

Quintana, R. M., Pinto, J. D., Tan, Y. (2021, April). *What We Learned When We Compared Discussion Posts from One MOOC Hosted on Two Platforms*. Paper presented at the Annual Meeting of the American Educational Research Association (AERA). April 9-12. Online.

What We Learned When We Compared Discussion Posts from One MOOC Hosted on Two Platforms

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Abstract: We qualitatively compared discussion posts from a data science ethics MOOC that was hosted on two platforms. We characterized one platform as “open” because learners can see the posts of others before responding and the other as “locked” because they cannot. Our objective is to determine whether these platform differences are consequential and have the potential to impact student learning. Posts on the “open” platform were characterized by failure to address the prompt and showed evidence of reflection and persuasion tactics. Posts on the “closed” platform were characterized by an apparent intent to complete the task completion, assertiveness, and showed a diversity of ideas. We discuss implications findings may have on MOOC platform choice and tailoring tasks to platform affordances.

Introduction

In both face to face and online learning contexts, discussion is a key aspect of social learning (Cohen et al., 2003; Conole, 2014; Kellogg & Oliver, 2014). Within the context of Massive Open Online Courses (MOOCs), fostering rich social interaction is challenging because features of MOOC platforms are limited and instructors must rely on discussion forums as a primary space for learners to interact. There are other potential challenges associated with fostering meaningful peer to peer interaction within MOOCs, including low participation rates (Bruff et al., 2013), limited instructor involvement in discussions (Chandrasekaran et al., 2015), and interface usability issues (Azhar & Santoso, 2019). Yet, despite these known limitations, MOOC instructors continue to include discussion-oriented activities within courses because they offer opportunities for learners to respond to open-ended prompts and engage in higher order cognitive tasks (Ferguson & Sharples, 2014).

The question at the heart of this study is *how might differences in MOOC platform designs influence discussion post characteristics*. A related question is if platform configurations have the potential to shape discussion posts, *why might differences in platform designs matter?* MOOC discussion forum interfaces differ in important ways. Notably, on platforms whose discussion forums we would characterize as “open,” learners are given discussion prompts alongside responses that learners have already given. On platforms that we would characterize as “locked”, learners are shown a discussion prompt and must submit a response before they can view and respond to the posts of others. Given that there are such differences, research is needed to understand whether they are consequential and have the potential to impact learning.

Objectives

To explore this issue, we qualitatively examine discussion posts of learners who enrolled in a data science ethics MOOC offered on two platforms: edX (edX Inc., 2020) and Coursera (Coursera Inc., 2020). The course design was the same in every respect (i.e., all lecture videos and discussion prompts were identical), except that some learners experienced the course on edX and others on Coursera. Specifically, we seek to understand how learners responded when they were shown an active discussion forum prior to submitting a response (i.e., edX) compared to learners who were not shown an active discussion forum prior to submission (i.e., Coursera). Throughout this study, we will call the edX configuration “open” and the Coursera configuration “locked.” Figure 1 illustrates differences in the way that learners interacted with discussion prompts on edX and Coursera, respectively.

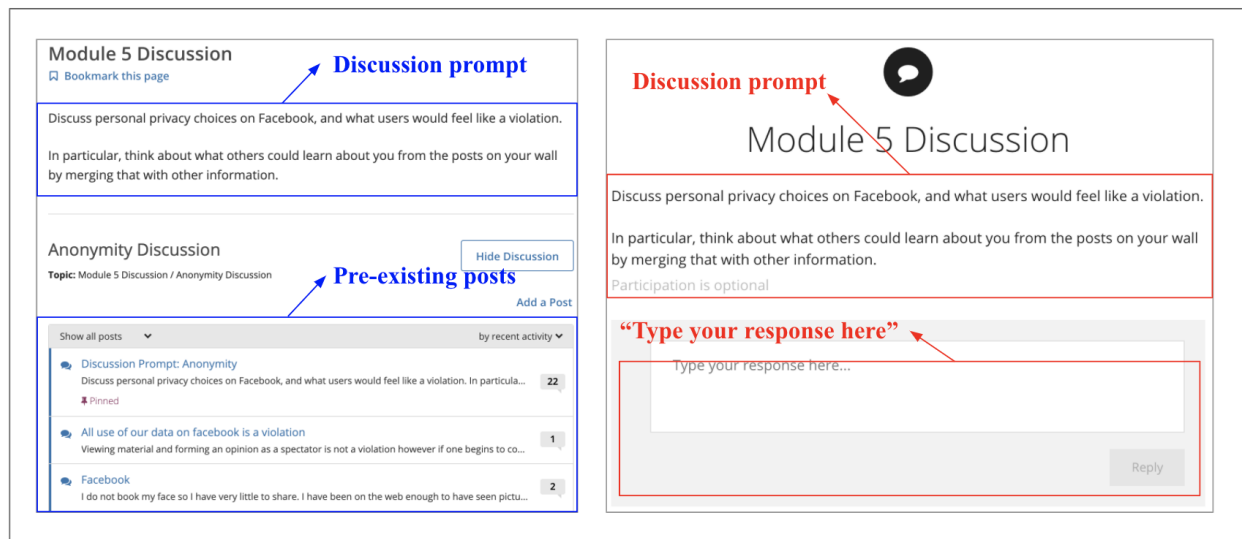


Figure 1: The differences in the way that learners interact with discussion prompts on edX and Coursera. **Left:** On edX, pre-existing posts are visible to learners before they respond to a prompt; **Right:** on Coursera, learners are asked to respond to the prompt without seeing historic posts.

Our ultimate objective is to provide instructional teams with findings to support decision-making around platform choice and to allow them to tailor discussion activities based on platform affordances.

To meet the stated objectives, we pursued the following research questions:

- *In what ways are learners' discussion posts qualitatively different when answered on an "open" platform or a "locked" platform?*
- *How might differences in MOOC platform configurations influence qualitative aspects of discussion posts? (i.e., "open" or "locked")*

Perspectives

Existing research on MOOC platform design has thus far focused mostly on user experience design, including studies that use heuristic evaluation techniques to identify interface problems on individual MOOC platforms (Glory et al., 2019; Hanifa et al., 2019). Research that compares MOOC platforms has also focused on usability (c.f., Tsironis et al., 2016) and user satisfaction with respect to how various platform features support learning activities (Oktavia et al., 2018). Such usability and user studies do not shed light on the intersection of platform design and learning.

The present study examines the same MOOC studied by Tan and Quintana (2019) and Tan et al. (2020). To understand how MOOC platform differences might influence interaction patterns, Tan and Quintana (2019) conducted a cross-platform study to compare learner activity in discussion forums on edX and Coursera using social network analysis. Tan and Quintana (2019) observed critical differences in interaction patterns across platforms, with increased learner-to-learner interaction on edX (i.e., learners responding to pre-existing posts), and reduced learner-to-learner interaction on Coursera, with learners responding to discussion prompts directly (i.e., rarely engaging with pre-existing posts). In a related study, Tan et al. (2020) examined the motivation of the most engaged learners on both platforms and found that edX learners were more interest-driven and Coursera learners were more motivated by career advancement.

Building on earlier work, our present study aims to scrutinize the *content* of learners' discussion posts and so qualitative approaches must be considered. Although qualitative methods are rarely used in at scale learning environments, Wong et al. (2015) provides an example of identifying the types of knowledge exchange associated with Bloom's taxonomy occurring in a MOOC discussion forum. Such qualitative approaches are more commonly found in formal higher education contexts that are not implemented at scale (e.g., Hara et al., 2000).

Methods

Data

We examined discussion posts from a data science MOOC created by a large U.S. Midwestern university. The course presented a series of case study videos that provided a basis for engaging in discussion around issues such as who owns data and how do we value privacy. The course contained eight modules, with one case study and discussion prompt per module.

We analyzed discussion posts from two modules of the course, called Prompts 1 and 2 in this study (see Appendix A). The first prompt asked learners to consider whether or not customers should be informed or give consent when a company uses their data to inform market strategy and a journal article. The second prompt asked learners to express concerns about validity with respect to the design of a survey.

We examined data from only the first six months that the course ran on each platform to eliminate the potential effects of a platform marketing intervention. On edX, 6058 learners enrolled and 1204 learners enrolled on Coursera during this timeframe. We studied only *direct responses* to prompts because we wanted to understand how platform configurations (i.e., “open” or “locked”) might influence qualitative aspects of discussion posts *at the point of interaction* with the prompt itself. Our dataset consisted of 110 Coursera posts and 16 edX posts for Prompt 1 and 54 Coursera posts and 14 edX posts for Prompt 2.

Approach to analysis

We employed a conventional content analysis, which starts with observation of the data and derives codes directly from the data (Hsieh & Shannon, 2005). This method was well-suited to our study because existing literature on the intersection of platform configuration and discussion post content is extremely limited. We collected and uploaded data into a cloud-based, qualitative software, which allows for collaborative coding by multiple users. The primary coder first created a preliminary codebook using an inductive and iterative approach to category creation (Thomas, 2006). They then coded 30 posts each from prompt 1 (alongside coder 2) and prompt 2 (alongside coder 3). After meeting and discussing the results, the primary and second coder established a pooled Cohen’s kappa (de Vries et al., 2008) of 0.73 for question 1 using 30 different excerpts, and the primary and third coder established a pooled kappa of 0.89 for question 2 using another 20 excerpts. The second and third coders then coded the rest of the dataset for Prompts 1 and 2, respectively, using the finalized codebook (see Appendix B).

Results and Discussion

Enrollment was five times higher on edX than on Coursera, so it seemed that there was a disproportionately low number of posts on edX compared with Coursera. We can posit several possible explanations, including that Coursera's linear platform design makes it appear that learners must progress sequentially through all course items. Another reason could be the visibility of all learners' posts on edX offers learners many posts to peruse, leaving them with less inclination or time to submit a response of their own.

Characteristics of discussion posts on the “open” and “locked” platforms

Prompt 1 findings:

- We coded whether learners addressed all aspects of the prompt completely, partially, or not at all. Learners who took the MOOC on the “locked” platform answered the prompt in its entirety more often than those on the “open” platform. Learners on the “open” platform failed to answer the prompt 37.5% of the time, whereas learners on the “locked” platform did not answer the prompt 7.3% of the time (p-value of 0.0003, indicating very high statistical significance despite the small “open” platform sample size).
- For each response, we coded whether learners' intent was to complete the task, persuade, or reflect. On the “locked” platform, 31.8% of responses were coded as “intent to complete task” (as opposed to 6.3% on the “open” platform, with a p-value of 0.035). Learners on the “open” platform demonstrated evidence of reflection and persuasion tactics.
- For each response, we also coded confidence levels, either assertive or tentative. Responses were generally more assertive on the “locked” platform (50.9%) compared to the “open” platform (43.8%).

Prompt 2 findings:

- We observed a wider *variety* of responses on the “locked” platform, indicated by the fact that three of our codes (n=12) only applied to this, and not the “open”, platform.
- We also observed a unique phenomenon in the “open” platform where learners referred to others' posts.

Learners on the “locked” platform may have viewed posting as a necessary task within a learning sequence. Learners may have perceived that providing a response was merely fulfilling a requirement that allowed them to move towards a goal of course completion. These responses had a more “assertive” level of confidence and used language that was clear and sure. The “locked” platform design seemed to cultivate attributes of efficiency and task completion.

Learners on the “open” platform may have failed to answer the prompt because they saw that other learners had already provided a valid response and therefore did not see value in reiterating what had already been said. Instead, they offered a different perspective that might have been complementary, but could not be coded as “completely answers the prompt.” We also witnessed reflection and persuasion tactics on the “open” platform. It is perhaps surprising that learners engaged in reflective activity in the presence of others, but they may have seen value in sharing formative ideas to build community. Additionally, as learners were aware of other perspectives, it is not surprising that they referenced existing ideas and engaged in persuasion tactics to convince others of the validity of their own views.

Scholarly Significance

Our study shows that differences in platform configurations do promote qualitative differences in discussion posts, which have the potential to impact learning. If it were important for every learner to engage directly with ideas presented, it would be worthwhile knowing that “open” platforms do not necessarily advance that goal. If an instructional objective is to promote deep reflection (Boud et al., 1985), a “locked” discussion forum design may not necessarily foster that activity. If showcasing diversity of ideas shared within a community was a pedagogical goal (Scardamalia & Bereiter, 2006), an “open” platform design might not achieve this. In fact, we found that learners on the “locked” platform also presented a wider range of ideas, which suggests that a productive instructional strategy could be to ask learners to engage with an idea individually before sharing with the larger community (as on Coursera). If providing opportunities for learners to make a persuasive argument was a critical instructional objective, then situating discussion prompts within an “open” platform could help achieve this objective. Our study provides insight into how “open” and “locked” designs have the potential to shape the way learners respond to discussion prompts and can thus guide instructors towards making decisions about MOOC platforms and instructional activities situated within a learning sequence.

Our study contains some limitations, including a relatively small sample size with an uneven distribution of responses across platforms. Additionally, we only studied responses to two prompts from one MOOC. Given that there is limited research about how discussion forum configurations impact discussion post responses, we hope to build on the present study and conduct future research that examines other cases of MOOC discussion prompts that are hosted on multiple platforms.

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Appendix A

Prompts 1 and 2 were the basis of discussion posts we examined in this study

<p>Prompt 1</p> <p>Company X has learned about Facebook’s mood manipulation experiment, and believes that a happy person is much more likely to buy than a grumpy one. Therefore, it has designed its web site to tell heart-warming stories in callout boxes on every page. These stories, at best, are tangentially related to the products being sold on the page. They A/B test this web-site before launch to see if the story boxes do have the intended effect. They find that the boxes do have the desired effect of increasing sales. They then adopt the new website design with the story boxes, and they write an article describing their findings in a Marketing Journal.</p> <ul style="list-style-type: none"> ● Does Company X need to inform its customers about this effort? To what extent? ● Does it need to obtain consent? If so, for what? <p>If you answered YES to the consent question above, what is the smallest change to the scenario described above that would make you change your answer to NO.</p>
<p>Prompt 2</p> <p>Seeking to expand their business and improve their product, suppose that Amazon sends a survey to all Kindle owners asking them what they like and dislike about their Kindle. What validity concerns would you have about the survey results obtained. If the primary goal is to grow Kindle sales, what could Amazon do to get more valid data.</p>

Appendix B

Codebook we used to analyze posts in Prompt 1

Code	Description	Example(s)
Answers prompt: Yes	The response fully answers the question(s) in the prompt. It includes a response to the two main questions included in the prompt (i.e., a reference to inform and to consent).	<i>I don't believe that Company X needs to inform its customers about this effort or obtain consent. Company X is doing a straight A/B test - they are not conducting an experiment to see whether the stories change buying behavior - rather they assume that this is true at the start based on Facebook's experiment and are simply comparing two website designs - with and without stories - and measuring which drives greater sales.</i>
Answers prompt: No	The response does not fully answer the question(s) in the	<i>I think the ethical problem is not so much the experiment, but what the limits are to manipulating the weaknesses of humans into</i>

	prompt.	<i>buying stuff. For instance the idea that pictures of your friends and family can be used to generate a personalised advertisement. It will subconsciously cause you to believe the message, because your brain recognises your friends trades. That is unethical.</i>
Answers prompt: Partially	The response partially answers the question(s) in the prompt.	<i>Yes I think Company X needs to inform its customers about the experiment so that they can have a right to withdraw if need be.</i>
Intent: Complete task	The response indicates that the learner simply wanted to complete the task. These responses are often succinct and to the point, with no explanation of the reasoning behind the response.	<i>yes they should inform. yes take consent .</i>
Intent: Persuade	The response indicates that the learner is trying to persuade others as to why they are correct. These responses may use explanations, examples, and/or rhetorical moves in an attempt to prove a point.	<i>I don't believe that Company X needs to inform its customers about this effort or obtain consent. Company X is doing a straight A/B test - they are not conducting an experiment to see whether the stories change buying behavior - rather they assume that this is true at the start based on Facebook's experiment and are simply comparing two website designs - with and without stories - and measuring which drives greater sales.</i>
Intent: Reflect	The response indicates that the learner is using this space as a self-reflection of their own thought processes. These responses are often written in a stream-of-consciousness style. They may also consider opposing views in a sort of self-dialogue.	<i>I feel like the people in this experiment should have been notified. Although I feel like it should be a very vague notification so it doesn't mess with the data. It could go either way but consent from the users would be good because this was affecting their emotions. I would have added a small page that would ask you if you would like to participate in a test but be vague.</i>

<p>Confidence: Assertive</p>	<p>The response uses language that is sure and direct.</p>	<p><i>The company does not have to obtain consent from its customers in this scenario. They did not obtain any customer info per se, and any action on behalf of the customer was of their own informed accord. The action of the company to use feel-good stories to accompany their product pitches is the very essence of the discipline known as 'marketing.'</i></p>
<p>Confidence: Tentative</p>	<p>The response uses language that is not entirely certain of itself, such as “I think,” “perhaps,” “it seems,” etc.</p>	<p><i>I think the company should provide a statement in their terms of use letting the public know that they will use their data to improve the site (this would include improving sales). I think this is standard business practice and is understood (i.e. ethical). Publishing in a journal is research and requires informed consent.</i></p>
<p>Examples: External</p>	<p>The response uses examples not found in completed parts of the course.</p>	<p><i>As long as they are not lying, the practice is acceptable. Turn on your TV set and look at any ad. My favorite example at this moment is for a product being pitched to people with non-small cell sarcoma of the lung, which if you read the fine print accompanying the ad says that in clinical trials it raised the lifetimes of the subjects on the average by 3 months. The ad shows happy, smiling people, and repeatedly promises a longer life. In reality, someone with end stage lung cancer is not out walking around or watching baseball games. Is the ad ethical? Absolutely. It makes no false promises or claims. Is it realistic? No less so than the ad for the baldness product that shows the 'after' guy hand in hand with a beautiful woman. I challenge my fellow students to cite a single example of an advertisement that does not attempt to place the viewer or reader in a happy mood. Some of the most successful ads in all history were ones that were simply humorous, barely even mentioning or showing the product being sold. For those of you old enough to remember, VW beetle ads; Alka-Seltzer.</i></p>
<p>Examples:</p>	<p>The response uses</p>	<p>Yes.</p>

Internal	examples found in completed parts of the course. E.g., Facebook, OKCupid	<i>There is a fine line between research and business though. For business purposes you are not required to explicitly ask for consent. But after Facebook and OKCupid's experiment, and the backlash they faced, it makes sense to have this written in the terms of service/privacy agreement.</i>
References other posts	The response makes reference to other posts in the same module.	<i>I think this sort of thing is fine, and it's primarily because of context. A company website exists first and foremost to sell the company's products, so anyone visiting the website may reasonably expect to be marketed to. Even small improvements in the UI can lead to more 'desirable' (i.e., buying) behavior, and these are common and well-researched tactics as well. I think it would become unacceptable if the company strongly implied that these were testimonials; or lied about the tactics when directly questioned; or as R_Streeter said, didn't anonymize the information.</i>

Codebook we used to analyze posts in Prompt 2

Code	Description	Example(s)
Validity concerns: Sampling bias	The surveyed sample isn't representative of the target population, or the surveying method itself is otherwise problematic. For example, only surveying existing Kindle customers negatively impacts validity.	<i>My primary validity concern would be the choice of a representative sample. Current Kindle owners will probably not be representative of the (potential) user groups Amazon would like to sell new Kindle's.</i>
Validity concerns: Participation bias	Similar to sampling bias, but in this case the unbalanced representation arises from people choosing to participate or not. Those who choose to	<i>Persons who are very happy or very unhappy with their Kindle may be more inclined to respond versus those who don't feel as strongly one way or another. The unbalanced response rates might affect validity.</i>

	respond may share attributes not representative of the target population.	
Validity concerns: Other selection biases	<p>Other validity concerns dealing with the group that is being surveyed.</p> <p>Examples include:</p> <ul style="list-style-type: none"> • Respondents may rarely use their Kindles • Kindle customers may not be the consumers • Kindle model differences • Possibility of low response rates • Customer saturation 	<p><i>The first validity concern (supposing that the survey is sent via an email which could be accessed in any device) would be if it is sent to the correct person i.e. it should be a current and active user of the device for a relatively accurate response. If the survey is sent to an in-built kindle application then the above thing won't be a concern. So supposing the second possibility the next validity concern would be of demographics. If the survey doesnt collect info like sex, age, ethnicity and even income levels then the survey data would have to be taken as a very broad based data set which won't be useful for them to customise their product for particular target groups.</i></p>
Validity concerns: Poor-quality responses	<p>The quality of the responses themselves may lead to questionable validity.</p> <p>Examples include:</p> <ul style="list-style-type: none"> • Skewed results based on current events • Subjective responses • Purposefully misleading responses 	<p><i>Secondly, this method will yield subjective data - only things the users are aware of, sometimes possibly being a hypothesis that is not true.</i></p> <p><i>Furthermore, some users (competitors?) might intentionally enter incorrect data.</i></p>
Validity concerns: Leading questions	Asking questions on the survey that may sway participants to answer in a specific way.	<i>Asking users what is liked and disliked will likely steer users away from a neutral rating, compared to asking users to merely give their reflections about their purchase.</i>
Improving validity: Include non-Kindle-owners	<p>The survey should also be sent to people who don't already own a Kindle.</p> <p>Examples include:</p>	<i>I'd advise amazon to include a random sample of all Amazon users to get more valid data. This sample will be more representative of all people that might be interested in buying a Kindle.</i>

	<ul style="list-style-type: none"> ● Target other Amazon customers ● Target regular book readers 	
Improving validity: Alter sampled group in other ways	<p>The surveyed group should be modified in other ways.</p> <p>Examples include:</p> <ul style="list-style-type: none"> ● Ideas for increasing response rate ● Survey newer Kindle owners 	<i>Amazon could offer a gift card to have focus groups done where they can select the demographics they want to know more about.</i>
Improving validity: Survey content/design suggestions	<p>Specific suggestions for the types of questions that should be asked on the survey or the survey’s design in order to improve validity.</p>	<i>Amazon could ask to every amazon user that doesn't bought a kindle device if there is a reason why they did not, and if they have bought another ebook reader, why they preferred it to the kindle, and of course, to those that have bought it, if there is something that they would change or improve in a future version.</i>
Improving validity: Alternatives to surveys	<p>An alternative data-collection method should be considered—something different than surveys.</p>	<i>To get data that was more valid, Amazon could invite non-users to participate in paid focus groups or demos where they used a Kindle and shared about their experience.</i>
Improving validity: Control for representation biases in the analysis	<p>The analysis stage of the study should include ways to account for representation biases in the sample. This often includes taking varying demographics into account.</p>	<i>Amazon must make a random sampling of those who have Kindle and still use it. Segmentation must be based on location, age, gender, education level, occupation, income range and the model that they bought as. Societal practices may be relevant to usage patterns, occupation is necessary as some professions require a lot of reading while certain others read out of interest. Similarly medical certain conditions that happened after purchase of Kindle that prevent them now from using Kindle comfortably needs to be taken into consideration.</i>

		<i>The segmented population must be weighted when the number isn't equal it's most often unlikely to have an equal number.</i>
Improving validity: Anonymous/confidential feedback/data	Considerations regarding the anonymity/confidentiality of participants may contribute to increased validity.	<i>Confidentiality must be assured and that details collected will not be sold to third parties or be used for other purposes not meant for at the time of data collection.</i>
Additional points not directly related to validity	The learner's response includes suggestions/thoughts that are actually unrelated to the validity of the proposed study.	<i>Among the responses, Amazon can find some that have a good suggestion on how to improve the product. In this sense, the survey can provide valid input.</i>