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Extending Classroom Discussion with Discussion Boards: Using Technology to Meet the Needs of Diverse Learners

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Extending Classroom Discussion with Discussion Boards:
Using Technology to Meet the Needs of Diverse Learners

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Abstract

Discussion boards are Web 2.0 tools that can extend classroom learning. The purpose of this study is to analyze the discussion board dialogue and student perceptions of discussion board use of five graduate classes on two campuses. Are there similarities in student perceptions about discussion board use? Data from class discussion board dialogues, open-ended and Likert survey questions were collected and analyzed for common trends and themes. Results of the statistical analysis will be discussed with the hope that there will be a dialogue with those present at the session so that we can exchange ideas and learn from each other.

Keywords:

Educational Technology

Teaching and Teacher Education

Learning and Instruction

Extending Classroom Discussion with Discussion Boards:
Using Technology to Meet the Needs of Diverse Learners

Problems sometimes arise when educators find that they have limited class time to discuss a topic, especially one that may concern a new invention, idea, or related issue. One way to approach this dilemma is through the use of a discussion board, which gives students an opportunity to read and think further about an issue, compose a thoughtful response to it, and post it for the whole class to read and respond to (Beeghly, 2005; Lindsey-North, 2000). Course management platforms like Blackboard (adopted by many colleges and universities) have a discussion board area built into the program that can be easily accessed by Blackboard users.

Educators want their students to succeed in their studies, get excited about their learning and take responsibility for their learning by seeking more information on their own. Some researchers have found that discussion boards can be helpful in these endeavors (Beeghly, 2005; Burgess, 2009). Robinson (2011) reported that the majority of students in his study thought that the discussion board was useful in group work and students preferred this forum over face-to-face meetings. Importantly, some students perceive that the discussion board helps their learning (Gomez, Wu, & Passerini, 2010; O'Dea & Rowley, 2010; Rainsbury & Malcolm, 2003; Rosenfeld, O'Connor-Petruso, Bletterman, & Shorter, 2011), although other researchers reported that student perceptions of learning benefits from the discussion board were mixed or negative (Pena-Shaff, Altman, & Stephensen, 2005).

The discussion board forum also allows the instructor to analyze and assess individual student progress on a given issue (Lindsey-North, 2000), and may help students to be better

informed and form opinions on a particular topic (Rosenfeld et al., 2011). Some researchers have noted that the use of a discussion board is beneficial to students by giving a voice in classroom discussions to quiet or shy students and helping them be part of a community of learners (Beeghly, 2005; Burgess, 2009; Cox & Cox, 2008; Rainsbury & Malcolm, 2003; Rosenfeld et al., 2011). Burgess points out that because the discussion board fosters social and collaborative aspects of learning, the opportunity for building new knowledge or adding to pre-existing knowledge is increased. Coole and Watts (2009) concur by suggesting that interactions among learners when working on appropriate tasks in communal environments can result in more effective learning. When students learn from each other, they are moving away from a teacher-centered learning environment toward one that is more student-centered (Kupczynski, Mundy, & Maxwell, 2012).

Method

Purpose

The purpose of this study, which builds on the prior work of one of the presenters, is to analyze the discussion and student perceptions of discussion board use of five classes taught by two instructors at two university campuses. Some guiding questions include:

Are there similarities in student perceptions on the use of discussion boards?

Did students feel better informed and form opinions on discussion topics?

Did students think about topics differently as a result of the discussion?

What is the impact of the topic on student participation?

Participants

Participants in this study included 17 graduate students enrolled in an Advanced Curriculum and Pedagogy in Childhood Education course during spring 2011, 22 graduate

students enrolled in the same course in spring 2012, 21 graduate students enrolled in two sections of a Leadership Development course during spring 2012, and 19 graduate students enrolled in a Curriculum Development course in the Summer 2012 semester. The 79 students from two urban northeastern campuses constitute a sample of convenience.

Instrumentation

Data were collected from the class Blackboard discussion boards as well as from the responses of both open-ended and Likert scale questions.

Method

Blackboard discussion boards were used in all participating classes, although the protocols for use differed. In some classes, participation was a course requirement; for others it was optional. In one course the discussion was almost always started by the professor; in other classes students took charge of starting and moderating some of the discussions themselves. One class did not have access to the Likert scale questions, but contributed qualitative data in the form of responses to open-ended questions.

Student opinion survey data were used to evaluate what features of the protocols were linked to different patterns of discussion board use and student preferences in discussion board design. The data were statistically analyzed to note relationships.

Results

Of the invited sample (n=62), nine students chose not to participate or did not fully complete the survey instrument. The sample that remained consisted of 53 respondents (85% response rate) for the quantitative data. Additional qualitative data were collected in the discussion boards themselves and in open-ended questions that were administered concurrently with the Likert-scale instrument. Because of the relatively small sample, non-parametric

techniques were used to analyze the data. The samples were compared with a Kruskal-Wallis test for independent samples and further investigated through cross-tabulations.

The sample data were also used to assess correlations between the instrument items. In the earlier research using this instrument, several of the items were found to correlate with each other. The item wording (Table 1) was designed to have a negatively worded item and a positively worded item addressing the same idea.

Table 1

Item wording for Likert scale Survey Items

Item #	Item Wording
1	This class was worthwhile.
2	I enjoyed this class.
3	I would recommend this class.
4	The Blackboard Discussion Board helped my learning this semester.
5	I participated a lot on the Discussion Board.
6	My participation was minimal; I did not respond to my classmates' postings.
7	The Discussion Board helped me to form (develop) my own opinions.
8	I changed my opinion on a topic after reading the discussion.
9	My opinions were not changed, but I felt better informed after reading the discussion on the Discussion Board.
10	Classmates' postings influenced my own thinking so that I questioned my opinions on a topic.
11	I read all of the discussion on the Discussion Board.
12	I read the discussion weekly (or more often) on the Discussion Board.
13	I would like to participate in a Discussion Board again.

The negative wording (item 6) is intended to slow the respondent's cognitive processing. It was expected that the negatively worded item and the positively worded item would demonstrate a strong negative correlation. The Spearman's rank order correlation coefficient, rho (r) for items 5 (I participated a lot on the discussion board) and 6 (My participation was minimal, I did not respond to my classmates' postings) was statistically significant ($r_{53} = -0.668, p=0.003$) but not the highest inter-item correlation found (Table 2).

Table 2.

Inter-item Spearman's Rho Correlation Coefficients without Bonferroni Correction

Item #	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1.000 p=.000												
2	.691** p=.002	1.000 p=.000											
3	.900** p=.000	.703** p=.002	1.000 p=.000										
4	.009 p=.973	.261 p=.312	.123 p=.637	1.000 p=.000									
5	.293 p=.254	.540* p=.025	.286 p=.266	.477** p=.000	1.000 p=.000								
6	-.668** p=.003	-.454 p=.067	-.667** p=.003	-.381** p=.005	-.699** p=.000	1.000 p=.000							
7	.036 p=.891	.257 p=.319	.027 p=.917	.494** p=.000	.410** p=.002	-.168 p=.228	1.000 p=.000						
8	-.254 p=.326	-.047 p=.858	-.358 p=.158	.251 p=.070	.241 p=.082	-.161 p=.249	.325* p=.017	1.000 p=.000					
9	-.054 p=.836	.284 p=.269	-.054 p=.836	.339* p=.013	.020 p=.886	-.034 p=.807	.109 p=.436	-.101 p=.471	1.000 p=.000				
10	.040 p=.878	.376 p=.136	.055 p=.835	.208 p=.135	.332* p=.015	-.055 p=.695	.466** p=.000	.420** p=.002	.038 p=.785	1.000 p=.000			
11	.040 p=.880	.083 p=.752	-.119 p=.650	.158 p=.258	.391** p=.004	-.266 p=.054	.102 p=.468	.201 p=.148	-.031 p=.825	.150 p=.284	1.000 p=.000		
12	.471 p=.057	.638** p=.006	.318 p=.214	.367** p=.007	.667** p=.000	-.429** p=.001	.269 p=.051	.215 p=.122	.201 p=.148	.273* p=.048	.432** p=.001	1.000 p=.000	
13	.182 p=.486	.525* p=.030	.282 p=.272	.642** p=.000	.481** p=.000	-.441** p=.001	.417** p=.002	.183 p=.191	.482** p=.001	.233 p=.093	.246 p=.076	.547** p=.000	1.000 p=.000

The most strongly correlated items were 1 and 3, "This class was worthwhile" and "I would recommend this class". This strong correlation is not surprising, nor does it offer any new insights, what it does is help orient and scale the other responses based on the sample. There were other statistically significant findings that were consistent with researcher expectations. "The Blackboard Discussion Board helped my learning this semester" (Item 4) was positively

correlated with items 5, 7, 9, 12, and 13, and significantly negatively correlated with item 6. Interestingly, item 4 was not correlated significantly with item 8, “I changed my opinion on a topic after reading the discussion,” item 10, “Classmates’ postings influenced my own thinking so that I questioned my opinions on a topic,” and item 11, “I read all of the discussion on the Discussion Board.”

Items 8 and 10 were correlated with each other, but beyond that, item 8 was only correlated with item 7, “The Discussion Board helped me to form (develop) my own opinions.” Item 10, where the wording was more about being influenced rather than having one’s opinion changed, demonstrated correlations with item 7 and 8, as expected, but also with some of the participation items, 5 and 12. Participation items, 5, 6, 11, & 12 were generally correlated with each other. Item 6, the negatively worded item, and item 11 did not demonstrate significance at the $p=.05$ level, but the relationship did approach significance ($r_{53} = -.266, p=0.054$). Because of the number of correlations conducted simultaneously, the significance data reported are possibly inflated. Care should be taken in generalizing these item correlation results.

Beyond investigating the relationships within the responses, the classes were compared. Because the numbers for each of the groups within the sample were relatively small, the assumptions for parametric procedures could not be met. To compare the groups, the independent samples, Kruskal-Wallis test of the distributions was applied to the data (Table 3).

Table 3

Kruskal-Wallis test of independent samples, with asymptotic significances

Item #	Item compared across the four groups	Significance
1	This class was worthwhile.	.458
2	I enjoyed this class.	.302
3	I would recommend this class.	.958
4	The Blackboard Discussion Board helped my learning this semester.	.050
5	I participated a lot on the Discussion Board.	.041
6	My participation was minimal; I did not respond to my classmates' postings.	.604
7	The Discussion Board helped me to form (develop) my own opinions.	.064
8	I changed my opinion on a topic after reading the discussion.	.078
9	My opinions were not changed, but I felt better informed after reading the discussion on the Discussion Board.	.039
10	Classmates' postings influenced my own thinking so that I questioned my opinions on a topic.	.232
11	I read all of the discussion on the Discussion Board.	.008
12	I read the discussion weekly (or more often) on the Discussion Board.	.009
13	I would like to participate in a Discussion Board again.	.128

While the courses sampled in this research were at two different urban universities in the northeast, and they were taught by different professors, with different content area foci, there were more similarities in the distributions of responses than there were significant differences. For each of the items with statistically significant differences in the distributions across classes, a cross-tab analysis was conducted to further investigate where the differences were. It should be noted that the distributions for items 4, 5, and 9 were statistically significant, but less so than for

items 11 and 12. It would be interesting to see if, with additional data collection, the statistical significance increases or diminishes.

Item 4, The Blackboard Discussion Board helped my learning this semester, showed a statistically significant difference in distributions, at the minimum threshold for identifying a significant difference. The cross-tab (Table 4) shows that while most of the sections were in agreement with the statement, ED 7203 12, had two respondents who disagreed. It should be noted that there were no respondents who selected strongly disagree even though the option was available.

Table 4

Cross tabulation of frequencies for Item 4, The Blackboard Discussion Board helped my learning this semester

		Strongly				
		Disagree	Neutral	Agree	Agree	Total
Course	EDL 685	0	2	4	2	8
	EDL 602	0	3	5	1	9
	ED 7203 12	2	3	10	4	19
	ED 7203 11	0	0	9	8	17
Total		2	8	28	15	53

The other sections appear to be very similar in the distribution of their responses. Unlike table 4, table 5 does show a response listed in the strongly disagree category. There were also six respondents in ED 7203 12 and ED 7203 11 that indicated that they disagreed with the statement that they participated a lot. This distribution of responses is different from the responses for the other two classes. Together, nearly three-quarters of respondents (73.6%) felt that they had participated a lot on the discussion board; with an equal number (n=7, 13.2%) indicating either that they disagreed (disagree or strongly disagree) or were neutral.

Table 5

Cross tabulation of frequencies for Item 5, I participated a lot on the Discussion Board

		Strongly Disagree		Neutral	Strongly Agree		Total
Course	EDL 685	0	0	0	3	5	8
	EDL 602	0	0	3	3	3	9
	ED 7203 12	1	3	4	8	3	19
	ED 7203 11	0	3	0	6	8	17
Total		1	6	7	20	19	53

Table 6 presents the results of the cross tabulation for item 9, a compound statement, “My opinions were not changed, but I felt better informed after reading the discussion on the Discussion Board.” The frequency distribution of results for this statement were significantly different, $p=.039$, and while the overall sentiment was positive (81.1% agree or strongly agree),

Table 6

Cross tabulation of frequencies for Item 9, My opinions were not changed, but I felt better informed after reading the discussion on the Discussion Board.

		Strongly Disagree		Neutral	Strongly Agree		Total
Course	EDL 685	0	1	0	6	1	8
	EDL 602	1	1	3	3	1	9
	ED 7203 12	1	0	1	10	7	19
	ED 7203 11	0	0	2	7	8	17
Total		2	2	6	26	17	53

the pattern of neutral (11.3%) and negative (7.5%) responses varied by class. EDL 602 demonstrated a very flat distribution, no group varied from any other group by more than two responses, where the other three classes show high frequencies in agree and strongly agree that are each much higher than the neutral or negative responses. In fact, the agree response, while

equal with the neutral for EDL 602 is at least three times as high as the neutral response for the other classes.

A similar, flat pattern of responses was seen in ED 7203 12 for item 11 (Table 7). The aggregate responses for strongly disagree and disagree indicate that over one-quarter of respondents (26.4%) acknowledge that they did not read all the discussions. One might also group the neutral

Table 7

Cross tabulation of frequencies for Item 11, I read all of the discussion on the Discussion Board.

		Strongly Disagree		Neutral	Strongly Agree		Total
Course	EDL 685	0	0	0	4	4	8
	EDL 602	0	0	1	5	3	9
	ED 7203 12	3	3	5	5	3	19
	ED 7203 11	1	7	2	4	3	17
Total		4	10	8	18	13	53

responses with the negative responses, a neutral response to reading all the discussions is more likely an acknowledgement that all the discussions were not read. Including the neutral responses, 41.5% of respondents did not read all the discussions, and most of the neutral and negative responses were in two of the four classes. The differences in the discussion board policies and frequency of posts would further enrich these findings.

In comparing the responses to item 12 (Table 8), respondents indicated that they read weekly more positively than they did reading all the posts. Only 15% of respondents indicated a negative or neutral response to the item. ED 7203 12 was more negative than other classes. This

Table 8

Cross tabulation of frequencies for Item 12, I read the discussion weekly (or more often) on the Discussion Board.

		Strongly Disagree		Neutral	Strongly Agree		Total
Course	EDL 685	0	0	0	1	7	8
	EDL 602	0	0	0	5	4	9
	ED 7203 12	1	4	2	7	5	19
	ED 7203 11	1	0	0	6	10	17
Total		2	4	2	19	26	53

may be an indication of Hawthorne effect or something unique to the class reaction to the discussion board. Across all four sections, the majority of students (85%), indicated that they were reading the discussion board weekly. The qualitative data showed that there was wide variability in discussion board use. Some students reported using the board “as little as possible” whereas others in the same class reported their use as “often, I probably checked in about 2 to 3 times per week throughout the semester and participated in most of the discussions.”

One sentiment that was not captured in the quantitative data was the student’s natural comparisons of online and in-class discussion. One respondent was dissatisfied with the asynchronous nature of the online discussions, this student found the two types of discussion (in-class and online) “similar but online were more time consuming – waiting for someone to respond after you posted – and in class was a continual dialogue.” Another student compared the two, viewed the asynchronous format as a boon,

the discussion board conversations are quite different from class conversations because of the reflection time (They give you time to think about your response before typing it and to be more reflective. The same goes for reading those reflections of my classmates. It gives me more time to process them.) as well as the “security” of an online format.

Sometimes people are more willing to share things online than in person.

This perceived difference in the level of candor in the online environment was noted by a different student who noted that the “classroom discussions were more organic. The discussion boards were safe and a bit contrived.” Similarly,

I felt that there was something lacking in the discussion boards. Despite the advantages of reading something that was refined (as opposed to a comment in class) and the opportunity to analyze thoughts at your own pace, the lack of spontaneity left the discussion void of passion.

Even respondents who were dissatisfied acknowledged some benefit to the board, “It [discussion board] is a good means to open up conversation, but in the end I think it was ‘one more thing’ to do that wasn’t overly helpful.” The responses vacillated between the negative aspects of the discussion board requiring more out of class time, and some of the perceived benefits. “I think the discussion board provided a good opportunity to continue discussions from class in a more structured way. Having to actually read somebody else’s thoughts and then compose your own requires a somewhat different approach than participating in class discussion.”

Discussion boards were also vehicles to move student opinions. One respondent indicated that the discussion boards helped to clarify opinions but did not move or change the respondent. “People are far too conservative with the written word, available for public scrutiny.” Another student did not see the discussion boards as useful, but deemed them to be “busy work, that is all” where another found them to be pleasant, but not influential, “while I enjoyed reading the comments, the discussions did not change my interpretation of the topics.” Several others responded that the discussions did not cause them to change how they felt, but rather clarify. “The opportunity to read and respond to other people’s thoughts about a particular

topic helps me to focus my own thinking.” “The discussions helped to confirm my ideas, and even to help me understand certain topics better. Some of the examples other students gave helped to clarify things when I was confused.” These qualitative results confirm the lower frequencies for item 8, only 20.8% of respondents indicated that they either agreed (13.2%, n=7) or strongly agreed (7.5%, n=4) with “I changed my opinion on a topic after reading the discussion.

Discussion/Implications

This research specifically sought to explore the similarities in student perceptions across classes and across campuses, whether students indicated discussion boards informed, changed or helped develop opinions, and what impact the topic had on participation. Beyond the stated purpose of the study there were three major findings in the data: there was a significant correlation between student perceptions of the discussion boards being helpful and participating a lot, fewer students identifying that discussion boards changed their opinions, and overall the discussion board increased weekly class contact time. The specific research questions this study sought to address were:

Are there similarities in student perceptions on the use of discussion boards?

Did students feel better informed and form opinions on discussion topics?

Did students think about topics differently as a result of the discussion?

What is the impact of the topic on student participation?

The last aim of the research was confounded by the myriad of variables present in “real-world” classes. Each of the five classes was instructed to access the discussion board “about” or “at least” once a week, and two classes were given word goals for posts and two classes were told that contributions should be “substantial.” There was no limit placed on how frequently a

student was allowed to post, but in one class there was a minimum of five required posts and in all classes participation in the discussion board was linked to grades, either as a separate grade or as part of the class participation grade. Three classes had topics that were a mix of professor generated and student generated topics, and two classes had topics that were all professor generated. Even with the murkiness of the discussion board directions and the relatively small sample, on eight of the thirteen items, there were no significant differences in the distribution of the responses. As a result the perceptions of students were overall similar across the two campuses with students on both campuses noting both positive and negative features of the discussion boards in both qualitative and quantitative responses.

The qualitative data helped inform the quantitative results, offering a voice to the range of responses seen in the Likert-scale items. Some students found the discussion board offered them a way to participate that they did not feel they had in class, while others saw the discussion board work as artificial and one person called it a “waste of time”. The range of quantitative data mirror this range. The interpretation of neutral responses was problematic, in some cases the respondent choice of neutral was actually a negative response. It may be useful in the future to force the respondent to choose agree or disagree with a 4 point scale that eliminates the neutral option. Since the respondents were students in class, the student may have wished to provide pleasing responses, and so rather than choose a negative response (disagree, strongly disagree) the student chose neutral.

Another challenge in the current data set was the correlation between student perceptions that the discussion board was helpful and reporting that they participated a lot. In order to establish that there is directionality to the relationship, more pointed qualitative responses should be solicited. Currently, there is no way to establish that participating more would make the

student perceive that the discussion boards were more helpful, only that students who felt that they were helpful also participated more. Since it is unlikely that a true experimental study would be employed to determine a causal link, or directionality, qualitative data is best suited to explore this relationship further.

Further exploration of item wording is also recommended. The responses to the class being worthwhile were more closely correlated with students recommending the class than enjoying the class. Interestingly, while responses to enjoying the class were correlated with a desire to participate in discussion board again, responses to the class being worthwhile were not correlated to other items, save a compound item that included two negative statements about the student's behaviors. In repeating this study, it is recommended to separate the ideas in the compound item, "my participation was minimal" and "I did not respond to my classmates postings" as two separate items, possibly rewording one of them to be positive so that there was only one negatively worded item. Having multiple negative items introduces reverse score bias, where in a factor analysis, these items would likely load on a separate factor. Changing the wording to be positive for all the items save one used to slow cognitive processing minimizes the opportunity for this type of bias.

One interesting finding from this study was an apparent resistance to having one's ideas changed by others. This was an unanticipated finding, as both professors believed that the discussion board might be an effective agent for change. There was a lesser aversion in the qualitative and quantitative responses to the word inform, but when the terms influence or change were included, the frequency of positive responses diminished. Further investigation into whether this is a result of the professional roles held by the graduate students invited to participate in this research, or whether this is a result of the individual participant's ego

development should be conducted.

The participants in this research were generally educators. In their job, they have to be perceived as the expert, they influence others. This may make it difficult to switch roles in the evening or on the weekend to be open to having their opinion changed by others. It is also possible, that the participants in this research had not developed past the self-aware (E-5) stage of ego development according to Loevinger's model. Most adults do not develop past this stage, and some do not even reach it (Manners & Durkin, 2001).

As the ego develops in this model the individual holds an increasingly flexible view of the world and their place in it (Manners & Durkin, 2001). Gal and Rucker (2010) state that the beliefs that an individual hold may serve to define and protect the individual's self-concept. They also assert that to avoid the unpleasantness of uncertainty and impact to one's self-view individuals process information in a biased manner. The unpleasantness, or cognitive dissonance, that participants may seek to avoid is, in part, a goal of the professors; to challenge that which the student knew to be true and have the student find a new truth that incorporates new knowledge and increasingly varied sources of information. The Washington University Sentence Completion Test (WUSCT; Loevinger & Wessler, 1970) could be added to the current items to assess participants' ego state, and qualitative questions regarding professional roles and the influence that participants feel they have on nonprofessional activities may help determine if either of these possible explanations fit the data.

Finally, with 85% of respondents indicating that they participated in the discussion board at least one time each week, the findings of this research suggest that discussion boards are a way to extend class contact time. Respondents perceived this in both negative and positive ways. Some students welcomed the opportunities to interact, and others felt the extended contact time

was an imposition. It might be interesting to explore the characteristics of the graduate students participating in these classes and look for predictors of positive and negative reactions to an increase in contact time through the use of discussion boards. It is possible that efforts by universities and professors to offer more to students may leave some students less satisfied.

As more and more campuses are moving to include web enhancements to on-site classes in addition to hybrid and on-line course offerings, the discussion board is becoming an essential tool in a professor's repertoire. Learners of all ages are relying more heavily on both synchronous and asynchronous types of digital communication. The use of learning management software has permitted professors to extend class time, and offers students opportunities to reflect and discuss at their own pace. One student wrote that the discussion board "was a helpful tool in continuing the conversations outside the class...everyone was able to provide input and opinions about a topic. For people that do not like to talk a lot in class, it was a good way for them to relay their thinking and ideas." Discussion boards permit students to process class material and integrate outside experiences and course readings in an individualized way.

Another added benefit of a discussion board is that it helps to build a learning community. One student commented that "The discussion board was a great forum where I felt I got to know my classmates better, which I really enjoyed. Half of our classmates I knew from a previous class but I didn't feel like I knew them until this course."

The findings from the current study offer faculty advice so they can set up discussion board protocols to maximize the interactions they desire. Faculty success is largely determined by student satisfaction. Increasing levels of student satisfaction through careful course design including structuring of web-based discussions can increase student learning outcomes by

creating greater opportunities for students to construct their own learning, to use their experiential knowledge, and to share their learning within their peer community.

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