in other words, with arguments of

- comparison;
- explication;
- interrogation; or
- verification.¹¹

The relevance of these considerations will vary with the rhetorical situation. Some decisions will no doubt carry a heavier burden of proof than others; because Helvetica is a standard typeface on most word processors, it may require less support than, say, Garamond. But in general, the arguments used by the students in this project were notable for their neglect of the critical considerations laid out above. Their rhetorical moves were almost entirely *positive*. They proceeded by proposing some material reality, often with a persuasively concrete visual accompaniment, and then associating that reality with an abstract social value or purpose. This kind of argument may be more rational and responsive than the kind advanced in, say, the “fine” arts; but it still leaves much to be desired from a critical point of view.¹² We can say positive things about Helvetica and Garamond; but how, without comparison, without a clearer explanation of how and why certain material things produce certain values, without assurances of prior consensus about values and their prioritization, without a shared narrative of deliberation and choice, without empirical verification of the connection between artifact and value, can we be persuaded that these are the best typefaces to use?

How is it, then, that the students’ work moved forward at all? Why would a client ever pay for a design if the arguments supporting it were so thin? Did these students have ways, that is, to compensate for the logical chasms in their reasoning? In the following paragraphs, I would like to speculate about features of design practice that may have persuasive force despite the limitations of the discourse designers use. In this effort, I am proceeding along lines drawn by Fahnestock & Secor (1991) who, having identified problems in the argumentative practices of literary critics, try to understand how those practices might still be persuasive: “[T]hough literary arguments may seem flawed when viewed from a distance and by a field-independent standard, they can still be compelling to the audiences for whom they were intended” (p. 84).

Materiality. No amount of argument will persuade a client if the design is never actually built. At some point in every project, the artifact itself — as a material, physical, concrete thing — takes on part of the burden of proof. The materiality of the design, in other words, becomes one proof of its goodness. Regardless of what it actually *looks* like or can *do*, a design that has a material status apart from the words used to describe it has already achieved a certain persuasiveness. Compared to a verbal argument, an object actually built has resilience, intractability, obstinance, and stability; it is potentially a cause of other things and not “merely” an effect of language. Further, the artifact is a shared perceptual accomplishment, this fact taking over some of the work that words would normally have to do to socially *establish* it. The object can even dominate and silence words; its salience, that is, can make some kinds of verbal exploration and inquiry inappropriate or inaccessible. Finally, the material artifact can be tested and verified in a way that verbal proposals cannot; we can, for example, take the artifact and subject it to use. In sum, we can say about design what might be said about cooking: an imperfect but edible pudding is preferable to one eloquently depicted but physically unavailable.

Evolution. But it's not just that the object is materially-configured, it's that this presence represents an investment of time, talent, expenditure, and risk, the very effort required for its making being one proof in its behalf. The object *qua* object, in other words, may acquire persuasive power as it becomes evident that it is the result of a process that a client may not have the time, money, or patience to duplicate. Govier (1987), for example, claims that the revision of a design is a “tacit argument” against the original product and for the revision (p. 240). It would appear, then, that, while designers may not canvas alternatives according to a traditional “adjudication” model (see Black, 1978), in which multiple solution candidates are contemporaneously available for comparison, they do appear to judge the objects they build vis à vis previous incarnations of those objects. That is, the argument works not by comparing X with alternatives Y and Z, but by comparing X today with the way X looked yesterday. Since the artifact is *better* by that criterion, the designer infers that it is *good* by other criteria as well.

We might say, then, that the central argument for an artifact is implicit in the agent-specific processes that produced it. Why don't designers more systematically consider alternative designs? Because they find it difficult to imagine that what *they* find valuable might not actually be so. Humans, Aristotle wrote, tend to prefer their own opinions, habits, and products over other opinions, habits, and products: “The producer is fond of the product, because he loves his own being. And this is natural, since what he is potentially is what the product indicates in actualization” (*Nicomachean Ethics*, 1.7 1168-a7-9; qtd. in Garver, 1994, p. 59). It may be more “critical,” “rational,” and “scientific” to produce large numbers of artifacts and only then choose which one best satisfies relevant criteria, but this does not appear to be a common way to design things. What designers produce they *already* value; if they didn't value it, they wouldn't have produced it. This doesn't mean that designers

don't change their minds, but it does mean that they may fail to differentiate what they do and build from what they value and prefer. For Mitcham (1979), this "break down" of "rational" control in design is a characteristic feature of the productive arts. Because of their involvement with the inherent particularity of the material world, the arts of technology make only limited use of *logos*. What, then, do they use?

[T]here is at the heart of technical activity if not of *techne* itself an irreducible, nonlogical component; there is an aspect of *techne* which necessarily cannot be brought into consciousness except through the immediacy of a singular, direct encounter, an encounter which takes place through sensorimotor activity and is properly grounded in one of the various forms of love, *storge*, *philia*, *eros*, *agape*. Only love can encompass or grasp the singular. (p. 182)

The *reason* that designers build the things they do, in other words, is because they *desire* those things.

Authority. Designers have a third, perhaps even more persuasive, argument available to them. As professionals, they can always appeal to their own authority. Often illegitimate, this kind of argument can be a perfectly rational move when a claim is based on expertise, experience, or status that one's opponent or client does not possess.¹³ This is an ethical appeal with obvious logical merit: other things being equal, an argument supported by a person whose position gives him or her a privileged understanding of the problem will be considered more effective than an argument without such support. The designers in this project clearly positioned themselves as "experts" vis à vis the JCC. They may have insufficiently considered counter-designs and counter-values in their presentations, then, because they assumed that their expertise was a substitute for a broad search for solutions. The obligation to question and criticize falls, therefore, to the client, who often has neither the courage nor the understanding to confront the professional's claims.

Conclusion

The analysis presented here describes several features of design argument that might be useful in the education of designers. First, the arguments advanced in the JCC project were fundamentally *deliberative*.¹⁴ This makes sense because design is about planning the non-necessary future, a domain within human control but admitting of multiple possibilities. In Goel & Pirolli (1992), for example, design involves the mental formulation and external representation of "future states of affairs" (p. 395). A study by Lawson (1980) found that designers were more *solution*-focused than scientists (pp. 30-32). For most design theorists, this orientation towards the future is a cognitive, technical, or formal problem. But rhetorically, deliberation is an *argumentative* act. For Aristotle, it involves the use of words to exhort or dissuade others

concerning debatable future events (*Rhetoric*, 1.3 1358b). If design discourse is a species of deliberative rhetoric, then it will be oriented towards future goods.

Second, these future goods are situation- and audience-specific; that is, they are constituted in discourse which is *addressed* to particular people at a particular place and time. One result of the JCC project was the students' discovery that what they previously thought to be universal or self-evident values (say, visual balance or consistency) turned out, in fact, to be particular. This doesn't mean that designers need to give up on their own sense of the good and useful, but it does mean that design practice involves negotiation of values across different social groups, an activity that many design students will have had little practice in.

Third, design requires that future, particular goods be instantiated in material artifacts. A key challenge of design discourse is this association of object and purpose. The argumentative moves examined above can be seen as responses to this challenge. How can the material world be imbued with such abstractions as "the good" and "the useful"? By claiming, for example, that an artifact *was built* with those values in mind; or by saying that an artifact *allows* those values. Making such words "stick," however, is problematic. If, as a designer, I claim that a particular object is "fun," a critic might reasonably complain that there are other objects that are equally "fun"; how is this one preferable? Similarly, other words could describe the object; it could be "fun," but it could also be "expensive." The connection of object and word involves a reciprocal underdetermination, and designers will need to be sensitive to the complexities of that connection.

In sum, this analysis suggests that the practice of design involves joint reasoning about purposive objects in situations fraught with a tension between the object proposed and all the objects not proposed but equally purposive. Design theorists have tried to ease this tension by formulating various rational models in which a problem is exhaustively analyzed, then multiple solutions generated, those solutions evaluated by a criterion indexed to the earlier problem analysis. But such models, even fitted with various feedback loops, do not seem to provide a realistic account of how designers actually work. Lawson (1980) claims, for example, that, in design, analysis and synthesis are merged; he cites several studies showing how the understanding of a design problem and the generation of solutions for that problem are contemporaneous activities (p. 33). Designers learn about a problem, that is, by exploring possible solutions to it. Research by Perkins (1977, 1981) makes a similar point; in the design process, reasoning and production are fused. Designers don't reason about a problem and then produce solutions for it; nor do they produce solutions and only later reason about them. Rather, they *produce things with the reasons already attached*.

Rhetorical analysis of naturally-occurring design discourse can lead to a fuller understanding of the design process, especially the ways in which the social embedding of design entails complex discursive challenges. The con-

clusions reached in such analysis can be useful in preparing design students for the professional demands that lie ahead of them. The typology developed in this paper, in which design arguments are grouped into *explaining*, *predicting*, *justifying*, and *warranting* categories, is one example of the kind of data-driven vocabulary that promises greater reflection, and improved practice, on the part of design students. If, for example, “explaining” turns out to be a reliably-discerned category in multiple design contexts, then designers — students and professionals alike — may benefit from having the ethical force of such discourse pointed out to them.

There are implications of this research for rhetorical theory as well. In a culture increasingly constituted by its relationship to technology, public argument is likely to occur more and more often at the interface between expert and lay knowledges, between technical and practical reasoning, between visual and verbal artifacts, between material and abstract constructions, and between individuals and the various social groups with whom they interact. We would do well to explore in greater depth the implications of those changes.

Notes

¹ I wish to thank the faculty and students of the Carnegie Mellon University Department of Design and the staff of the Jewish Community Center of Pittsburgh for allowing me to observe the project described in this paper. I am also indebted to Prof. David Kaufer of the CMU Department of English for his helpful comments on this and related papers.

² In other places, I also look at the different discursive repertoires the designers and client used to account for this project and the artifacts produced in it (Fleming, 1996a); the ways in which the students’ informal studio conversations served to stabilize and de-stabilize the artifacts under construction (Fleming 1996b, ch. 3); and the argumentative nature of visual artifacts such as those created by these students (Fleming, 1996c). In addition, Fleming, Werner, Sinsheimer, & Kaufer (forthcoming) examines the role of intra- and inter-group collaboration in student design projects.

³ Each excerpt is identified in the first line by an excerpt number (proceeding consecutively through the paper); transcript and line numbers locating the excerpt in the data archive; the date of the speech or, alternately, page numbers from a written manual. The speaker or writer of each excerpt is identified by the letter D and an individual number. Transcript notations are those developed by Gail Jefferson and presented in Text 13(2): 157-158.

⁴ The phrase is from G.E.M. Anscombe, as quoted in Davidson (1980), p.9.

⁵ For Aristotle, the end of deliberative rhetoric is *sympheron*, the advantageous, usually translated as the “expedient,” and thus often seen as a morally compromised *telos* (see Kennedy’s note in Aristotle, 1991, p. 49); but in other parts of the *Rhetoric*, Aristotle seems to conceive of the advantageous as encompassing both the useful (what is good for us here and now) and the good (what is good in itself) (see 1.3-8). Cicero (*De Oratore*, II.lxxxii) writes that

deliberation aims at both the worthy and the expedient, although he admits that the latter is usually more persuasive. The author of the *Rhetorica ad Herennium*, meanwhile, claims that the end of deliberative rhetoric is “advantage,” although he later breaks this down into security and honor (III.ii). Clearly in this design project, the client would be interested in designed artifacts that *work*, but the goods appealed to by these designers (organization, unity, flexibility, elegance, reader-friendliness) might also be seen as important values in and of themselves, particularly as this is a non-profit community organization devoted to “virtuous” social and cultural goals.

⁶ According to Govier (1987), arguments and explanations are distinct intellectual and discursive operations. In explaining a thing, we generally assume that thing to be true; our effort is directed, therefore, towards showing *how* or *why* it came to be true (in deliberative terms, “good” or “useful”). In arguing, on the other hand, the conclusion is typically less certain than the premises; we put forward arguments to persuade others that our conclusion is true on the basis of reasons or evidence in support of it, rather than *assume* the conclusion is true from the outset. In other words, when we argue, we don’t explain the phenomenon under debate; we attempt rather to render it acceptable or plausible. Govier writes, “In a society where people so often tell you how, as a matter of fact, they came to think as they do while seeming incompetent to address issues of justification, to omit the distinction between argument and explanation from the pedagogy of argument and critical thinking would be a serious mistake” (p. 175). I would argue, however, that when designers “explain” their work as motivated by socially-relevant purposes or goals, an action which Govier would characterize as *non*-argumentative, they are both explaining *and* arguing; it’s just that they have left out the claim that the purpose motivating or causing their actions is, in fact, a *good* one (cf. Davidson, 1980).

⁷ Cf. Perelman & Olbrecht-Tyteca’s (1969) “argumentation by consequences” and “pragmatic argument” (pp. 263-78).

⁸ My notion of “justifying” owes a debt to Wellman’s (1971) theory of “conductive” arguments. For Wellman, conduction is a kind of ethical argument distinct from both deductive and inductive inference. It is “a sort of reasoning in which 1) a conclusion about some individual case 2) is drawn non conclusively 3) from one or more premises about the same case 4) without any appeal to other cases” (p. 52). In examples like “You ought to take your son to the circus because you promised,” one or more “good” reasons are offered in support of a conclusion, the validity of the move depending more on relevance than on formal deductive or inductive logical structures or norms. Govier (1987) associates Wellman’s conduction with what others have called argument by “balance of considerations,” “good reasons,” or “convergence.” What all these share, she claims, is a type of reasoning about particulars which doesn’t rely on some linking or overarching generalization (ch. 4).

⁹ My use of the term “warrant” here is influenced by, but distinct from, Toulmin’s (1958).

¹⁰ Regarding the inadequacy of designers' own "intuitions" in assessing their inventions and the relative superiority of empirical research (both scientific investigation and user-based iterative design), see Sims-Knight (1992).

¹¹ I am influenced here by the "critical questions" Walton (1990) proposes for practical reasoning (p. 85). His argumentation scheme for practical reasoning is as follows:

A is the goal;

B is necessary to bring about A;

Therefore, it is required to bring about B.

The four critical questions relevant to that scheme are:

Are there alternatives to B?

Is B an acceptable (or the best) alternative?

Is it possible to bring about B?

Does B have bad side effects?

¹² Toulmin, Rieke, & Janik (1979), for example, claim that "argumentation is peripheral to the artistic enterprise" (p. 266). This is debatable, but it does seem reasonable to expect that designers would make a more conscious effort to "rationalize" their work for others than would "fine" artists.

¹³ On the *argumentum ad verecundiam*, see Walton (1989, ch. 7; 1992, ch. 2).

¹⁴ Cf. Buchanan's (1989) notion that the rhetoric of design is primarily *epideictic*.

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We value your privacy.Â Our learning studies assess the arguments students construct using the Knowledge Integration Environment debate project about light propagation and, explore the relationship between students' views of the nature of science and argument construction. We examine how students use evidence, determine when they add further ideas and claims and measure progress in understanding light propagation.Â It can also guide design, not in a prescriptive manner but by providing designers with heuristics and examples of possible ways to address the challenges learners face. View.Â Results showed that students' epistemic beliefs and prior knowledge predicted the quantity, quality and diversity of the different types of arguments the students constructed.