

Evaluating affordance short-circuits by reviewers and authors participating in on-line journal reviews

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Abstract

This paper presents the results of a “by-hand” analysis of the on-line interactions that occurred during seven peer reviews of articles submitted to JiME (Journal of Interactive Media in Education), an academic e-journal. JiME has been specifically designed to promote open, on-line dialogue between article reviewers and authors as part of the article review process. When articles are published, edited versions of the review comments are included with the articles. The purpose of this study was to examine pre-publication interactions between reviewers and authors as they debated over article submissions, with an eye to how affordances of the JiME review medium were utilized. The goal was to determine whether those affordances contributed to what was seen as a computer-supported collaborative effort, or whether commentators somehow circumvented the affordances. Based on the findings, a set of design and editorial interventions are recommended.

Keywords: affordances, computer-mediation, review processes

Introduction

For about three semesters, we have been engaged in a series of seminars on CSCL. In 1999, we reviewed theories of mediation and experimented with several CSCL media. Currently we are looking at the role that artifacts more generally play in cognition and collaboration. This paper reports on a study of a specific designed medium to support the review and publication of scholarly articles: JiME (the Journal of Interactive Media in Education, available at <http://www-jime.open.ac.uk/>).

Although promising, it is clear that there are many challenges and practical barriers to the use of computer technology in collaborative learning (Stahl, 1999). This paper attempts to characterize some specific issues that arise in the JiME medium. We focus on the initial review process in which a small group of reviewers and the author engage in a critical dialogue. JiME is not strictly a learning environment, but does encourage social interaction via computer-based affordances. The users of those affordances are the multidisciplinary reviewers and authors of articles submitted to JiME. The goal of JiME is to support a limited community (later broadened during open review and eventual publication) to engage in knowledge-building. The desired product is a scholarly publication that incorporates the author’s ideas in a way that is compatible with the reviewers’ critical reception. Starting with a draft expression of the author’s ideas, the knowledge-building process subjects that draft to the multiple interdisciplinary perspectives of the reviewers. This leads to a dialogue in which questions are posed and issues raised. The author responds and in some cases enters into more prolonged discussions with the reviewers. In the end of closed review, the editor makes recommendations that typically summarize the knowledge-building process and delineate a view of the collaboratively constructed ideal article.

One of the unique and central concepts behind the design of JiME (Sumner, et al., 2000) is its artifact-centered structure. The idea here is that the knowledge-building activities of the review process are grounded in the artifact of the author’s text. Each section of the text is automatically linked to comments on that section. Furthermore, the JiME interface displays the section of text and its associated discussion side-by-side. A usual outcome of the review is that some of the review discussion is kept linked to the text when the article is revised and published.

New users such as the volunteer reviewers must gradually learn how to use a medium like JiME. In some cases they discover or are instructed in the intended usage patterns and they come to master these; in others,

they adapt or appropriate the technology as best they can to their personal preferences and constraints. Thus, the JiME communication medium with its specific affordances can be conceptualized as a cognitive artifact which can be either “mastered” or “appropriated” (Wertsch, 1998) by its users. If the JiME affordances are mastered, then article reviewers and authors will use them in ways similar to those intended by the designers. If the affordances are appropriated, they will be modified to suit the users’ purposes. Those purposes may not necessarily meet the intention of the artifact designers. While artifacts come with physical (or virtual) affordances, the uses of the artifact are not always obvious to the users, particularly with computer-based media which are inherently complex to use and which come with many associated technical problems (e.g., monitor resolution). The degree to which users learn to take advantage of JiME’s affordances can seriously affect the progress of the knowledge-building process as envisioned by the JiME designers.

In this paper, we look in some detail at the usage patterns in a series of JiME reviews. From this analysis, we draw some conclusions about how well reviewers master the affordances of the JiME medium as a collaboration artifact, in particular, how well they take advantage of the intended links between the text artifact and the review discussion.

Methodology

Data source

The Journal of Interactive Media in Education is an electronic publication that was designed as a “document-centered discourse” environment (see esp. Sumner, Shum, Wright, Bonnardel & Chevalier, 2000). The journal is designed to link the discourse between peer reviewers and authors directly to the content of the reviewed article itself. Of particular interest for the study reported here is the fact that the discourse interface itself is designed to encourage interaction between the multidisciplinary reviewers and authors through use of a pre-assigned hierarchy within which reviewers and authors can enter comments about article sections or abstract areas. The standardized discussion hierarchy features five General (abstract) review categories:

- Originality and Importance of Ideas
- Clarity of Goals
- Appropriateness of Methods
- Clarity and Credibility of Results
- Quality of Writing

Additionally, each article is assigned Specific categories that correspond to particular sections of each article. These categories are unique to each article and assigned by the article editor.

At the beginning of the JiME review process, for a period of about one month (the “Closed” review period), the invited reviewers and the article authors “debate” the merits of the articles. This debate consists of the reviewers entering comments under whatever headings/categories they choose. Authors and other reviewers see the comments after they are posted and can respond by posting comments at the same level (Level 1 if entered at the same hierarchical level as the original comment), or at a subordinate level (e.g., Level 2 would appear indented and below the comment being responded to, etc.).

In addition to entering and responding within the General hierarchy itself, comments may be linked directly to the Specific article sections. The idea behind this design was that the debate entries thus constitute a kind of footnoting to the original text.

Editors can and do modify both the linked and original comments when the articles are published in JiME. Because of this, for this project, only pre-print archives are used for analysis. These pre-print versions of the review debates have not been altered by editors, and so represent the original way reviewer and author interactions occurred. Also, while it is an important knowledge-building and collaborative affordance of JiME, aspects of the linked text are ignored for this project due to space and time limitations. Finally, there are occasions when an editor directs reviewers or authors. These directives are not studied here, although there will be a brief commentary regarding this in the concluding section.

Between 1996 and 1999 there were twenty-two articles submitted and archived in JiME. These were made available to the investigator by JiME editors as part of coursework at the University of Colorado, Boulder. Of these 22 articles, seven were chosen to be examined based on the fact that each had one or more Level 3

comments in their debate hierarchies—this collection of seven articles constituted the entire body of articles with more than 2 levels of interaction. That is, at least one instance of the following type of interaction was present in some aspect of the debate hierarchy of the seven examined reviews:

- Reviewer makes an initial comment (Level 1)
- Author or another reviewer responds or enters a comment corresponding to the initial entry (Level 2)
- A third comment or response is entered (Level 3)

The decision to choose articles based on depth of debate was made because a primary interest of this project is to understand how JiME affordances for collaborative exchange were used (or not used). Level 3 interactions were rare among the 22 archived articles, and it was hoped that the seven with Level 3 interactions would provide points of insight that could not be seen in articles with less depth of interaction.

Research questions and analysis

If the primary affordance for collaboration is presumed to be the debate hierarchy, then the first question to be addressed is: “Do contributors follow the hierarchical format?”. A simple qualitative examination of all categories in every article was conducted to answer this question, with notes made about how reviewers and authors use the predetermined categories.

The second major question to be addressed regarded how reviewers and authors interact. In order to answer this question, a descriptive statistical analysis is performed to reveal the degree of interaction by Level of commentary. Supplementing this is a qualitative analysis of the timeliness by which debate comments are entered relative to each other—an analysis that answers the question of “when” reviewers and authors respond to each other. This last provides clues as to the limits of the collaborative interactions that are reported in the results.

Analysis

Do contributors follow the hierarchical format?

Reviewers and authors do not strictly follow the pre-determined hierarchy established before the review debates begin. For instance, reviewers do not tend to make entries in every possible category. This is not surprising, since even in traditional reviews it is unlikely that a reviewer would comment on every possible section of an article. However, JiME affords collaborative exchange in two categories for all articles. A General comment section is designed for comments regarding abstract consideration of articles (Quality of Writing, Clarity of Goals, etc.). The Specific category allows for exchanges on specific subsections of each article. For illustrations of the JiME hierarchy, see Appendix A.

The primary pattern that emerges from examination of the seven articles studied in this project is that it is common for individual reviewers to make comments in either the General or the Specific categories, but in not both. Of the 25 reviewers, more than half (14) made comments predominantly in one kind of category—either General or Specific. Table 1 provides an example.

Table 1. Example of how reviewers and authors tend to choose either General categories or article-Specific categories for their comments.

Article 1 Author/Reviewer	Date entered	Time entered	Category		Level
			General	Article Specific	
Reviewer 1	22-Oct	7:38 gmt	Orig. & Imp. of Ideas		1
		7:44	Approp. of Meth		1
		7:47		1. Bkgrnd	1
		7:48		1.1 The Course	1
		7:50		2. Res. Questions	1
		7:51		2.1 Res. Ques/Pop Topics	1
		7:53		3. General results	1
	Nov. 2	20:29 GMT	Re:Orig. & Imp. of Ideas		3

Reviewer 2	Oct. 23	17:57	Orig. & Imp. of Ideas		1
		18:05	Clarity		1
		18:16	App of Meth		2
		18:30	Cred of results		1
		18:20	Qual of Writing	References	2
Reviewer 3	26-Oct	2:27	Approp of Meth		1
Reviewer 4	Nov. 1	19:27		1. Background	2
		20:07		2. Research Questions	2
		21:07		3. General results	2
		2:02		4. Conclusions and results	1
Author	1-Nov	19:52	Orig & Imp. of Ideas		2
		20:34	Approp of Meth		2
		23:41		1.1 The Course	2
	Nov. 2	23:55		2.1 Res. Quest/ Pop Topics	2
		3:18		1. Background (A)	3
		4:14		1. Background (B)	2

As exemplified in Table 1, although reviewers may make entries in both General and Specific categories, there tends to be a preference for one type or the other. In the case of Reviewer 3, for example, only one comment is made. In this case, the reviewer made a substantial single entry that covered several facets of the article.

The most serious implication of this “single-category” pattern is that the JiME affordance for an individual to consider an article from two perspectives is short-circuited. The two types of category should allow review comments to be input at two different levels: an abstract level exemplified by the General categories, and a more detailed level at the Specific level. But by segregating their comments to one or the other category, Reviewers in particular create a limiting factor in their interaction with other reviewers and the author.

For example, if a reviewer enters a majority of his or her comments in the General categories, then obviously this reviewer is not contributing debate comments in the Specific categories. The reviewer entering only General comments may be missed or ignored by those who are concentrating their comments on Specific categories. In this way, there is a kind of double barrier to interaction between reviewers: the reviewer may be self-limiting, plus other reviewers (also self-limiting) may miss interaction because they are not paying attention to the comments in categories they are not considering. This is suggested by Article 2, represented in Table 2.

Table 2. Example of category-specific responses. Reviewers tend not to respond across their category preferences.

Article 2	Date of	Time of	Category		Level	
Auth./Reviewer	Entry	Entry	General	Article Specific		
Reviewer 1	21-Jan	15:05	Orig/Imp of Ideas		1	A
		15:14	Clarity of Goals		1	a
		15:17	Approp of Meth		1	A
		15:19	Cred of results		1	A
		15:20	Qual of Writing		1	A
		16:12			1.1 What do pub do	1

		16:28		1.2 How textbook op work	1	
		16:48		1.3 Exp w/multimedia adopt.	1	
		17:07		2. Causes of reluctance	1	
	22-Jan	14:39		3.1 What can author do: interface and support (A)	1	
		15:07		3.1 What can author do:interface and support (B)	1	
		15:08		3.2 What can pub do: workshop & class support	1	
		15:11		3.3 What can commun do: peer and user groups	1	
	3-Feb	17:11	Approp of Meth		3	
Reviewer 2	3-Feb-98	2:19	Orig & Imp of ideas		2	B
		2:26		3.1 What can author do	2	
Reviewer 3	3/5/1998	14:53	Orig/Imp of ideas		3	C
		16:45	Clarity of Goals		2	b
		16:58	Cred of results		2	B
		16:48	Qual of Writing		2	B
		14:43		2. Causes of reluctance	2	
Reviewer 4	2/22/1998	2:37	Orig/Imp of ideas		1	
		2:49	Approp of Meth		4	
Author	3-Feb	16:23	Approp of Meth		2	B
		15:41		3.1 What can the author do	2	

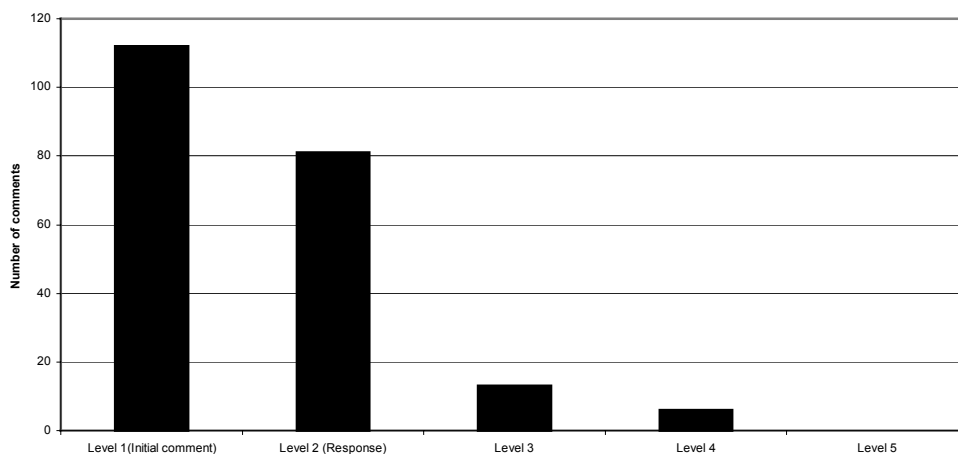
In this table, comments by Reviewers 2-4 and the Author are relatively restricted to the General comments entered by Reviewer 1. For instance, Reviewer 1 entered a comment on the Originality and Importance of Ideas on January 21(indicated by *A*); Reviewer 2 responded to this on February 3 (*B*); finally, Reviewer 3 enters the last response for this category (*C*). The case is similar for the other General categories, where *A* indicates the first comment entered and *B* indicates the response.

The primary point of this table is that even though Reviewer 1 entered several comments in Specific categories, the other Reviewers chose to respond only to the General categories. For whatever reason, they did not further elaborate on the Specific categories and JiME has no current affordance to encourage more complete involvement by Reviewers across categories.

How do reviewers and authors interact?

Figure 1 shows the descriptive breakdown of comments based on the hierarchy level in which they occur.

Figure 1. Incidence of comments by level.



Of the 112 entry-level comments examined in this study, 55% (62) have only one response and these responses tend to come exclusively from the article Authors. Only 12% (13) of the entry-level comments have two responses, and about 5% (6) have three responses. The overwhelming pattern of interaction is that a Reviewer will make an entry-level comment, an author will respond, and there will be no further responses. This pattern allows rejection of the hypothesis that there is a high level of interaction among JiME Reviewers and Authors.

One question that is raised by this pattern, however, is what kind of topics prompt Authors to respond to initial comments and is there reason to believe the answers have an inhibitory influence on other Reviewers. Although a more in-depth study of this is warranted, a superficial survey of the articles shows the following issues tend to elicit Author responses:

- Requests for more info
- Direct questions regarding methods
- Direct questions regarding concepts
- Terminology debates
- Conceptual debates (i.e., reviewer challenges conceptual definition)
- Claim debates (e.g., reviewer argues against a claim made by author)
- Debates about external issues (“The problem . . . is that people are insufficiently critical.”)
- Comments about “external” issues (such as relationships to experiences, books cited, etc.)
- Presentational issues (“[have] text popped up over the node . . . so as not to divert your attention”)
- “Simple” agreements (“Good point!”) (rare)
- Compliments (rare)

Given that an Author responds particularly to criticisms of the claims he or she has made, as well as conceptual and terminological issues, it would be reasonable to speculate that further commentary or questioning by other Reviewers might be unnecessary. This presumes, however, that Author responses are made in a timely manner relative to the initial entries—that is, that such criticisms are immediately countered by Authors and thus need no further questioning by other Reviewers. As will be shown in the next section, however, this is frequently not the case.

Time-related issues

In-depth exchanges (comments at Level 3 and beyond) are not common in JiME review debates. This could be interpreted as a simple matter of pragmatics. The closed debate period in which the invited reviewers have available for considering the articles is typically only one month long (with a different time period for other readers during the “open” review period). But even given this narrow time span, it is reasonable to ask what contributes to the lack of deeper interactions among reviewers and authors.

A closer examination of time issues across the seven articles studied in this project shows that Reviewers tended not to utilize more than one day for entering review comments. This pattern of entering comments on a single day is common across all the article debates reviewed in this study. Of 25 Reviewers in the articles studied here, only 32% (8) made entries on more than one day. It is possible that this indicates that the Reviewers wrote their observations elsewhere (in word processing applications, for instance) and copied them into the JiME hierarchical structure. This would amount to producing a traditional-style review, which essentially by-passes some of the affordances of the JiME hierarchy for collaborative work. There is some evidence to substantiate this idea of transference of a traditional review.

The time at which a commentary is input into the debate hierarchy is recorded by the JiME software. The record of input for all Authors and Reviewers provides further evidence that Reviewers may be producing their reviews external to the hierarchy and then transferring it into the debate structure. This pattern is apparent particularly in Table 1, where Reviewer 1 has made seven entries in about 15 minutes. Although these entries cannot be shown here due to confidentiality issues, the entries are large enough that it is unlikely they were composed and entered in JiME at the rate of one every two minutes.

If Reviewers do write their reviews in a traditional, non-interactive manner and then transfer their comments into the debate structure, then this may be contributing to restricted dialogue between both Reviewers and Authors. It seems logical that there is a disincentive for Reviewers to go back into a debate looking for comments to respond to after they have made such entries.

On the other hand, consider the article represented in Table 3. This article, which is atypical in that almost all contributors made entries on more than one day, there is no interaction between Reviewers at all.

Rather, Reviewers have merely added comments under various sections, and at Level 1. They are not interacting with previously entered comments, but simply adding their observations to the relevant categories. Even under the title “5. Whose Value”, where there appears to be a Level 2 response by Reviewer 3 to Reviewer 2, there is only a confirmation of what was said with additional comments added. Only the Author responds to the comments in this section, with a short clarification of a point made particularly by Reviewer 3.

Otherwise, responses to Reviewer comments in this paper are exclusively from the Author. The JiME affordance for collaboration in this case is reduced to an affordance for collection of sectioned review comments. The Reviewers are not considering each other’s views or points, or at least they are not responding to them more than superficially.

Table 3. Representation of an article in which Reviewers enter comments at Level 1, suggesting non-interaction with other commentators (Reviewers or Author).

Article 6 Auth./Rev.	Date of entry	Time of entry	Category		Level	
			General	Article Specific		
R1	27 Jan.	16:38	Orig/Imp		1	
		16:52	Clar of Goals(Scope)		1	
	28-Jan	13:58	App. Of Meth		1	
		14:02	Cred of Results		1	
		14:08	Qual of Writing		1	
		15:07		2. Print vs. WWW	1	
		15:08		4. Typo in fig 4	1	
		16:25		5. Jobs	1	
16:39		7. Transition?	1			
R2	13-Feb	14:41	Orig/Imp		1	
		14:44	Clar. Goals (Rt. Obj.)		1	
		14:48	App of Meth		1	
		14:52	Cred of Results		1	
		14:55	Qual of Writing		1	
		14:59		2. Print vs WWW	1	
		15:02		5. Whose value?	1	
		15:06		7. The challenge	1	
15:10		7.1.1. Custom publishing	1			
R3	16-Feb	21:12gmt	Orig/Imp		1	
		21:43		5. Re: Whose value?	2	
	17-Feb	20:00		6. Ed Object Economy	1	
		21:54		7. Transition	1	
	18-Feb	19:27		7. Re Transition	1	
19:32			8. Copyright			
Author	27-Feb	22:04	Orig/Imp		6. Ed Object Economy	2
					7. Transition (disagree)	2
	28-Feb	12:19gmt	12:29	Orig/Imp		2
			12:39	Clar of Goals		2
			12:39	Clar. Goals (Rt. Obj.)		2
			14:22	Cred of Results		2
			13:25		4. Typo fixed	2
			13:34		5. Current job ex's.	2
14:42		5. (Whose value) What publisher do?	3			

The pattern of lack of Reviewer to Reviewer interaction is in evidence to some degree across all articles in this study. Consider Table 4, for example.

Table 3. Incidence of comments by Reviewers

and Authors(A) by hierarchical level.

Totals	R1*	R2	R3	R4	A 1	A 2	Total
Level 1	48	33	22	6	3		112
Level 2	3	7	8	5	53	5	81
Level 3	3	1	5		3	1	13
Level 4	1	1		1	3		6
Level 5							0
	55	42	35	12	62	6	212

Table 4 shows that most debate entries by Reviewers are at Level 1. With rare exception, Level 1 entries are non-responsive to either Reviewers or Authors. While the reason for this is unclear, it points to the need for a remediation via either the JiME medium or from an editor if more collaboration is desired. This will be addressed in a later section of the paper.

What is also apparent from Table 4 is that Authors make the most responses. This is probably not surprising, since Reviewers direct their comments to the content of articles. What is important for this paper is that if a medium like JiME is to support more collaboration or interaction between debate commentators—be they Reviewer or Author—a way must be found to remedy the lopsidedness of responses. If a medium like JiME were to be used for collaborative knowledge-building, a serious redesign of affordances and editor mediation would be needed.

Discussion

There is a distinct trend for Reviewers to engage in the review debate from either the General perspective or the article Specific perspective. There is also a tendency for Reviewers to enter comments over a narrow time period. It has been argued here that both contribute to a subversion of the JiME affordance for collaboration and interaction among Reviewers and Authors.

One way to counter this would be to change the affordance of the hierarchical structure in such a way that Specific categories were presented to Reviewers and Authors at a time before the General categories were accessible. This could be accomplished in several ways, but simply removing the five General categories from the debate hierarchy at the beginning of the debate period might suffice. After a time period for review of Specific categories had passed, the editor could then open the debate to the more abstract General discussion—perhaps restricting access to the Specific categories at that time.

In this way, individuals could be encouraged to view the article from two perspectives. Depending on how the interface was changed, there might also be a second opportunity for Reviewers and Authors to read and respond more deeply to comments.

It is also possible that the editors themselves might mediate the debates in a more calculated way. Rather than just organizing the debate hierarchy into article-Specific categories and directing actions to be taken by Authors, a new role might be undertaken—that of facilitating discussion of particular points within the debates. For instance, asking questions about whether or not consensus had been reached on terminological or conceptual issues might further deepen discussions. This, however, is not necessarily the goal for a journal like JiME, but might be more appropriate for a medium or context more directly concerned with knowledge building.

On the other hand, asking Reviewers to pick or summarize the most important commentaries would be another way editorial mediation could enhance a medium such as JiME. This could potentially also be incorporated into the JiME debate structure, and be implemented as a final stage of the review process.

To return to a point brought up in the Introduction of this paper, we can see that both Reviewers and Authors contributing to the JiME reviews have generally appropriated the affordances of the system, but they have not mastered them. Both design and editorial remediation, as suggested above, may help.

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