Am I Ready to Get Feedback? A Taxonomy of Factors Creators Consider Before Seeking Feedback on In-Progress Creative Work

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ABSTRACT

Receiving feedback on preliminary work allows content creators to gain insight and improve outcomes. However, many creators only share in-progress work at late stages of the creative process and lose opportunities to address conceptual issues in the work. To contribute to the base of knowledge of factors that shape one's decision to seek feedback on their work, we conducted 24 semi-structured interviews with creators in product, interaction and graphic design domains. The results yielded a taxonomy of process-related, social, and cognitive factors that affected a creator's choice to seek feedback. Next, we administered a survey to quantify the prevalence of these factors at different design stages and for different levels of expertise. Our results show feedback strategy varies by expertise—experts are more likely to create personal deadlines to seek feedback than novices—and by stage. At the early stage, creators sought feedback when testing multiple alternatives. At the late stage, creators are most likely to consider revision granularity prior to seeking feedback. We demonstrate future possibilities for new features in creativity tools through speculative design sketches motivated by our findings.

CCS CONCEPTS

• **Human-centered computing** → *User studies*; *Collaborative interaction*; Interaction design theory, concepts and paradigms;

KEYWORDS

design, feedback seeking behavior, iteration, community practices

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1 INTRODUCTION

Receiving non-evaluative, formative feedback helps designers gain insight on design problems, create better design outcomes, and learn new design skills [5, 16, 31]. Novices in design fields may especially benefit from formative feedback as it can invoke feelings of higher self-efficacy and higher productivity [29, 44]. Unfortunately, seeking feedback on early stage ideas and prototypes is not as common a behavior as it should be [7, 10, 15, 25].

Prior work has shown that feedback seeking behavior reduces when feedback seekers fear receiving harsh or low quality feedback [21, 45] or when the effort needed to gather the feedback outweighs the perceived benefit of the feedback [2]. To assist in the process of feedback generation, the creative research community has explored tools to generate high-quality feedback quickly from a non-expert crowd [12, 30] and choose the right crowd [49]. This prior work assumes that creators can identify appropriate times to seek feedback and follow through. However, differences in status [3, 43, 46], anonymity [20], and experience [36] can contribute to creators not seeking feedback at appropriate times during the creative process. Without knowing when to seek feedback, creators will not reap the full benefits of existing feedback tools produced by industry or the research community.

We deepen our understanding of the factors that influence the decision to seek feedback on in-progress work by conducting semi-structured interviews with 24 creators about their approaches to seeking feedback during the creative process. The interviews surfaced a taxonomy of process-related, social, and cognitive factors considered by creators before seeking feedback on their work. We then administered a survey to quantify the prevalence of these factors at different stages and for different levels of expertise.

Our results show that novices and experts use different strategies to decide when to seek feedback. Experts relied more on design milestones, such as eliminating alternatives and personal deadlines, as compared to novices. The stage of the project also influenced the decision to seek feedback. At early stages of the creative process, creators sought feedback when they felt they needed to shift conceptual directions and considered whether a feedback provider would understand the design and provide high-quality feedback. At later stages, creators sought feedback from providers who would bring a new perspective to the project. All the factors are summarized in Table 3.

This study provides the following three contributions to the C&C community. First, we develop a taxonomy of process-related, social, and cognitive factors that influence feedback seeking behavior

in the context of an open-ended creative task. Next, we deepen our understanding of which factors creators most consider when making the decision to seek feedback based on the expertise of the creator and the stage of the project. Finally, we demonstrate insights through speculative design sketches of how the factors identified in the study could enable a new class of features to foster feedback seeking behavior.

2 RELATED WORK

Our work builds on prior research on feedback seeking behavior–the proactive search for feedback to improve creative processes–which is positioned in organizational theory and set in academic and experimental environments. Additionally, this prior work focuses on single instances of feedback seeking behavior; however, less is known about how feedback is sought in a context where multiple rounds of feedback are required to reach a successful outcome, such as in design.

We extend this body of literature by investigating feedback seeking behavior in open-ended projects in the wild, how it changes between early and late stages of work, and how it differs between expert and novice creators. We further situate our work within the context of recent research to assist creators in gathering high quality feedback and platforms for sharing in-progress work.

2.1 Seeking feedback in the creative process

Feedback seeking behavior is a strategy that is encouraged in both professional and learning environments as it supports skill assessment [16, 35], can lead to improved solution quality [22, 33, 35], and increases innovation [9].

Gathering and reflecting on feedback can be especially valuable to certain subgroups, for instance novice creators who learn and grow from each cycle of feedback [16, 50]. Since the skill of identifying when to seek feedback is generally gained through experience and can be difficult to directly teach [36], novices may identify when to seek feedback differently from experts. For instance, Kotturi et. al. shows that novice creators often overestimate how developed a project needs to be in order to get constructive feedback [25]. This can further result in the differences between the design processes of experts and novices. For instance, experts spend more time gathering information and evaluating their designs, and iterate at a greater frequency than novices [4, 31]. However, this body of literature does not investigate how the strategies of novices for identifying when to seek feedback on their work differ from expert strategies.

Some prior work has explored the benefits of specific feedback seeking strategies. For instance, sharing multiple alternatives of the prototype [40] and context about the changes made to a design [27] with a feedback provider can result in higher-quality critique. Another line of work shows that seeking feedback on early prototypes can give the creator more time to revise to address conceptual issues with the work [28].

However, these strategies to increase the quality and usefulness of feedback are countered by other factors. One factor is the perceived threat to the seeker's reputation which affects both experts in an organization [2, 41] as well as novices who are seeking feedback on their performance [34]. Other factors include the utilization of social capital [20], the relationship strength between the feedback provider and seeker [42], the perception that a project has to be in the late stage to receive high-quality feedback [25], the fear that seeking feedback too early on a novel idea will hinder creativity [14]. As such, many creators wait to get critique at later stages of the creative process [7, 8, 25] and when they are most confident in their work [1, 2, 37].

Prior work has not yet investigated how pervasively such factors are considered when a creator decides to seek feedback on their work in the wild. Little is also known about how these factors relate to one another, are considered by creators of varying expertise, or change given the stage of the project. Given that the usage of creativity tools can vary based on a creator's personal experience and cultural context [39], knowing which of these factors most influence a creator's process can assist in the development of innovative features that align with a creator's process [23] and assist designers in gathering feedback when they most benefit from it. We conduct the study with the motive of building features to help creators identify the best moments for seeking feedback and reduce the costs of seeking feedback. We additionally illustrate examples of features to foster feedback seeking behavior.

Moreover, prior work on feedback seeking behavior has been conducted primarily in the context of organizational theory [1–3, 43]. This paper studies feedback seeking in the context of creative work, which allows the work to dig deeper into the decision processes of creators when seeking feedback during the prototyping process.

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2.2 Feedback exchange tools

The research community has explored online feedback exchange systems to enable creators to access a diverse set of feedback providers [20, 49] and guide feedback providers to write high quality feedback. For instance, anonymity can increase the specificity of feedback [19]. In addition, structuring the feedback writing task [6, 30, 48] and showing design history [17, 27] can increase the quality of feedback. Creative platforms, such as Redpen.io, Adobe, and Autodesk, have made it easier to share creative work. Steps have also been taken to encourage designers to share in-progress work through online communities [24].

However, these systems do not sufficiently address issues to effectively decide when and whether to seek feedback [13]. Many of the tools currently in use leave the burden of deciding when to get feedback on the designers themselves [13] who may wait until late stages of the design process to interact with feedback providers [7, 15]. Due to this gap, creators who lack the skills or mind set for seeking formative feedback on their work, such as novices, may not take timely advantage of the tools available to them [7, 15]. In this study, we address this gap by investigating the factors that influence a creator's decision to seek feedback on in-progress work. The results of this study can be used to develop features that can foster feedback seeking behavior.

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3 RESEARCH QUESTIONS

Our study extends the current literature on the factors that influence feedback seeking behavior by investigating when novice and

Table 1: Semi-structured interview questions. The interviewer defined what was meant by early and late stages of design in a domain agnostic way—early stage of design was described as working concept sketches and the late stage of design was described as working on a close to final prototype. Participants were allowed to interpret the stages as they saw fit.

Questions regarding a memorable experience seeking feedback
(1) Describe a recent or memorable experience where you sought feedback on your work.
(2) Who did you get feedback from? Why did you get feedback from them?
(3) Why did you consider seeking feedback at this stage of the project?
(4) Did you get feedback before this point? If you didn't get feedback sooner, why didn't you get feedback? If yes, when did you get feedback and why?
Questions about general FSB behavior
(1) In general, how do you know when to seek feedback on a project? Does this differ between early and late stages of design?
(2) What strategies do you use to make sure that you seek feedback at the right time on a project? Do these strategies differ between early and late stage design?
(3) Who do you usually seek feedback on your designs from? Does this differ between early and late stages of design?
(4) What difficulties have you faced in getting feedback on your projects? Does this differ between early and late stages of design?
(5) Do you ever feel worried about the impression your work would make on the people you showed your work to? Why or why not? Does this change over your design process?

expert creators seek feedback on their work, from whom they seek feedback, and the difficulties each face in seeking feedback on their work. We ask the following questions:

RQ1. What factors influence when, how, and from whom creators seek feedback on in-progress work?

RQ2. How do the factors identified in RQ1 differ between the early and late stage of the creative process?

RQ3. How do the factors identified in RQ1 differ between novice and expert creators?

Answers to these research questions can inform the design of feedback exchange systems and other creativity support tools to better integrate the experiences of creators and encourage feedback seeking.

4 METHODS

To understand the decision process of creators as they plan to seek feedback on their work, we conducted semi-structured interviews with designers. The interview responses were split into idea units and grouped into themes. These themes then informed the design of an online survey which we used to help us gauge the generalizability of the themes and understand how they occur over the creative process. In this study, we focus on situations where the seeker plans to seek for feedback as opposed to feedback through spontaneous interactions with colleagues.

4.1 Interview

We conducted semi-structured interviews with 24 designers. The interviews focused on a participant's approach to seeking feedback, any deterrents they faced when trying to get feedback, and their overall perspective on the feedback seeking process. Participants first described a recent or memorable instance where they gathered feedback on a project. They were then asked why they chose to seek feedback, when the event took place, and from whom feedback was sought. The interviewer followed with questions about how the designer chose to seek feedback at other times in the creative process, both at the early and late stages. The interview structure is shown in Table 1.

Participants were recruited through UpWork (a site for hiring freelance workers), advertisements on Reddit and Facebook, and through word-of-mouth. Nine participants (37.5%) were male. 13 designers (54.2%) worked mainly on graphic design projects. Nine (37.5%) designers worked in industrial design, and 3 (12.5%) focused on interaction design. Details about individual participants can be found in the appendix.

We initially categorized designers by their self-rated expertise in design: 12 designers (50%) considered themselves to be experts, three (12.3%) self-rated as intermediate, and the other nine (37.5%) considered themselves to be novices. We confirmed this categorization using other demographic factors including the number of years of professional experience and formal design education. Participants who considered themselves as experts generally had 3 or more years of professional experience or pursued an advanced degree in design along with some professional experience. The self-identified novices were mostly students pursuing their bachelor's degrees in a design field or self-taught with less than 1-year of experience. Participant details can be found in greater depth in Table 2.

The interviews were analyzed through iterative coding [32]. One member of the research team conducted line-by-line open coding to generate preliminary codes. This member also conducted the initial round of axial coding to combine similar codes into broader categories. Subsequent passes and discussion by the research team

Table 2: Participant demographics

	Interview	Survey
Total participants	24	96
Gender		
Female	15 (62.5%)	55 (57.3%)
Male	9 (37.5%)	39 (40.6%)
No answer	-	2 (2%)
Professional Experience		
None	7 (29%)	31 (32%)
<= 2 years	6 (25%)	23 (23.7%)
2-5 years	5 (21%)	17 (17.5%)
5+ years	6 (25%)	26 (26.8%)
Self Rated Expertise		
Novice	9 (37.5%)	34 (35.4%)
Intermediate	3 (12.5%)	27 (28.1%)
Expert	12 (50%)	35 (36.4%)

	Interview	Survey
Creative Field		
Industrial Design	9 (37.5%)	15 (15.5%)
Interaction Design	3 (12.5%)	11 (11.3%)
Graphic Design	13 (54.2%)	39 (40.2%)
Architecture	-	8 (8.2%)
Creative Writing	-	35 (36.1%)
Music	-	14 (14.6%)
Other	-	26 (27.0%)
Creative Education		
None	-	12 (12.4%)
Self-taught	5 (21%)	18 (18.6%)
Some formal training	5 (21%)	33 (34%)
Bachelor's degree	13 (54%)	25 (25.8%)
Graduate degree	1 (4%)	9 (9.3%)

Table 3: A taxonomy of 15 factors designers reported that affected their decision to seek or delay feedback. The table reports the number of designers that discussed each factor and breaks down the interview responses by the expertise of the designer: Novice (N), Intermediate (I), and Expert (E). The table also indicates the design stage relevant to the factor.

		Stage	Total	N	I	E
Process-related Factors: Events during the design process that influence designers to seek feedback	P1: Narrowing down directions	Early	11	3	1	**7**
	P2: Shifting conceptual directions	Early	11	4	1	6
	P3: Amount of revision	Late	5	1	2	2
	P4: Pausing to reflect	Both	6	**4**	2	0
	P5a: External deadlines	Both	9	3	2	5
	P5b: Personal deadlines	Both	6	1	0	**5**
Social Factors: Characteristics of the feedback provider	S1: Needing fresh eyes on the work	Late	10	4	2	4
	S2: Provider availability	Late	9	4	0	5
	S3: Anticipated feedback quality	Early	19	8	0	11
	S4: Scope of feedback network	Both	6	**4**	0	2
Cognitive Factors: The designer's relationship to their own work and fears they feel about sharing their work	C1: Feeling stuck	Both	11	3	2	6
	C2: Confidence in the design	Early	16	7	2	7
	C3: Evaluation apprehension	Both	15	6	1	8
	C4: Emotional attachment	Early	8	2	1	5
	C5: Working in a competitive environment	Both	3	2	0	1

refined the categories into a taxonomy of fifteen factors split across three categories. See Table 3.

4.2 Survey

We designed and administered a survey to a wide audience to quantify the factors that were identified in the interviews and generalize them to a larger population of creators. The survey contained one question relating to each factor. See Table 4. Participants indicated the stages of the creative process in which they experienced each factor: Analysis, Concept, Embodiment, and Refinement [18, 38]. The survey defined these stages so participants would understand what each stage entailed as they responded to the survey. As in Snider et. al. [38], the Analysis stage was defined as the time at which the desired and required functions of the prototype were determined. Next, the concept stage is where a creator creates preliminary prototypes, such as wireframes and sketches. The Embodiment stage involves more detailed and higher fidelity prototypes. Finally, Refinement indicates when the prototype is final or close to final. For analysis, we consider the Analysis and Concept stages as early and the Embodiment and Refinement stages as late.

The survey was advertised on distribution lists in several U.S. academic institutions, newsletters of creative organizations, Facebook group pages, and online communities and received 96 responses. Participants came from a variety of creative fields including graphic design (40.2%), industrial design (15.5%), interaction design (11.3%), and creative writing (36.1%). Participants were allowed to select multiple areas. Participants also self-rated their creative expertise on a scale from 1 (novice) to 7 (expert). The survey defined expert and novice to help participants better calibrate their response. An

Table 4: Survey responses (N=96) . The columns represent each stage as follows: A-analysis, C-concept, E-embodiment, R-refinement. We additionally report the percent of novices (%N) and the percent of experts (%E) who reported the survey item.

Factor	#	Survey Item	A	C	E	R	Total	%N	%E
P1	Q1	Get feedback when I narrow down on a direction after creating multiple alternatives	59	40	21	13	72	68%	80%
P2	Q2	Get feedback to check if prototype needs to shift in a new direction	49	33	16	10	62	59%	69%
P3	Q3	Get feedback when making smaller and smaller revisions	14	18	34	29	55	50%	54%
P4	Q4	Get feedback when stepping back to reflect on the prototype	28	31	46	32	66	62%	71%
P5a	Q5	Get feedback when I reach external deadlines	44	33	42	52	66	56%	**74%**
P5b	Q6	Create personal deadlines to seek feedback	30	25	23	32	46	35%	**57%**
S1	Q7	Get feedback from providers with a fresh perspective	53	51	49	38	76	71%	80%
S2	Q8	Get feedback from providers who are most available	36	31	35	33	56	62%	71%
S3	Q9	Get feedback from providers who will provide high quality feedback appropriate to this stage of the project	64	62	67	68	82	74%	**91%**
S4	Q10	Lack of appropriate feedback providers in network	38	32	40	35	55	74%	54%
C1	Q11	Get feedback when feeling stuck or blocked	52	38	33	17	68	71%	71%
C2	Q12	Get feedback when feeling confident in work	41	27	46	58	72	62%	**86%**
C3	Q13	Concern about damaging personal reputation	22	22	20	21	32	32%	34%
C4	Q14	Felt too much effort sunk into the work for it to be critiqued	12	13	24	31	45	41%	49%
C5	Q15	Concern about working in a competitive environment	15	15	16	24	31	21%	**43%**

expert (rating of 7) was defined as someone with 2+ years of professional experience, who has a graduate degree in the creative fields, or who has received an external reward for their creative work. A novice (rating of 1) was defined as someone who rarely performs creative work or is just learning how to produce work in their particular field. The average self-rated expertise was 3.9. We categorized those who rated themselves five and above as experts (36.4%), three and below as novices (35.4%), and exactly four as intermediate (28.1%). Finally, participants reported their formal education and professional experience. We report survey participant demographics in detail in Table 2.

5 RESULTS

Our results revealed five process-related factors that creators used to identify when they needed to seek feedback, five social factors for deciding whom to seek feedback from, and five cognitive factors to engage in FSB (see Table 3). Furthermore, we analyze the differences in FSB between novice and expert creators and how the factors are used at early and late stages of the creative process.

5.1 Taxonomy of FSB Factors (RQ1)

When reporting our results in this section, we use "I = <value>" to indicate the total number of interview participants and "Q# = <value>" to indicate the number of survey respondents who reported the survey item as a factor that influenced how they sought feedback on their work. The full form of the survey question can be found in Table 4. We additionally indicate individual interview participants by "I#".

Process-related factors. Creators would often use events along their creative process to motivate FSB. The interviews revealed five such events during the creative process that motivated creators to seek feedback.

P1: Narrowing down directions (I=11, Q1=72): Creators would often seek feedback to narrow down on a direction after conceiving of multiple initial options: "you have to weed out things from your brainstorming session to figure out which track to go on" (I6, expert in industrial design).

P2: Shifting conceptual directions (I=11, Q2=62): To identify if feedback would be beneficial, creators would consider if they needed to change conceptual directions and consider different ideas. Creators would do this often at the early stages of the creative process so that they were "not too far along in the process and [...] can go back to square one without too much time lost" (I23, novice in industrial design).

P3: Amount of revision (I=5, Q3=55): Creators considered the amount of revision to determine when to seek feedback. For example, I20 (novice in graphic design) realized she needed to "stop tweaking the design" when she created several options that were so similar that a friend could not identify the differences between the variations.

P4: Pausing to reflect (I=6, Q4=66): One strategy that helped creators focus on the bigger picture was to step back, reflect, and realize they actually needed help: "I'll keep thinking in my head and developing what I want to do with it. If there's nothing I really love then I go out and ask others think" (I8, novice in graphic design).

P5: External (I=9, Q5=66) and personal (I=6, Q6=46) deadlines: FSB was commonly triggered by external deadlines for critique and review set up by supervisors both in early and late stages of the creative process. Six creators set up additional personal milestones for getting feedback: "Write it down and make a

schedule around it so when it comes time you will do it" (I5, novice in industrial design).

Social factors. The interviews surfaced five factors that influenced when and whom a creator contacted for feedback. These included the creator's relationship with and the characteristics of the feedback providers.

- *S1: Needing fresh eyes on the work (I=10, Q7=76):* Creators sought feedback when they needed a fresh perspective on their work. Generally this was sought from providers unfamiliar with the project as "they would be more unfiltered" (I18, intermediate experience in industrial design). Creators who worked in studios would ask coworkers for feedback. Those who did not work around other creators relied on online communities.
- *S2: Provider availability (I=9, Q8=56):* Before initiating a feedback request, a creator would consider if the feedback provider was too busy with their own work or would respond promptly. Creators also considered how many times the feedback provider had been contacted previously as they were "afraid that I would exhaust [the feedback providers]" (I20, novice in graphic design).
- *S3: Anticipated feedback quality (I=19, Q9=82):* Creators sought feedback when their design was at a stage at which a provider would be able to understand it and provide beneficial feedback. This meant creators waited longer to share prototypes with providers without a creative background which includes target users and clients. I7 (expert in industrial design) explained, "they won't understand it unless they get [the prototype] all at once."
- *S4: Scope of feedback network (I=6, Q10=55):* Creators considered if they had the right feedback providers in their network prior to seeking feedback. And while having a small feedback network meant creators relied on online communities for feedback, creators often felt they did not get constructive critiques online, felt "ghosted" by more established creators, and found it difficult to develop new relationships.

Cognitive factors. The interviews surface five cognitive factors that influenced a creator's decision to engage in FSB. These factors focus on the creator's relationship with the work they produce and apprehensiveness sharing work.

- *C1: Getting stuck (I=11, Q11=68):* For I21 (expert in interaction design), struggling with significant navigational questions was "an indication that I don't really understand what I'm doing". Faced with this challenge, a creator would seek help or clarification on the prototype from feedback providers.
- *C2: Confidence in the prototype (I=12, Q12=72):* A creator often waited until they were confident with the prototype before seeking feedback to not waste a feedback provider's—often a client's—time. However, several creators (I=4) also cautioned against being too confident due to the potential of overlooking conceptual issues.
- *C3: Evaluation apprehension (I=15, Q13=32):* Concerns about social signals a prototype could send, such as the professionalism or aptitude of the creator, delayed feedback seeking from experts and clients. For example, designers worried more about the impression they gave to others regarding their work ethic: "I don't want [my boss] to know that I haven't been working on the design" (I2, novice in interaction design).
- *C4: Emotional attachment (I=8, Q14=45):* A high level of investment may prevent a creator from seeking feedback on a project. For example, a novice creator might sink a significant amount of effort into only one or two ideas which they personally feel are exciting and novel and delay feedback until the idea is worked out completely.
- *C5: Working in a competitive environment (I=3, Q15=31):* Competitive work environments, where creators wanted to impress supervisors, reduced the occurrence of FSB between peers. For example, I23 "really wanted to make a good impression on my profs" to increase his chances for extracurricular opportunities such as internships.

5.2 Seeking feedback at early and late stages of the creative process (RQ2)

To decide it was time to seek feedback, creators considered different factors based on the stage of the project. These patterns were reflected both in the interview and survey responses. At the early stage, creators sought feedback when they expected to test alternatives (P1, Q1) or if they felt they needed to shift the conceptual direction of the work (P2, Q2). At the late stage, creators considered the extent of revisions (P3, Q3). Creators would additionally set different types of personal feedback deadlines (P5b, Q6) at different stages of the project. At the early stage, creators would set a time limit to work on the project. At the late stage, creators would seek feedback after addressing prior feedback. Moreover, the choice of feedback provider also changed over the creative process–creators chose providers who they anticipated would provide high-quality feedback at early stages of the creative process (S3, Q9) while providers with different perspectives were chosen at the late stage (S1, Q7). A χ^2 test on the survey data did not show statistical differences between each stage.

5.3 Differences between expert and novice FSB (RQ3)

To answer RQ3, we compare the interviews of experts and novices as shown in Table 3. We use "N=<value>%" to indicate the percent of novices and "E=<value>%" to indicate the percent of experts who reported experiencing particular factor. Our results indicate that experts were more likely to use concrete strategies to seek feedback such as setting personal deadlines (P5; N=11%, E=41%,) and after they had created multiple alternatives to collectively narrow down the direction they would finally take (P1; N=33%, E=58%). Novices in the study reported they were more likely to seek feedback when they paused to reflect on a project (P4; N=44%, E=0%,). Novices additionally faced more challenges in finding feedback providers with the knowledge or expertise needed to provide useful guidance for a project (S4: N=44%, E=17%). Of the six creators who mentioned this, three were current students, one was a novice and a hobbyist, and two were expert freelancers.

The survey responses broken down by expertise are summarized in Table 4. Some surprising finding include that experts are much

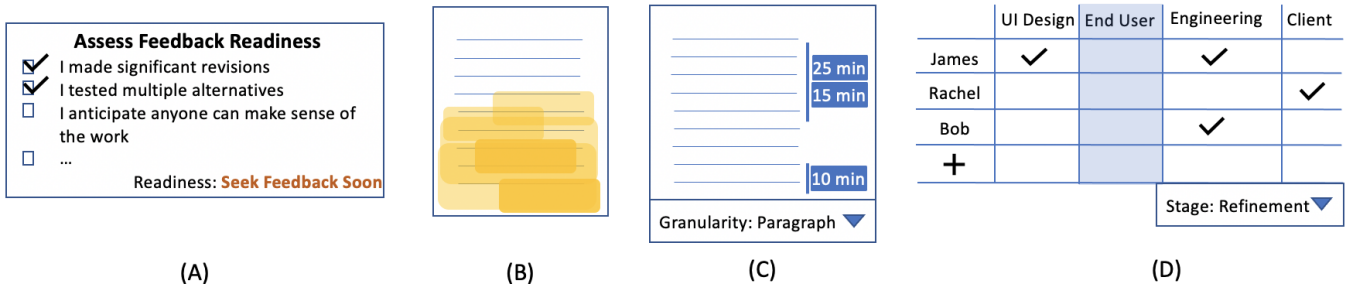

Figure 1: We present examples of four design features that could be implemented in creativity tools based on the results of our study. (A) Drawing from P4 in our taxonomy, a creativity tool could prompt the user to assess their feedback readiness by completing an explicit reflection activity about the status of their creative process, e.g., when the user closes the tool. (B) Show a heat map of changes on a document made since the last instance of seeking feedback to show the extent of revision. Based on factor P3, a user could use this information to determine if they have made significant changes to the work. (C) Indicate the time spent revising a section of the content since the last instance of feedback. A user could select to view the revision time at different levels of granularity, such as at the paragraph or section level if working on a document. A spatial view of changes, as shown in (B), could indicate if a user is mentally stuck on one element of the work (factor C1), pausing to reflect on their work (factor P4), or shifting directions (factor P1). Such visualizations could also be shared with feedback providers so they know where to prioritize their time when reviewing the work. (D) Visualize feedback provider perspectives and identify missing perspectives useful at the current stage of the project. Users could organize potential providers by the perspectives they bring to the project, identify missing feedback provider perspectives, and add providers with new perspectives. As indicated by factors S1 and S3, at the early stage a creator may wish to focus on a few providers with technical expertise and bring in end users at the late stage. Any of the features discussed above should include the ability to be reset or disabled if the user does not find them valuable for the project or stage.

more likely to use confidence (Q12; N=62%, E=86%) as an indicator they should seek feedback compared to experts. Experts are also more likely to avoid seeking feedback due to competition from their peers than novices (Q15; N=21%, E=43%) and were more concerned about the quality of the feedback they would receive (Q9; N=74%, E=91%). Other responses corroborate the interviews; for example, experts set personal deadlines (Q6; N=35%, E=57%) more than novices did, but also had more external deadlines (Q5; N=56%, E=74%). A χ^2 test did not reveal significant difference between novices and experts.

6 DISCUSSION

In this study, we interviewed and surveyed creators about their feedback seeking processes. Our results surfaced fourteen factors further classified into a taxonomy of process-related, social, and cognitive factors that deepen our understanding about a creator's decision process when identifying when to seek feedback on in-progress work. Specifically, we surface novel process-related factors, which relate to events over the process of a creative task, that trigger creators to think about seeking feedback on their work. Social and cognitive factors then influence from whom the creator will seek feedback and if they follow through with seeking feedback on their work.

The results indicate that creators consider different factors when seeking feedback at the early stage compared to the late stage of the creative process. At the early stages, creators were more likely to seek feedback when they needed to decide on a direction to move forward (P1, P2). Moreover, the preference for feedback providers also changed over the creative process–creators tended to choose providers with design expertise or prior familiarity with the project (S3) at the early stage of the creative process and providers with different perspectives at the late stage (S1).

Our results further demonstrate differences between how experts and novices seek feedback on their work. For instance, experts are more likely to set personal deadlines to get feedback compared to novices (P5b). Additionally, in the survey responses, most of the factors were more likely to be considered by an expert. This result indicates that experts may have a better understanding of when they will need to seek feedback. While novices may gain these strategies over time and experience [36], digital design tools could provide support to novices by implementing features to help novices identify the best moments for feedback seeking and to learn and practice these strategies.

Supported by the findings of this study, we propose four design features for creativity tools to encourage reflection on feedback seeking behavior. See Figure 1. Reflection itself is a tool that has been used in prior work including assisting novice creators with interpreting the feedback they received [50]. These features we propose in this paper include both *holistic* and *localized* cues to trigger self-reflection. The holistic cues attempt to guide a user to assess their readiness to seek feedback by considering the process-related and cognitive factors mentioned in this paper. The localized cues highlight a user's interaction with the creativity tool and indicate areas that have received more of a user's effort.

Novice creators may particularly benefit from the holistic features to assist them in recognizing they are at a beneficial point at

which to seek feedback and to identify gaps in their set of feedback providers. For example, as shown in Figure 1A, the creativity tool could prompt the user with questions stemming from the taxonomy presented in this paper. This self-reflection feature can also be triggered intelligently based on the user's work habits, the user's expertise, the current stage of the design (early or late), and the recency of the last instance of feedback. Self-reflection features can also be triggered by events that signify context switching, such as the closure of a document, or can be present at all times for users to engage in at their own discretion.

Localized cues can guide a creator to realize they are at a point in the design process where they would benefit from feedback by quantifying and visualizing interactions with the content creation interface. For example, a tool can indicate the extent of revision by highlighting the locations of changes on a document or the time spent on a particular section of a document (P3). See Figures 1B and 1C. A creator who spends the majority of time on one section might benefit from feedback on that section. To scale the feature, a user can change the granularity of the revision, e.g. paragraph, section, or chapter. These features are feasible given the availability of revision history logs on common applications such as Google Docs and Microsoft Word. The information contained in these localized cues could additionally be incorporated into a feedback request to assist a feedback provider in prioritizing sections of work for feedback, thereby increasing feedback quality [17, 24, 27].

Incorporating cues into creativity tools also has the potential to help designers break through cognitive barriers that result in delayed feedback seeking. For users who are apprehensive about sharing their work (C3), a creativity tool could provide an example of other creators who sought feedback and were able to improve their project. Viewing such examples may encourage a creator to seek feedback even in circumstances where they are hesitant to share their work. In prior work, such activities have been used to assist feedback seekers to cope with the effects of receiving negative feedback [47]. Online communities could also consider limiting sharing of in-progress work only to a creator's strong ties or encourage mentorship so members can gain history with one another and develop relationships [27].

Creativity tools can additionally assist a user to consider a group of feedback providers and identify if there are missing perspectives in the group. Such a feature can ensure that experts are present in the group at the early stage and show what perspectives are missing at the late stage. See Figure 1D. Intelligent creativity tools can additionally recommend feedback providers based on the stage of a creative project and the perspectives the providers will bring.

Lastly, the interviews surfaced difficulties that the sub-populations of novice and freelance creators may face more greatly than experts. Novices were particularly vulnerable to the scope of their feedback network (S4). A novice's main source of feedback was from peers who may not have the required expertise to provide insights to the problem at hand. While online communities are meant to make it easier for designers to connect with others, the emphasis on reputation on many online platforms [11, 26] may make it difficult for novices and newcomers to garner attention for their work and receive constructive criticism.

7 LIMITATIONS AND FUTURE WORK

The creative process varies significantly by project and creator; therefore, the factors we present in this study may not be exhaustive or applicable to all creative domains. Moreover, the three categories of factors we discuss in this section–process-related, social, and cognitive–are not rigid boundaries for factors that influence FSB. For example, some cognitive factors such as working in a competitive environment (C5) may stem from the social dynamics of a project. However, the soft boundaries introduced in this paper can be used as a starting point to understand the factors that influence FSB. Future work can also supplement these results with observational studies and consider instances where feedback is given to creators organically by others in the vicinity. Finally, future work is needed to implement and test the features proposed in the discussion as well as explore other features to foster feedback seeking behavior.

8 CONCLUSION

Seeking feedback on early prototypes is integral for the creative process. However, creators may not seek feedback as early as they should giving them less time to address conceptual issues in their work and create an outstanding product. We interviewed 24 creators to deepen the existing body of literature on the factors that lead a creator to seek feedback on in-progress creative work. These interviews surface a taxonomy of process-related, social, and cognitive factors that influence a creator's decision to seek feedback on their work. We further quantified the prevalence of each factor by administering a survey. While the factors surfaced in this study may not be exhaustive, they provide a starting point to understanding the feedback seeking process in creative fields. Our results show that novices and experts use different strategies when seeking feedback. Novices seek feedback when they pause to reflect on their work (P4) while experts build intentional deadlines into their work (P5b). Additionally, different factors influence FSB at the early stages (such as narrowing down alternatives—P1) and at the late stages (such as making small modifications—P3). Finally, we demonstrate insights through speculative design sketches of how the factors identified in the study can enable a new class of features to foster feedback seeking behavior. We hope that the results of our study contribute toward a future where all content creators are able to initiate feedback gathering at moments most beneficial to their project.

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A INDIVIDUAL INTERVIEW PARTICIPANT DETAILS

Table 5: We provide detailed information about the the design background of each of the participants in this table.

	Education Level	Design Area	Expertise	Employment Type	Professional Experience (Years)	Gender
P1	Bachelors	Graphic	Intermediate	Employee	2 years	Female
P2	Self-taught	Interaction	Novice	Employee	1 year	Female
P3	Bachelors	Graphic	Expert	Freelance, Employee	5 years	Female
P4	Bachelors	Graphic	Expert	Freelance, Employee	10 years	Female
P5	Current student	Industrial	Novice	None	None	Male
P6	Bachelors	Industrial	Expert	Entrepreneur, Teaching	20 years	Female
P7	Bachelors	Industrial	Expert	Employee	3 years	Male
P8	Current student	Graphic	Novice	None	None	Female
P9	Current student	Industrial	Novice	None	None	Male
P10	Self-taught	Graphic	Novice	None	None	Male
P11	Current grad student	Industrial	Expert	Freelance, teaching	1 year	Female
P12	Bachelors	Graphic	Expert	Freelance	5 years	Female
P13	Bachelors	Graphic	Intermediate	Freelance, Teaching	2 years	Male
P14	Self-taught	Graphic	Expert	Employee	4 years	Female
P15	Bachelors	Graphic	Intermediate	Employee	2 years	Female
P16	Current student	Industrial	Novice	None	None	Female
P17	Bachelors	Graphic	Expert	Freelance, Employee	5 years	Female
P18	Bachelors	Industrial	Intermediate	Freelance, Teaching	2 years	Male
P19	Bachelors	Graphic	Expert	Freelance	7 years	Male
P20	Self-taught	Graphic	Novice	None	None	Female
P21	Self-taught	Interaction	Expert	Employee	25 years	Female
P22	Bachelors	Industrial	Expert	Employee	7 years	Female
P23	Current student	Industrial	Novice	None	None	Male
P24	Bachelors	Interaction	Expert	Employee	10 years	Male