Characterizing Growth and Decline in Online UX Communities

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ABSTRACT

UX practitioners increasingly rely on online communities to collaborate on and discuss complex design problems. Understanding how these platforms flourish is thus of interest to both HCI academia and the broader UX discipline. In this study, we comparatively investigate the longevity of two such groups: the r/userexperience community on Reddit and the UX subforum on Stack Exchange. By quantifying how users post online on aggregate and what users discuss in their individual posts, we find that Reddit has grown consistently as a digital forum for UX practice. In contrast, Stack Exchange has contracted despite being more responsive and being as capable of addressing mainstream UX concepts as Reddit. Discussions of niche, higher-level UX concepts on Stack Exchange also declined disproportionately, leading to less conceptual diversity. Our results therefore contribute an initial comparative understanding of community longevity between online UX platforms.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; **Empirical studies in collaborative and social computing**.

KEYWORDS

UX practice, online communities, forums, platform growth

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1 INTRODUCTION

The field of user experience (UX) design has grown rapidly over recent years, leading to multiple online communities like UX Stack Exchange and Reddit's r/userexperience becoming popular forums for the exchange of ideas and feedback for UX practitioners. These online communities are therefore key resources for the UX discipline thanks to the support they provide to the design process. On the one hand, they provide accessible, global platforms for collaboration [16, 30]; on the other hand, they can help address informational needs via question-and-answer (Q&A) practices [19]. It is therefore critical that UX practitioners have access to thriving online communities with their peers.

While there is a rich set of literature on the growth and sustenance of other online communities [2, 3, 6, 29], there is little similar research on UX communities where discursive participation is central to the discipline [22]. For example, existing work on UX communities has analyzed design ideas [1], social roles [20], and UX concepts [19]. However, to our knowledge, there is no large-scale, longitudinal study on the stability of online UX communities.

We therefore conduct an exploratory, quantitative study of the digital health of online UX communities. We operationalize this as platform growth, i.e. the extent to which discussion and activity thrives online. To focus our study, we consider two of the largest discussion-orientated platforms: the UX subforum on Stack Exchange, and the 'r/userexperience' subreddit community on Reddit.

We guide our work on these forums with two research questions: **RQ1**: *How do different UX platforms compare in their longevity and growth?* **RQ2**: *Are changes in the discussion of UX concepts associated with changes in community size?* To address these questions, we conduct a quantitative investigation of the complete posting histories of the two forums from the start of 2012 to the end of 2019. This consists of two approaches. First, we conduct longitudinal analyses of aggregate posting behaviors across this time period, such as unanswered posts per year. Second, we adapt simple language processing techniques [19] to compare UX concepts mentioned over time in individual posts.

Overview of results. By comparing UX community participation patterns on Reddit and Stack Exchange, we find that the former has been consistently growing in activity, whereas the latter has declined since a peak in 2014. We also discover evidence suggesting that community responsiveness is not the main factor behind contracting UX communities, despite the discipline's emphasis of active discourse. Thus, other factors like social and moderation norms are likely stronger predictors of community growth.

Furthermore, we observe that lower-level UX concepts like interface elements are over-represented in both communities, whereas uncommon, theoretical concepts like affordance become disproportionately rarer as communities shrink. Together, these results serve as a first step to understanding how UX communities comparatively flourish and decline through differences in digital discourse.

2 BACKGROUND AND RELATED WORK

In recent years, the field of UX has experienced rapid development as evidenced by high job and skill demand [11]. This has coincided with a rich body of literature in academic research on UX practices. For example, researchers have explored the UX knowledge generated online [17, 19], design ideas [1], UX concepts [13, 19],

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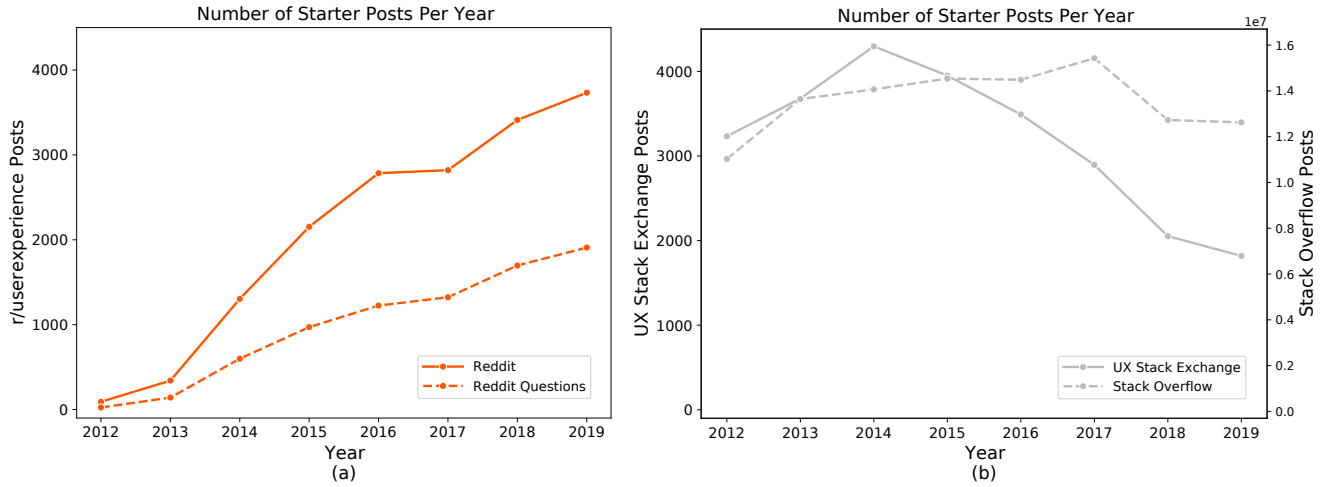

Figure 1: *(a)*: annual number of all submissions and submissions with questions on r/userexperience; *(b)*: annual number of posts on the UX Stack Exchange and Stack Overflow.

and UX education [12, 28]. Methods range from qualitative [17] to quantitative [1], with techniques involving text analysis [19] to surveys [21, 22]. However, many have cited the need to study real-life, everyday UX practices *in situ* [13, 15, 19, 21], illustrating the need to understand how online forums support UX communities.

Because UX practitioners tackle heavily subjective problems in their work, online communities provide opportunities for brainstorming, sharing ideas, and gathering feedback [13, 22]. Furthermore, both new and experienced UX practitioners increasingly rely on them to explore and develop design knowledge [17, 19]. Indeed, since design problems are often complex and inherently context-dependent, pre-existing offline resources may not be able to adequately address individual UX needs [22]. These studies thus highlight the importance of online forums to the UX community, and suggest the need to maintain active platforms to help UX practitioners connect to each other and informational resources. Two such platforms, r/userexperience and UX Stack Exchange, are frequently studied due to their popularity amongst both UX amateurs and professionals [14, 17–20]. However, despite this academic interest, we found no existing work comparatively analyzing their participants' discursive behavior nor their growth and longevity.

Outside of research on UX communities, community stability has long been a subject of scientific interest. For example, churn analysis is a common approach for measuring the survival of community platforms [25, 27]. Some suggest that engaging a core of power users is critical for initial growth, while fostering participation of casual users is likewise crucial for medium to long term stability [26]. This is echoed in studies that identify how user roles contribute to the composition of a community and its long-term health [5]. On Q&A sites in particular, work has identified ways to predict the long-term value of questions [3], as well as the responsiveness [6] and retention [7] of answer-providers.

In the present study, we take inspiration from these approaches to investigate whether UX communities should be similarly concerned with platform sustenance. We draw on quantitative, data-driven approaches to measuring community health from the perspective of activity on discussion threads [6, 25]. We supplement this with an analysis of UX-specific concepts [19] and their relationship to community longevity between different online platforms.

3 METHOD

Our study takes two approaches. Firstly, we perform a longitudinal, quantitative analysis of forum discussion traces, scrutinizing broad metrics of activity and growth such as user contributions to discussion threads. We then derive finer-grained understanding of post attributes by applying text-based analysis, such as the UX concepts mentioned in posts. These two methods correspond to measuring *how* users post content and *what* they post on UX platforms.

Data. We focus our work on the UX Stack Exchange and the "r/userexperience" subreddit on Reddit. All data from the UX Stack Exchange is publicly accessible as part of Stack Exchange's broader periodic data dump[1], which we preprocess through a `postgresql` instance. In contrast, we obtain Reddit data by using Pushshift.io's API[2] to gather all submissions and comments in the subreddit.

Stack Exchange is a Q&A site, with top-level questions and answers categorized as posts. Comments on Stack Exchange are separately categorized and not explicitly nested in its user interface. Reddit, in contrast, treats a thread's initial post as a "submission" and the rest as "comments". Comments can have nested comments. Unlike Stack Exchange, Reddit does not follow a universal Q&A structure, although users often use submissions and comments as Q&A threads. For comparability, we therefore consider only the questions and answers on Stack Exchange, and the submissions and immediate comments (first nest level) on Reddit. We label these as "starter" posts and "responses" on both sites. Note that on both sites we ignore, and thus undercount, responses to starters contained in lower-level comments.

[1] Available at https://archive.org/details/stackexchange.
[2] Details available at https://github.com/pushshift/api.

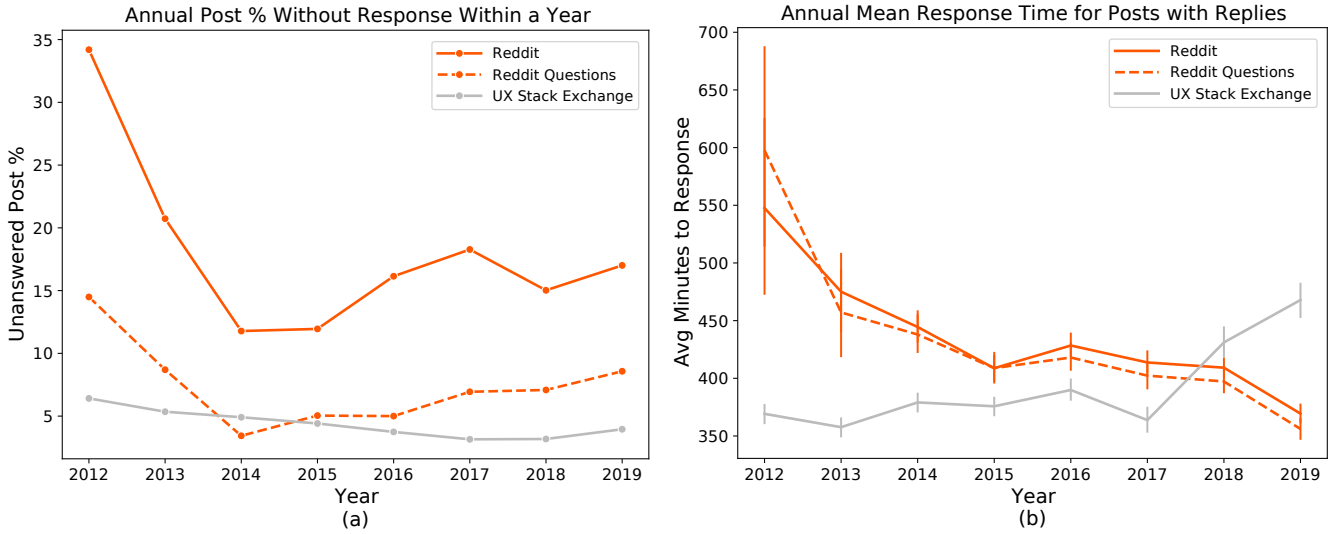

Figure 2: *(a)*: annual percentage of r/userexperience submissions, questions, and UX Stack Exchange posts without reply in 365 days; *(b)*: mean response time for posts with eventual replies in the same timeframe. Error bars are 95% confidence intervals.

From 2008 to 2020, we obtain 29827 starters and 78036 responses from Stack Exchange, and 21054 starters and 56709 responses from Reddit. Due to low activity before 2012 and the exogeneous effect of COVID-19 in 2020, we further restrict our analysis to years between 2012 to 2019 to obtain 25416/64393 and 16639/43102 entries respectively. We remove bot and auto-moderator posts by checking user handles, such as "AutoModerator" and names ending in "Bot".

Text Analysis. In addition to measuring the broad trends presented by posting behaviours, we also consider the text contained in individual posts with HTML tags and embedded code removed. For both datasets, we also tokenize the text and lemmatize words, before applying a part-of-speech (POS) tagger using `nltk`. We further apply Kou and Gray's keywords for UX concepts on the nouns in posts' titles and body text after processing [19]. Although originally meant for Stack Exchange specifically, this framework translates well to r/userexperience in practice with appropriate language processing (e.g. removing stopwords and deleted posts); see Section 4.2. We obtain a set of UX concepts mentioned per post from this, which we de-duplicate to prevent confounding from text length.

Because Stack Exchange starters are typically questions whereas Reddit contains a mixture (questions, links to external sites, expressions of gratitude/frustration, memes, etc.), we also label Reddit posts as questions if the POS tags contain a question mark. Although oversimplified, this approach labels 93% of Stack Exchange questions correctly, which we believe to be adequate for the present study. 48% of Reddit starters are questions according to this method.

4 RESULTS

Our results consist of two parts. First, we delineate the longitudinal posting trends in the UX Stack Exchange and r/userexperience that highlight differences in community longevity. This reflects *how* users post online. Then, we explore *what* community members post about by analyzing common UX concepts in submitted text.

4.1 Patterns of Growth and Decline Between UX Communities

We first analyze the simplest measure of community activity on these forums: the number of posts contributed by users. Figure 1 illustrates the number of starter posts made per year with two baselines: the starter posts with questions on r/userexperience (a), and the posts on the broader Stack Overflow platform (b).

Some interesting observations are immediately noticeable in this analysis. Firstly, r/userexperience has grown steadily over the past 8 years as an active locale of UX discourse. The annual number of posts grew quickest between 2013 and 2016 by more than a multiple of 8. Note that the number of questions in the subreddit traces the overall growth, suggesting that mixed Reddit submissions like sharing links do not detract away from question posting behavior. Instead, questions are undiluted or even complimented by content that do not explicitly seek advice or informational assistance. As a multipurpose platform, r/userexperience exhibits clear signs of community longevity.

However, the UX Stack Exchange displays a contradictory trend. Unlike r/userexperience, its posting activity has not only flattened but also shrunk steadily since 2014. In fact, the 1819 questions in 2019 were only 42% of the peak in 2014. One may wonder if this were attributable to the Stack Exchange platform as a whole, but this appears only to be partially the case. Stack Overflow, the most popular branch of the platform for programmers, also stagnated after 2017. Nonetheless, it had been growing before this point, even as participation in the UX Stack Exchange began to drop rapidly in 2014. Thus, it appears that the UX community on Stack Exchange fell into a steep decline unlike r/userexperience, and also started contracting significantly earlier than the larger Stack Overflow.

In addition to the number of starter posts, we also considered activity metrics such as comments, unique active users, and first-time posters. We found the same trend as in Figure 1 across all of

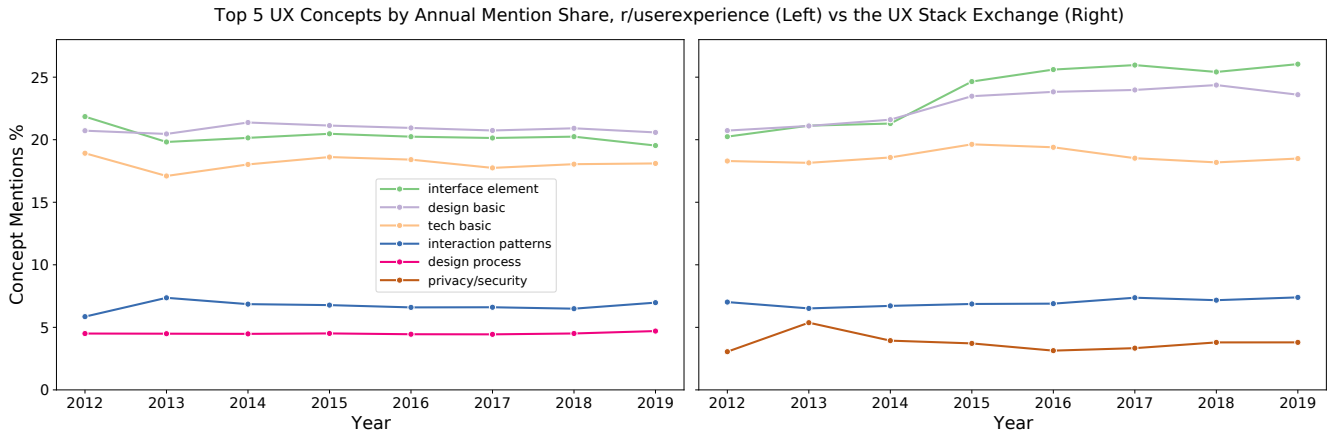

Figure 3: Annual mention percentage of top 5 UX concepts mentioned in starter posts on *(a)* r/userexperience and *(b)* the UX Stack Exchange. Design Process and Privacy are respectively the 5th-ranked concepts on Reddit and UX Stack Exchange.

these variables: r/userexperience has steadily grown over the past decade, whereas the UX Stack Exchange has declined significantly since its 2014 peak. Thus, while the ratio of e.g. authors to posts remains approximately stable between years for both platforms (≈ 3 posts per author), Stack Exchange's general reduction in activity means fewer UX practitioners engage with the platform over time.

A possible factor driving growth and deterioration is whether community participation in the form of posts is reciprocated by responses [6, 7]. For example, one may envision that a user whose posts are ignored would become less incentivized to post in the future. To investigate this, Figure 2 depicts the annual percentage of posts without replies within 365 days (a), and the average time to response for posts that do receive replies (b).

Surprisingly, despite the clear differences in post activity between r/userexperience and the UX Stack Exchange in Figure 1, questions on both platforms are replied to at a similar rate. In fact, the UX Stack Exchange has a consistently low, decreasing rate of starter posts without responses in spite of its overall activity decline. Questions on r/userexperience are also likely to yield a response within a year, albeit with slightly higher rates of unanswered posts. When considering posts overall (including non-questions) on r/userexperience, we find significantly higher levels of ignored starters than on Stack Exchange – over the last 5 years, 15.7% of Reddit submissions had no comments. Together, these observations suggest that ignored posts are not responsible for the UX Stack Exchange community having stunted growth.

We also find that, of the questions that *do* receive answers, the UX Stack Exchange has a record of prompt replies even when its size began contracting in 2014. In contrast, Redditors were slower to respond to both questions and non-questions until after 2018, when Stack Exchange response speeds began to slow. This reinforces our finding that UX communities' responsiveness to others is likely an effect, not a key prerequisite, of flourishing discourse.

With respect to **RQ1**, our results provide evidence that UX communities online have comparatively different rates of growth – Reddit has continuously grown, whereas Stack Exchange has strikingly declined since its peak in 2014. These effects also do not seem to be driven by community responsiveness, with the UX Stack Exchange maintaining low rates of unanswered questions and quick response times. This is particularly surprising given established research on the importance of replies to community success [6, 7].

4.2 Individual Posts and UX Concepts

We have thus far identified that *how* users post on online forums can contribute to community growth and decline; we now turn to comparisons of *what* users post on Reddit and Stack Exchange in terms of actual text. Text-level analyses are important not only because they uncover the actual content available for users to consume, but may also reveal the effects of different social norms and community moderation rules on discussion topics.

We follow recent work on UX concept hierarchies on Stack Exchange and apply Kou and Gray's framework to both platforms in our study [19]. Because Section 4.1 uncovered evidence that growth is unlikely driven only by replying behavior, our current investigation focuses on the content of starter posts. Figure 3 traces the top 5 most frequent concepts mentioned in starter posts' titles and body text, expressed as a percentage of all unique concepts mentioned per post each year. For example, if a post contains "button" and "persona", this counts as mentioning the Interface Elements and User Research concepts. If this were the single mention of User Research in 50 posts containing 2 concepts each (100 concept-mentions), then User Research would have a 1-percent share of mentions that year.

We find the top concepts to be surprisingly similar in both r/userexperience and the UX Stack Exchange: Interface Elements, Basic Design, and Basic Tech concepts have by far the largest share of mentions, accounting for around 60% of concepts contained in posts for both platforms. They are followed by Interaction Patterns at 6.8% and 6.9% respectively across the entire dataset. Although not shown in Figure 3, Privacy/Security, Design Process, and User Research occupy the next spots in slightly different orderings for both communities.

This suggests two observations about how users discuss UX concepts. Firstly, the bulk of the posts mention at least one of the top 3 concepts in Figure 3 (each concept appears in over 40% of

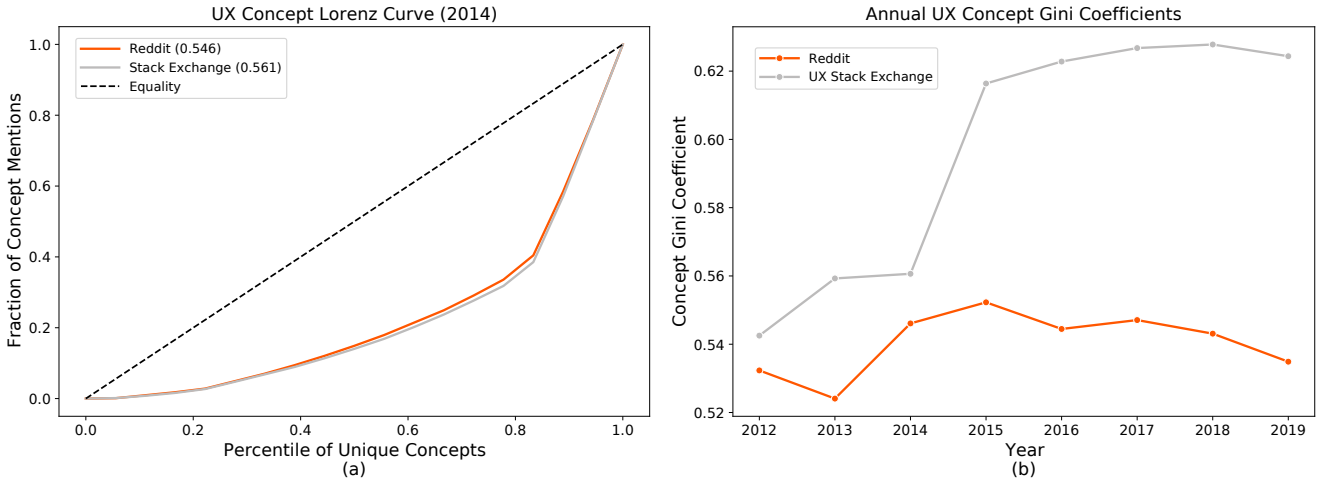

Figure 4: *(a)*: Lorenz curve of UX concept mentions in 2014; each (x, y) point illustrates y shares of mentions given to the xth fraction of concepts by popularity. $x = y$ represents perfect equality. *(b)*: Gini coefficient (area between equality and Lorenz curve) per year; 0 indicates perfect equality and 1 total inequality.

posts with non-empty body text on both platforms). Because these pertain to lower-level UX notions like buttons, menus, and UI [19], it appears that members of online UX communities largely begin discussions around some concrete aspect of design implementation. This further hints that both r/userexperience and the UX Stack Exchange are able to address the discursive needs of those who wish to discuss implementation details, even if the latter is systematically shrinking in size. Thus, discussion of lower-level UX concepts seems to be associated with neither community growth nor decline.

However, we also observe that the top concepts in the UX Stack Exchange become much more prevalent after 2014. This likely means that rarer concepts received even fewer shares of discussion over time on the forum. To investigate this, we use the Lorenz curve and corresponding Gini coefficient in Figure 4a. This method plots how many community members receive a certain share of the community's goods, allowing for quantification of how egalitarian a community is [8]. In our case, we measure how many mentions are received by concepts on r/userexperience and the UX Stack Exchange in total across the 2012-19 time period. The Gini coefficient corresponds to the area between the Lorenz curve and 100% equality, where n% of concepts receive exactly n% mentions. Higher values indicate more inequality.

We find that both platforms show some evidence of the classic Pareto principle, with 80% of mentions coming roughly from 30% of the concepts. This indicates a fair amount of inequality in terms of community discussions, with a few mainstream concepts being present in a majority of threads. In contrast, there are many niche concepts that rarely occur, such as Visualization, Accessibility, and Information Architecture (< 1% mentions in both platforms).

Nonetheless, concept inequality in Stack Exchange is relatively unstable over time compared to Reddit. Figure 4b plots the Gini coefficients of yearly Lorenz curves in both platforms. While this hovers around 0.54 each year for r/userexperience, the UX Stack Exchange's Gini value increases significantly from 0.56 in 2014 to 0.62 in 2015. This coincides with the community's contraction starting in 2014 depicted in Figure 1, suggesting that Stack Exchange's decline is disproportionately associated with reductions in discussions of niche concepts. Between 2014 and 2017, for example, the share of mentions shared by the rarest 5 concepts dropped from 4.9% to 4.7% on Reddit, whereas on Stack Exchange they dropped from 4.8% to 3.3%. In other words, conversions around more abstract, higher-level UX concepts were the first to leave the UX Stack Exchange when it began shrinking.

Thus, with respect to **RQ2**, our current work shows that individual posts on r/userexperience and the UX Stack Exchange have very similar distributions of popular UX concepts. Because there is no drop in discussion of mainstream, low-level UX concepts, it is unlikely that these concepts are responsible for UX practitioners leaving Stack Exchange at the rapid pace shown in Section 4.1. However, we find evidence that niche, high-level UX concepts became disproportionately more rare when the platform began to shrink. We speculate on the implications of this finding below in Section 5.

5 DISCUSSION

In summary, our results are as follows. In terms of **RQ1**, we find that online UX communities do not grow at the same pace. Despite growing public interest in UX and its positive reputation, the UX Stack Exchange's yearly activity has contracted by more than half since 2014. By comparison, Reddit's r/userexperience has seen steady growth and has approached Stack Exchange's activity at its peak. We also observe that the latter's decline is unlikely driven by community unresponsiveness, with Stack Exchange having consistently quick responses and low occurrences of unanswered posts. In terms of **RQ2**, we find that UX concepts discussed on both forums are strikingly similar. Both have discourse centering around concrete, lower-level UX concepts like Interface Elements, indicating both communities are similarly capable of addressing mainstream design concepts. Nonetheless, as Reddit grew and Stack Exchange

declined, niche, higher-level concepts like Theory and Value became disproportionately infrequent in the latter. Thus, Stack Exchange became both less active and less diverse over time.

These findings have many potential implications for both HCI academia and the broader population of UX practitioners. Firstly, we show that online UX communities are prone to differing rates of growth and even decline, which may help practitioners identify appropriate groups to participate in. For example, a UX enthusiast wishing to discuss a particular design may find both Reddit and Stack Exchange be adequately responsive, but may also be discouraged by Stack Exchange's general lack of posting activity. On the other hand, those wishing to ask about uncommon, theoretical concepts like psychology may invest in a growing platform with sufficient discursive diversity. Because sustaining discourse is critical to the UX discipline (cf. [22]), our work serves as an initial step towards understanding which platforms have the longevity to support UX practitioners.

This study also has clear implications for platform designers. From our results, simply encouraging responsiveness to questions asked is unlikely to improve community longevity. In contrast, other factors such as community moderation and social norms may be critical in determining whether UX platforms grow or shrink, which merits further investigation in future work. For example, the wide-ranging, non-question posts on Reddit do not detract from questions asked; rather, allowing this sort of content may serve to actually compliment Q&A discursive behaviors. Furthermore, decreasing diversity in UX concepts also appears to be a symptom of community deterioration. These observations suggest that supporting diversity in both post types (e.g. questions, memes, links to resources, career guidance) and concepts (e.g. implementation, theory, architecture) could be crucial for UX community growth. This echoes work linking diversity to long-term user satisfaction in other domains [4, 24].

Limitations and Future Work. While we strove to validate our results throughout our work, our approach still has several drawbacks. Firstly, this is a *correlational* study that does not pin down the causal mechanisms behind community growth and decline on its own. To probe for these mechanisms, we would need to e.g. identify natural experiments or conduct experiments of our own.

Additionally, although we tried to improve comparability between Reddit and Stack Exchange by limiting the former to submissions and top-level comments, there are many community-level differentiating factors that we did not consider e.g. social norms, moderation rules, and reputation mechanisms. Indeed, there are also content-level aspects that need to be compared, such as post quality, politeness, emotions, and whether they pertain to UX careers – all of which may encourage or discourage users to return to the platform. These observations reinforce our findings that pure responsiveness does not appear to prevent community decline.

As such, we are in the process of augmenting this short paper with two analyses. Firstly, we will supplement the primarily quantitative approach here with *qualitative* methods to analyze community-level factors like social norms, and content-level aspects like politeness [9], emotion [10, 23], and career guidance. Secondly, because the present work compares differences *between* UX communities, we are investigating predictors of continued participation *within* communities. This takes the form of predicting when certain users churn and leave the platform. We thus hope to more comprehensively provide insights into how the UX practice can be supported by flourishing online communities.

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