

IntroAssist: A Tool to Support Writing Introductory Help Requests

Julie S. Hui, Darren Gergle, and Elizabeth M. Gerber

Segal Design Institute
Northwestern University
Evanston, IL 60208

juliehui@u.northwestern.edu; {dgergle, egerber}@northwestern.edu

ABSTRACT

Writing introductory help requests is a key part of developing new professional connections, such as through email and other online messaging systems. This paper presents the design and an experimental evaluation of IntroAssist—a web-based tool that leverages cognitive apprenticeship instructional methods to support writing introductory help requests through an expert-informed checklist, tagged peer examples, self-tagging, and suggested word limit. In a study of IntroAssist with novice entrepreneurs, we find that 1) expert raters consider help requests written with the tool as more effective, 2) participants are able to perform introductory help seeking skills after the tool is removed, and 3) participants report being more likely to send help requests written with the tool. We present implications for the development of systems that support the initiation of professional relationships.

Author Keywords

Help seeking; entrepreneurship; skills; professional connections, social capital

ACM Classification Keywords

H.5.m. Information interfaces and presentation: Misc

INTRODUCTION

Internet technologies have long been praised for offering unprecedented access to developing professional connections with those who can provide resources and other forms of support [3,9,51]. Professional networking platforms, like LinkedIn, allow jobseekers to identify points-of-contact in desired careers [58]. Crowdfunding platforms, like Kickstarter, allow entrepreneurs to build worldwide networks of supporters who can provide funding and publicity [24,32]. And social media platforms, like Facebook, help people seek career inspiration from friends and family [33,58,65].

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CHI 2018, April 21–26, 2018, Montreal, QC, Canada

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ACM ISBN 978-1-4503-5620-6/18/04...\$15.00

<https://doi.org/10.1145/3173574.3173596>

And yet, while a plethora of Internet technologies have been created to build professional connections, people still face social, psychological, and skill-based barriers to contacting others [14,16]. Researchers studying the role of technologies in facilitating professional connections have found that people often don't know how to identify helpful others among the potentially millions available [40]. But, perhaps most importantly, many have not been taught how to even initiate new connections [15]. Even if an algorithm recommends an ideal match based on target expertise, willingness to help, or similar interests [8,31,34,38,40,43,50,69], people reaching out might still fail to send a help request that resonates with the receiver enough for them to respond.

We study how to support the initiation of professional connections through online written *introductory help requests*, requests where 1) the requestor has never met or interacted with the receiver, and 2) responses take a significant amount of time, effort, and/or social capital to fulfill. Introductory help requests often motivate new connections in professional settings because people are highly motivated to reach out to others when they are in need of support [25]. Specifically, we study how to support writing the first message to a new contact who could provide help, which we define broadly as any form of needed financial, social, human, or informational resource. For example, this might include writing an email to a new contact requesting a 20-minute conversation for feedback on one's project, or to be connected to a respected colleague. In this study, we ask:

How might we leverage cognitive apprenticeship instructional methods of modeling, coaching, and reflection in an online context to support help seekers in writing introductory help requests?

To address our research question, we create and test IntroAssist, a web-based tool that leverages cognitive apprenticeship instructional methods to support writing introductory help requests through an expert-informed checklist, tagged peer examples, reflection through self-tagging, and suggested word limit. To design IntroAssist, we draw from relevant research in learning sciences, human computer interaction (HCI), and management, as well as a needfinding study, to understand how to best support introductory help seeking behavior.

We chose to develop and test IntroAssist in the context of entrepreneurship, where the work heavily relies on help seeking, but where there often is no shared professional goal, preexisting relationship, or expectation to provide support to others, making the act of help seeking even more challenging [57]. An evaluation of IntroAssist with 26 novice entrepreneurs reveals that our tool design increases the quality of written introductory help requests, supports performance of introductory help seeking skills after the tool is removed, and makes help seekers more likely to report sending these help requests. Our work suggests that computer-mediated systems can be designed to facilitate learning from peers by providing features that support cognitive apprenticeship mechanisms of modeling, coaching, and reflection.

BACKGROUND

The need for and design of IntroAssist was informed by related work on help seeking processes in professional settings, help seeking support tools, and learning help seeking skills. Through this review, we find a need to better understand and support the help seeker's perspective in the management [5], HCI [66,67], and learning sciences [2,13] literature.

Help Seeking in Professional Settings

Across domains [7,49,59], extensive literature highlights the key role that help seekers play in initiating help interactions. For instance, management scholars find that 90% of help interactions are initiated by help seekers [10], with similar results found in multiple professional contexts over the years [4,47].

Help seeking is a complex process that involves multiple steps in both self-awareness and applying communication skills [28,48]. Seminal work on help seeking in educational contexts describes a five-step process to seeking help: 1) being aware of needing help, 2) deciding to seek help, 3) identifying potential helpers, 4) employing strategies to elicit help, and 5) reacting to the help seeking attempt [48]. Our work focuses specifically on stage 4) employing strategies to elicit help as few researchers have focused on supporting people in developing skills needed to initiate these interactions effectively [5].

In professional settings, people tend to help others who might help them later [27] and in order to gain status from professional peers [7,44]. Others decide whether to give help depending on the level of trust they have of the help seeker [36] and perceptions of the help seeker's status [21]. Linguists find that language that elicit positive emotions and reciprocity are more likely to get a positive help giving responses online [26,46], findings based in extensive psychology literature on influence [12]. All this is to say that carrying out a help seeking interaction requires a wide range of cognitive and emotional engagement [28], which can be overwhelming to help-seekers who are reaching out to someone for the first time.

The majority of studies on help seeking in professional contexts have focused on help seeking and giving in formal organizational settings, such as a company, where people often already know each other or are at least expected to provide help to peers for organizational purposes [5]. In contrast, we study the case of *introductory* help seeking in *informal* workplace contexts, like entrepreneurship, where there is often no shared professional goal, preexisting relationship, or expectation to provide support to others [57]. The lack of shared expectation of social support further exacerbates the already complicated requirements of help seeking in professional contexts, and is an understudied topic in the help seeking literature [5]. In situations where there is no existing relationship, it often falls on the help seeker to orchestrate the many factors that play into why someone might provide help in the first place [10].

Help Seeking Support Tools

The skills needed to perform help seeking online have changed and in many ways become more complicated with the introduction of new social technologies [52,63]. An ideal helper must have the skills to provide help, be willing to help, and be someone the user is willing to contact [47]. However, much of HCI research has been focused on the first two requirements. For instance, recommender systems find who has the most relevant knowledge and is willing to help in online social networks [8,31,34,38,40,43,50,69]. Others have studied what network structures and search strategies lead to experts most quickly and using the least amount of social capital [68]. Yet, even if an ideal match is recommended, the help seeker might still fail in writing a request that resonates with the help provider [12] or even have the confidence to reach out [53,54]. Failing to support the help seeker in writing and sending these help requests will ultimately lead to unrealized connections.

The few HCI studies that have focused on the help seeker's perspective have mostly been performed in formal organizational contexts [55,56,66,67]. For instance, researchers studying IBM's enterprise communication platform found that surfacing additional expert features, such as company division, expertise summary, and online social activity, helped subjects make a more informed decision when identifying an expert and in a shorter amount of time [55,66]. However, the researchers also argue that help seeking is still not well supported by current tools because they did not facilitate the in-depth interactions needed for more complex help seeking transactions [67]. Our work answers the call to better facilitate these complex interactions by facilitating the writing of introductory help requests in informal workplace contexts where there is likely to be limited shared trust and requirements to help each other [5,57].

Outside of academia, industry practitioners have provided multiple resources to support introductory help seeking in the form of how-to articles [60], marketing tools [71], and email analysis tools [72]. Although how-to articles exist, help seekers may struggle to understand how to apply these

practices to their own situations. For instance, state-of-the-art email support tools, like Boomerang's Responsible feature [72], only indicate how likely one's email might receive a response based on language and length, but does not provide support in composing the message in the first place.

Learning Help Seeking Skills

Help seeking skills, and socio-cultural communication skills more broadly, are generally developed via situated learning—extended engagement in communities, such as participating in conversations and observing interactions [37]. Apprenticeship—observing and working alongside an expert to learn new skills—is one of the most effective opportunities to orchestrate learning in situated environments where novices learn-by-doing with extended access to expert guidance [13,37]. However, there are limited opportunities for apprenticeship in many informal professional contexts, like entrepreneurship, because, there are limited experts who have time and resources to provide long-term in-depth instruction to multiple novices [57,61].

Through the design of IntroAssist, we explore whether it is possible to apply instructional mechanisms of cognitive apprenticeship [13], an extension of apprenticeship, to scale teaching of help seeking skills in an online context. Specifically, we apply the cognitive apprenticeship mechanisms of *modeling*, *coaching*, and *reflection* [13]. *Modeling* involves an expert performing a task so that learners can watch and emulate their processes; *Coaching* involves having someone provide feedback and advice as they see fit or as problems arise; *Reflection* involves encouraging the learner to evaluate their performance by comparing their work to a mental model or others' work, and identifying opportunities for improvement. We apply these mechanisms into the design of IntroAssist to facilitate the writing of introductory help requests in the absence of in-person expert guidance.

Hypotheses

Our goal is to investigate how to design a support tool that can facilitate help seekers' skill in writing introductory help requests and increase their confidence in sending these help requests. We present the following hypotheses:

- **H1:** The overall quality of the introductory help requests written with the tool will be higher than help requests written without exposure to the tool.

H1 is motivated by related work in apprenticeship showing instruction that supports modeling, coaching, and reflection to be highly effective in teaching complex tasks [13].

- **H2:** Help seekers will continue to be able to perform introductory help seeking skills after the tool is removed.

While allowing help seekers to continuously use the tool indefinitely is an option, it is important to know whether these lessons could be applied to situations where the tool might not be easily available. H2 is based on previous work highlighting the role of cognitive apprenticeship mechanisms in supporting knowledge retention and transfer [13].

- **H3:** Help seekers will be more confident in sending their help requests after being exposed to the tool.

Because help-seekers typically initiate contact with help providers in professional contexts [10], we see likeliness to send help requests as an important and desired outcome. H3 is based on related work describing how believing that one has needed skills makes one more likely to perform the task itself [6], especially in the context of help seeking [53,54].

DESIGN PROCESS

We followed a design research process [18,70], which involved performing initial exploratory qualitative data collection with help seekers and providers, using these insights to inform design goals, and developing and testing a paper prototype before building the fully functional final design.

Preliminary Qualitative Data Collection

First, we interviewed nine help seekers (5 F, 4 M) and performed a 1.5 hour-long participatory design workshop with five additional help seekers (3 F, 2 M) who were in the early stages of new ventures within a university incubator space and extracurricular entrepreneurship groups. During interviews, help seekers were asked to describe their most recent online help seeking experience and to reflect on what was easy or difficult about this process. Interviews lasted on average 20 minutes. During the workshop, we asked participants to reflect on why they have not reached out to certain people for help in a professional context, and to brainstorm ideas for encouraging and supporting help seekers, like themselves, to reach out for help in the future.

To understand the help provider perspective, we performed interviews with seven help providers (3 F, 4 M), identified as people who have received help requests from novice entrepreneurs, have over five years of professional experience, and receive at least one online introductory help request a week, such as requests for information about their organization or profession. During the interview, we asked help providers to reflect on the most recent introductory help request that they received via email and what they liked and disliked about this request. We then asked help providers to describe the most common mistakes help seekers tend to make. Interviews lasted on average 20 minutes.

We analyzed interview transcripts and workshop notes using inductive coding methods [45] to understand challenges with help seeking and help giving. From this initial exploratory data collection, we identify reasons help seekers struggle to write introductory help requests, and requirements for successful introductory help requests as identified by help providers.

Preliminary Qualitative Findings

Help seeker perspective

All help seeker participants shared anxieties about how to best attract a help provider's attention, but had different approaches to dealing with this challenge. For instance, one participant described taking multiple days to figure out how

to pitch her work to someone whom she saw as more experienced, *“The entire process took me several days and it caused a lot of anxiety about how I would introduce and portray myself, pitch myself, and also speak to [their] interests.”* Others took a very different approach, sending out as many, almost identical, help requests as possible hoping to increase the chances of a response.

While there are multiple resources explaining what to include in introductory help requests (e.g. [60]), students described having trouble understanding how to apply these suggestions to their own situations. For example, a participant who was part of a team working on a product design entrepreneurship project described not knowing how to effectively “personalize” his help request to a local community stakeholder. He tried to personalize his request by dedicating an entire paragraph to describing the information he learned on the stakeholder’s website, which buried his main question and made his overall message much longer and more difficult to read. We heard this difficulty of not knowing what content to include or language to use echoed among participants who were not taught or did not practice strong communication skills at home or in school.

Overall, help seekers described the process of writing introductory help requests as highly stressful because they saw it as the main opportunity to connect with someone who could provide needed professional support. Participants primarily described not knowing what was considered appropriate content or language, and often not having the confidence to even send these requests for fear of rejection.

Help provider perspective

Subsequently, help providers described being inundated with introductory help requests, or *“bad emails”* as one called them. They generally had little sympathy for requests that were unclear, impolite, and/or poorly written. The main complaints included not knowing enough about the sender, not understanding the request, or being annoyed by the type of request or tone. For instance, one expert described receiving many emails about the organization that she runs in which people fail to introduce themselves, *“When people say I’m very interested in the [organization], is it a high school student? Who is this person?...This wouldn’t be the kind of thing where like, oh! I got to respond to this right away! It would probably be down low on the list...I get emails like this that I just kind of ignored for a long time.”* Others described not responding to emails because they did not understand what response was needed: *“One of [the problems] is not asking for anything or being very unclear about what they are actually asking about. So, you get a lot of emails where it’s not even possible to figure out what the person is trying to get at.”*

Through coding of help provider transcripts, we identified seven main requirements for what help providers look for in a good introductory help request: 1) clarity of who is the help seeker (e.g. name, profession, organization), 2) understanding of relationship (e.g. mutual connection, mutual

community), 3) understanding of why the help seeker is reaching out (e.g. project goals), 4) understanding of what is being asked, 5) demonstration that the help seeker has put in prior effort (e.g. reviewed online information first), 6) indication that the help request is personalized (e.g. why reach out to a particular person), and 7) an appropriate tone (e.g. polite, professional). These preliminary findings reaffirm related work on what to include in successful help requests [21,27,36,60].

Paper Prototype

Following the initial exploratory study of introductory help seeking behavior, we identified the need to build a tool that would both assist help seekers in identifying the language to write higher quality introductory help requests, as well as the confidence to send them. We first developed a paper prototype called Build-a-Message, which put together a message template based on the help seeker’s needs. We tested the paper prototype using wizard-of-oz methods [29] where help seekers answered a few quick multiple choice questions about their type of help request (e.g. request for conversation) (Figure 1, left), and we, acting as the computer, pieced together an ideal template for help seekers to fill in (Figure 1, right). Help seeking participants were asked to perform a think-aloud as they interacted with the prototype.

Help seeker participants found the prototype mostly useful, but did not like that it reduced opportunities for personalization due to the fixed template. Even if the template could be editable, participants found that having the initial template limited their writing style. For instance, some expressed a fear of sounding “too generic”. Others described a distrust of the template, and wanted to know how it was developed, how often it was successful in the past, and for what scenarios. For example, one participant explained that there could be many different sentence structures to achieve the same help request, and preferred to look at different examples before deciding what style was most appropriate for her needs.

Help providers also disliked the idea that a help request might be mostly written by a tool rather than the help seekers themselves as the quality of writing was a significant factor in deciding whether or not to respond. Following our

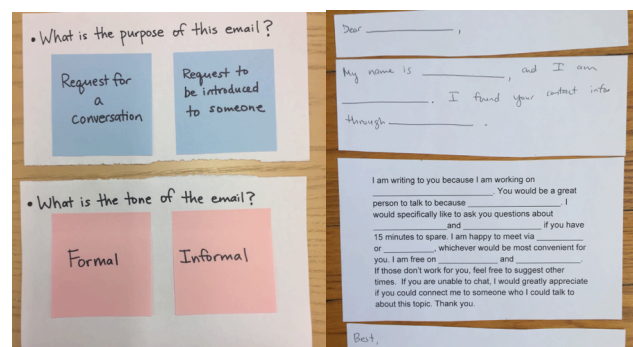


Figure 1: Build-a-Message helps craft a pre-written help request (Right) by having help seekers answer questions about their message (Left).

IntroAssist Matilda SIGN-OUT

Checklist: (a)

- ☐ Subject
- ☒ Introduction
- ☐ Connection
- ☐ Goal
- ☐ Qualifications
- ☐ Prior Effort
- ☐ Personalize
- ☐ Polite ask

Example: (b) [See more examples >>](#)

Subject: Quick call about outpatient therapy?

Hello Dr. [name],

I'm [name] with [Entrepreneurship Organization], a [University] organization where students use design to create local and social impact. My coach, [name], has put my team in contact with you.

My team is working with the [University] School of Medicine to improve the outpatient therapy of mild to moderate stroke survivors. We have not yet spoken to a doctor who is also an advocate, so your unique expertise would help us learn how to make the type of community impact that you have made with [Local Community] and [Local Community].

Would you be willing to speak with us sometime next week for 20 minutes to talk about our project? We would be happy to share the insights we gain from our work as well. We appreciate your time.

Thank you,
[name] and the E.O. Team

Draft your email here: (c) **Words: 149 of 175** (d)

Dear Whom It May Concern,

I'm Matilda Wormwood from Design Organization at Midwest University. My team is currently working with Local Organization, a City non-profit with a mission to make traveling more accessible for people with disabilities, to devise solutions to minimize damages done to wheelchairs when they are transported on and off the plane.

We are currently setting up multiple contacts of chair user samples for their feedback in order to gain insight on chair usage and damages, and we hope to use your help to create positive changes in our community. I understand that Accessibility Design Lab has worked with the Midwest University communities in numerous projects in the past and hope that another connection can be made.

Would you be willing to speak with us sometime this week for 30 minutes to discuss our project? We appreciate your time.

Thank you,
Matilda and the D.O. Team

Figure 2: IntroAssist is a web-based tool to support the writing of introductory help requests. It includes (a) an expert-informed checklist of best practices, (b) tagged community examples, (c) tagging one's own help request, and (d) a word limit suggestion.

design research approach, we took this feedback into account to develop our current functional design, which allows help seekers to view multiple examples in order to write the entire help request themselves.

IntroAssist Design

We designed IntroAssist as a web-based tool that leverages cognitive apprenticeship instructional methods to support writing introductory help requests. Unlike the earlier paper prototype, this online tool shows how items from an expert-informed checklist (Figure 2a) are instantiated through tagged examples of help requests (Figure 2b), supports reviewing of one's help request through self-tagging (Figure 2c), and encourages succinctness through a suggested word limit (Figure 2d). This prototype was built with Javascript, HTML, and CSS, using a Firebase database. The four main features of IntroAssist are outlined below:

Checklist of Best Practices: In order to share expectations of what to include in an introductory complex help request, IntroAssist provides a checklist of best practices informed by expert interviews (Figure 2a). Checklist items were informed by previous literature on what factors were important to help providers [21,27,36,60] and the exploratory interviews performed with help providers. Providing a checklist simulates some benefits of *coaching* [13] by breaking down and describing the type of content to be included in the help request [23,30]. While a checklist is not a replacement for the full range of coaching activities, providing a checklist falls under one of the coaching responsibilities of “providing hints” [13].

Tagged Peer Examples: In order to support making sense of other's help requests to inform one's own, IntroAssist highlights parts of the example help requests corresponding to items on the checklist (Figure 2b). Examples were provided by more experienced members of the entrepreneurial communities studied, and were selected by experienced help providers as particularly well written. Showing high quality tagged examples mimics the benefits of *modeling* [13], which has been shown to increase learning of complex tasks by showing how others perform similar work [17].

Tagging of Own Help Request: In order to encourage novices to reflect on the quality and content of their own help request, IntroAssist encourages novices to tag sections of their own written request with items on the checklist (Figure 2c). Tagging one's own help request encourages *reflection*, which supports knowledge retention [13].

Word Limit Suggestion: Finally, we include a word limit suggestion (Figure 2d). Previous work suggests that emails around 125 words tend to get more responses [1]. However, this finding was based on data analysis of all emails in general, where introducing oneself is not necessarily required. The chosen examples of introductory help requests provided in the tool were about 175 words or fewer, which was displayed as the suggested word limit.

EVALUATION

In order to evaluate the efficacy of IntroAssist, we performed a within-subjects experiment in a community of 26 novice entrepreneurs. We collected both quantitative and qualitative data on the quality of help requests and help seeker experience.

Measures for Quality	Description (Help provider rater)	Supporting Tool Features
Clarity of introduction	You had a clear sense of who they are.	Checklist/Examples - Introduction
Perception of reputability	They established themselves as someone reputable.	Checklist/Examples - Connection
Work description	They clearly described their work or project.	Checklist/Examples - Goal
Personalization	They appropriately personalized the help request to you or your organization.	Checklist/Examples - Personalize
Prior Effort	You are confident they did everything they could prior to asking you for help.	Checklist/Examples - Prior Effort
Clarity of ask	You had a clear sense of what they are asking of you.	Checklist/Examples - Polite Ask
Politeness	They asked their help request in a polite manner.	Checklist/Examples - Polite Ask
Tone	They used an appropriate tone given what they were asking.	Checklist/Examples - All items
Succinctness	They used an appropriate amount of words for what they were asking of you.	Word count
Flow	The content of the help request was appropriately organized.	Examples (overall organization)
Overall Quality	How would you rate the overall quality of the help request.	All features
Measures for Confidence	Description (Help seeker)	Supporting Tool Features
Confidence in quality	You are confident in the quality of this email.	All features
Likelihood to send	You are likely are you to send this email as is.	All features

Table 1: Measures to evaluate help request quality (Top) and help seeker confidence (Bottom). All measures were evaluated using a 7-point likert scale.

Participants and Setting

Twenty-six participants (14 F, 12 M) were working on early-stage entrepreneurship projects over the summer at a Midwest private university. Twenty-one participants were part of a six-week long program for social entrepreneurs in which they worked full time in teams of 4-5 to develop a product or service for a community partner. The remaining five participants were working on independent projects related to education and health. Participants had minimal to no previous entrepreneurship training, and needed to write introductory help requests to organizations, mentors, and users in order to request conversations and access resources. For instance, one team was creating a product to improve airport accessibility. They had to write help requests to airport staff and wheelchair manufacturers to request on-site meetings. Another participant was working to develop a mobile app related to exercise and needed to contact local running groups to ask if they would test her product. Participants were between the ages of 19 and 25, were currently in college (24 participants), recently graduated (1 participant) or in graduate school (1 participant). Two participants were non-native English speakers.

Experimental Setup

Each participant was asked to write two introductory help requests. Fourteen participants were asked to write a request *without* the tool then a request *with* the tool (No Tool First), while 12 participants were asked to write a request *with* the tool then *without* the tool (Tool first). See Table 2. This setup allowed us to collect within-subjects data of how tool usage affected quality of written help requests controlling for when the tool was introduced. All participants were compensated with a \$10 Amazon gift card.

Testing sessions lasted one hour and were performed in groups of 1 to 5 (one computer per participant) to best accommodate the busy schedules of the entrepreneurship teams. In order to minimize social interaction during the

experiment, we required participants to not speak to each other until all emails were written and surveys answered. We provided an introduction explaining that we were testing an email tool. We obtained verbal consent from participants to record their discussion and collect help requests written during the study. Participants were told they could leave the study at any time. Participants were then asked to list people to whom they needed to write introductory help requests for their project work, and then were randomly assigned one from the list for their first written help request and another for their second written help request. By writing to different people, we forced participants to write different content for each request.

Testing Session	No Tool First (14 people)	Tool First (12 people)
0-10 min.	Introduction to study	Introduction to study
10-20 min. (Request 1)	Write help request without tool (i.e. baseline)	Write help request with tool
20-30 min.	Survey A	Survey B
30-40 min. (Request 2)	Write help request with tool	Write help request without tool
40-50 min.	Survey B	Survey A
50-60 min.	Debrief and Discussion	Debrief and Discussion

Table 2: Participants were split between two conditions (No Tool First, Tool First), which determined when they were exposed to the tool treatment.

After each help request, all participants were asked to answer a survey about their help seeking confidence (Table 1, Bottom) and overall impression of the tool. At the end of the session, an open discussion was held about what participants found easy or difficult with writing emails with or without the tool. All final discussions were recorded and analyzed. Data was collected over a period of two months.

Assessing Help Request Quality

To evaluate quality of the introductory help requests, two experienced help providers evaluated each help request on multiple measures (Table 1, top). Rater 1 (the third author on this paper) has over 20 years of industry experience and

receives at least one introductory help request each week. A second rater (Rater 2) was added to provide an independent opinion from the project process and to detect potential bias from Rater 1's evaluations. Rater 2 is a professional career advisor and specializes in helping engineers connect with employers for jobs and internships. Neither rater participated in data collection or knew which help request was written with or without the tool. Raters achieved a high agreement using a Cohen's Kappa test of inter-rater reliability ($\kappa=0.93$) in identifying which email between subjects was higher quality in the No Tool First condition.

The two raters were asked to independently evaluate all the help requests (total of 4-5 hours each). Raters evaluated each help request on a 7-point Likert scale for 12 different features (Table 1, top). Rating was conducted individually and in person, so that raters could perform a talk aloud as they read through each help request. Raters were sent each help request to their email client so as to mimic an authentic introductory help-seeking scenario, and were asked to describe what they liked and disliked about each request.

Analysis

Overall, we analyzed 12 measures for quality of help requests (Table 1, top) and two measures for help seeker confidence (Table 1, bottom). The two independent variables included Tool Introduction and Assessment Time. **Tool Introduction** refers to whether participants are introduced to the tool when writing their first help request (Table 2, Tool First) or when writing their second help request (Table 2, No Tool First). **Assessment time** refers to whether the help request being evaluated is the first request (Request 1) or second request (Request 2).

Statistical analysis of the rating data was performed using the Aligned Ranked Transform (ART) for non-parametric factorial ANOVAs to analyze if tool usage had an impact on help request quality or help seeker confidence. Analysis was performed using the ARTTool package in R [35,64]. This is the most appropriate test because it analyzes for interaction effects in non-parametric repeated measures data, such as Likert data in a within-subjects experiment.

We also collected qualitative data through rater talk-alouds as they read through different help requests, and discussions with help seekers at the end of the testing session. Qualitative data was analyzed using inductive coding. To better understand why raters evaluated help requests in a certain way, we coded for positive and negative reasoning in their talk-alouds. To better understand help seeker confidence and general experience, we coded for expressed challenges as well as positive and negative impressions of tool usage.

Results

Results show that help requests written with the tool are generally higher quality, help seekers can perform introductory help seeking skills after the tool is removed, and that help seekers report being likely to send help requests written with the tool.

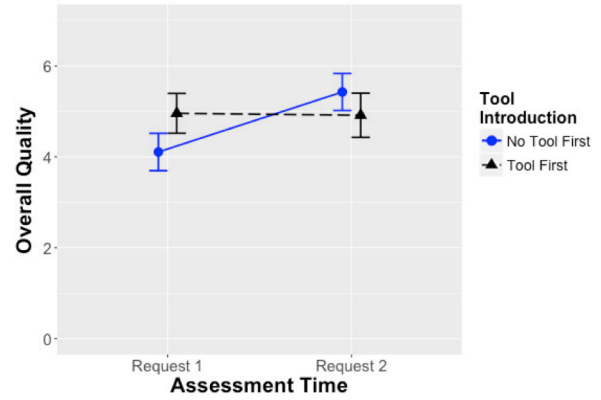


Figure 3: Help requests written using IntroAssist are rated as significantly higher quality ($p<.05$).

Impact on Quality

We find that help requests written with the tool are higher quality (H1). A two-way analysis of variance for non-parametric repeated measures data was conducted on the influence of two binary independent variables (Tool Introduction, Assessment Time) on the overall quality of the help request. Quality was measured on a 7-point Likert scale averaged between the two expert raters. This analysis revealed a main effect of assessment time whereby quality was higher at the second assessment time ($F(1,24)=14.53$, $p=.0008$). However, as can be seen in Figure 3, there is a significant interaction effect between Tool Introduction and Assessment Time ($F(1,24)=14.45$, $p=.0009$).

Using a post-hoc Tukey test, we find that help requests written with the tool during the first assessment time (Figure 3, Tool First-Request 1) were higher quality than those written without the tool (Figure 3, No Tool First-Request 1) ($M_{ToolFirst}=4.96$, $M_{NoToolFirst}=4.11$; $t(24)=5.084$, $p=0.0002$). There was also a significant difference in quality between help requests written after exposure to the tool (Figure 3, Tool First-Request 2) and help requests written with the tool during the second assessment time (Figure 3, No Tool First-Request 2) ($M_{ToolFirst}=4.92$, $M_{NoToolFirst}=5.43$; $t(24)=3.540$, $p=0.0085$). This interaction effect allows us to check that the increase in quality is due to the introduction of the tool rather than improved performance from writing another help request.

Even though Rater 1 and 2 highly agreed that help requests written with the tool were better, they disagreed on the reasons why. Based on both qualitative and statistical data, Rater 1 found that help requests written with the tool were better because they had a clearer introduction ($t(24)=9.159$, $p=0.006$) and indicated better reputability ($t(24)=11.803$, $p=0.002$), while Rater 2 found that help requests written with the tool were better because they had a clearer ask ($t(24)=8.665$, $p=0.007$), and were more polite ($t(24)=11.634$, $p=0.002$), personalized ($t(24)=8.666$, $p=0.007$), and succinct ($t(24)=14.460$, $p=0.0009$).

Without Tool	With Tool
<p>Hello,</p> <p>We are a group of undergraduate students from Midwest University working on a project to address adolescent depression through Design Organization this summer.</p> <p>As a bit of background information, Design Organization, also called D.O., is a program for college students that aims to make a lasting social impact through student-run design projects. D.O. is located at several universities throughout the country and is active throughout both the academic year and the summer.</p> <p>This summer, our group's project is to address the problem of depression and suicide in teenagers. More specifically, we are focused on the [City], [State] community, as there have been several suicides by high school students in the area in recent years.</p> <p>We are working with doctors at the [City] hospital, mental health professionals, and community members.</p> <p>One of our areas of interest in mental health training and education in high schools. From both our own experiences and research, we all feel that school mental health curriculum is often inadequate, and there is a major stigma surrounding mental illness that is what leaves problems hidden until it's too late.</p> <p>From our research we discovered [your organization], and are interested in learning more about your organization and its education and training in schools.</p> <p>Thank you. - D.O. members [First Name], [First Name], [First Name], and [First Name]</p>	<p>Hi,</p> <p>My name is [First Name] and I'm a student at Midwest University. This summer I'm working with three other students through Design Organization, which is a student organization that aims to address social problems and make a lasting impact through design.</p> <p>Our goal is to address depression and suicide, specifically in the [City] community. We are working closely with mental health professionals at the [City] hospital and community members. From our preliminary meetings we have realized that academic stress is often correlated to mental illness, and are considering this as the focus for our project.</p> <p>We think [your organization] would be a great resource as it deals with students who are a similar age and likely under the same experiencing similar problems.</p> <p>We would like to meet in person if possible to discuss mental health in teens and young adults. Would it be possible to schedule a group meeting with a professional from [your organization]?</p> <p>Thank you. - [First and Last Name] and the D.O. team</p>

Table 3: Expert raters found the help requests written *with* the tool (e.g. Right) to be higher quality than those written *without* the tool (e.g. Left).

Rater 1 expressed, *"Reputation always wins. I could get an email with a perfect ask, but if I don't know who it is then I won't respond."* For instance, in Table 3, the help request written without the tool does not include the help seeker's name (Table 3, left), while the request written by the same person with the tool includes the help seeker's name and more succinctly explains her background (Table 3, right). Rater 2 did not find significant differences in introduction and reputability, but did notice differences with respect to clarity of ask, politeness, personalization, and succinctness. For instance, Rater 2 explained that the help request written with the tool in Table 3 was better because it had a clearer ask: *"This one, they clearly said what they needed from me."* The help request written with the tool specifically asks to schedule a meeting (Table 3, right), while the help request written without the tool (Table 3, left) just says that they are "interested in learning more."

Overall, we find that using the tool positively impacts the overall quality of the help request. But it is unclear why a request may be better as raters preferred requests for different reasons, suggesting that different people value different content in evaluating help requests.

Performance After Tool Removal

We also find that help seekers are able to perform introductory help seeking skills after the tool is removed (H2). Using a post-hoc Tukey test, we find that when the tool was

introduced at the second assessment time (Figure 3, No Tool First), there is a significant increase in quality from Request 1 to Request 2 ($t(24)=5.354, p=0.0001$). But, there was no significant difference in overall quality when the tool was introduced during the first assessment time (Figure 3, Tool First) ($t(24)=.134, p=0.999$), suggesting that participants are able to continue performing introductory help seeking skills after the tool is removed.

Impact on Confidence

We find that help seekers were not more confident in the quality of help requests written with the tool, but did report being more likely to send help requests written with and after exposure to the tool. This provides partial support for H3. A two-way analysis of variance for non-parametric repeated measures data was conducted on the influence of two binary independent variables (Tool Introduction, Assessment Time) on the help seeker's report of being likely to send the help request, measured by a 7-point Likert scale. There was a main effect of Assessment Time ($F(1,23)=6.07, p=.022$) and Tool Introduction ($F(1,23)=11.48, p=.003$), where being likely to send was reported as higher at the second assessment time. As can be seen in Figure 4, there is also a significant interaction effect between Tool Introduction and Assessment Time ($F(1,23)=11.86, p=.002$).

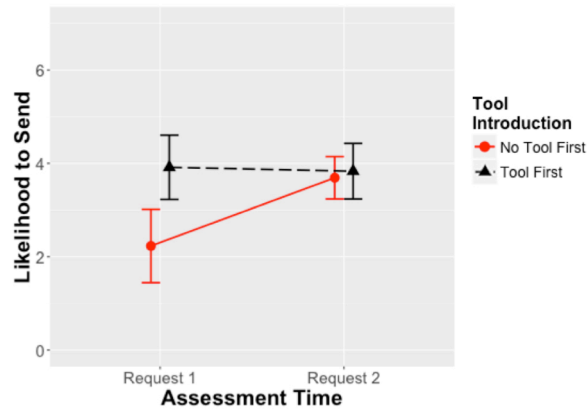


Figure 4: Help seekers are more likely to report being likely to send help requests written with IntroAssist.

Using a post-hoc Tukey test, we found that participants who used the tool during the first Assessment Time (Figure 4, Tool First-Request 1) reported being more likely to send their help request than those who did not use the tool (Figure 4, No Tool First-Request 1) ($M_{ToolFirst}=3.92$, $M_{NoToolFirst}=2.23$; $t(23)=3.429$, $p=.0114$). There was no significant difference in report of being likely to send after exposure to the tool (Figure 4, Tool First-Request 2) when using the tool at T2 (Figure 4, No Tool First-Request 2) ($M_{ToolFirst}=3.83$, $M_{NoToolFirst}=3.69$; $t(23)=2.127$, $p=.1745$). We also find that when the tool was introduced at the second Assessment Time (Figure 4, No Tool First), there is a significant increase in report of being likely to send from Request 1 to Request 2 ($t(23)=3.490$, $p=.0099$). There was no significant difference in report of being likely to send when the tool was introduced during the first assessment time (Figure 4, Tool First) ($t(23)=.404$, $p=.9772$), suggesting that participants have retained confidence in sending the help request a short time after the tool is removed.

Novices expressed that having the tool helped them structure the email, identify what to include, and come up with the wording more easily. Some participants even sent the help requests written with the tool during the experimental session. In future versions of this tool, tagging one's own email would help populate the pool of tagged examples from which peers can take inspiration. Even though tagging may take extra time, participants expressed that it helped them reflect on the quality of their writing and double-check that they included important content.

Understanding Use of Tool Features

Data on impression and usage of the tool provides a better understanding of which features may have influenced the significant effects. For each of the following features we report the percentage of participants that stated they found the feature to be very useful (i.e., they rated the feature either "4-Very Useful" or "5-Extremely Useful" on the Likert scale). 85% found the checklist very useful ($M=4.35$), 77% found the overall examples very useful, 69% found the tagging within examples very useful ($M=3.81$), 73% found the

word limit suggestion very useful ($M=3.62$), and 46% found the tagging of one's own email very useful ($M=3.35$).

Reinforcing the survey results, participants explained their experience using the tool. When asked to write a help request without using the tool, after having used the tool earlier, one participant explained, "I had a harder time coming up with words because I didn't have examples. It was taking me longer to actually form words...I definitely would not send the one I just wrote [without the tool]. I felt like the first one was more structured, and I felt more confident with that one."

Another participant explained how tagging his own email helped him make sure that he included all the needed information, "Forcing someone to [tag their own email] makes sure they have that content in their email, which is useful...I just found it very useful to like force myself to like, does it actually have a goal?"

We also collected log data on how often participants used tags and examples: 88% used the "Introduction" and "Goal" tag, 85% used the "Connection" tag, 81% used the "Qualifications" tag, 77% used the "Polite Ask" tag, 69% used the "Prior Effort" and "Personalize" tag, and 58% viewed more than one example. This data could suggest that certain checklist items may be more important or easier to fulfill than others. Further work also needs to be done to identify the optimal number of examples.

Impression of IntroAssist

IntroAssist was received positively with 86% of participants expressing that they found the tool "Very Useful" to "Extremely Useful," and "Very Likely" to "Extremely Likely" to recommend it to a friend. Some participants continued to voluntarily use the tool after the testing session as well, and multiple participants asked if the tool would be commercialized and if they could share it with friends. Throughout the development of IntroAssist, University career advisors expressed high interest and asked if they could use the tool as part of their undergraduate curriculum to help students write cover letters to search for jobs and internships. Interest from people outside of the entrepreneurship space highlights the broader applicability of this tool for supporting other types of requests, such as employment emails, grant writing, and publicity material.

The few participants who expressed dislike of IntroAssist explained that they already felt confident in their ability to write help requests and did not think this tool would help them or others. One participant who rated low usefulness of the tool explained "I guess I'm just not intimidated writing emails." In this particular case, this participant's confidence in her ability was not matched by a high-quality evaluation by either rater, suggesting that help seekers may not have an accurate evaluation of their own help-seeking skills.

DISCUSSION

Despite the increase in communication technologies meant to support the development of professional connections, many people still lack the necessary communication skills and confidence to access the resources they need. Like previous HCI scholars [15,22], we question the basic assumption that simply providing technologies to identify useful others is enough to encourage fruitful interactions. As a consequence, little work has focused on supporting the help seeker's ability and their willingness to reach out [5].

Applying Cognitive Apprenticeship Online

We apply cognitive apprenticeship instructional methods [13] to explore how the design of a web-based tool could facilitate professional connections through the writing of introductory help requests. Unlike previous HCI literature where researchers apply cognitive apprenticeship to support one-on-one mentorship online [62], we study how these instructional methods can be designed into tool features in order to provide instruction when expert guidance is not readily available. To reiterate, IntroAssist supports *coaching*-like activity through an expert-informed checklist of best practices and suggested word limit, *modeling*-like activity by providing tagged peer examples, and *reflection* by encouraging self-tagging of one's own help requests [13].

However, cognitive apprenticeship instruction is most effective if the learner believes the guidance provided is worth following [13]. IntroAssist may work best in environments where checklist items and examples come from respected peers or are chosen by respected experts. Suggestions of how platform design can help identify which work examples to follow have been described in multiple online contexts, such as crowdfunding where higher funded projects are seen as more useful examples [32], in fan-fiction [11,19] and graphic design platforms [42] where users identify content based on the number of likes or comments, and in crowd work support tools where crowd workers are provided "gold standard" examples of how to perform complex web search [17]. Similar indications could be built into IntroAssist, such as through community leader tagging, to better encourage trust in instructional material.

We also recognize the opportunity for IntroAssist to enhance, rather than replace, supports provided by existing offline services. For instance, given initial interest by career counselors, IntroAssist might be particularly successful as a support tool deployed within existing career centers (e.g. university or city-based employment centers) or local professional communities (e.g. co-working spaces) where people look to leadership for suggesting supplemental resources that can be used at home when expert guidance is not readily available. The general design of IntroAssist could be applied to broader written communication contexts, such as seeking mentorship [62], funding [32], and feedback [22], where communication requirements are more complex than expected [22].

Overall, not seeking help can have long term negative consequences on social capital development, as those who fail to make professional connections will have fewer opportunities to learn skills and access resources critical for success [20,39]. These challenges can be exacerbated when there is a power dynamic [41,54] (e.g. among marginalized populations) and for those who have low communication self-efficacy (e.g. non-native English speakers). Through the design of IntroAssist, we begin to address some of the hidden challenges in developing professional connections, and social capital more broadly.

LIMITATIONS AND FUTURE WORK

We also acknowledge limitations with this study. For instance, the tool was tested in a specific entrepreneurial community. Future work would include deploying this tool to other contexts to test how different community-types, demographics, and structures influence tool usage. We explore how a package of features supports help request performance and confidence. A future lab study could be done to test each of these features individually and in combination to identify what specific benefits each feature provides. We also plan to perform a longer-term study to test more robust measures of learning, such as long-term skill retention and transfer to other help seeking contexts. Now that we know this initial design produces positive effects on help seeking behavior, we plan to deploy the tool for longer-term use in multiple professional communities, in order to test usability on a broader scale and identify what additional facilitation might be needed for successful adoption.

CONCLUSION

Based on a review of help seeking literature and our empirical studies, we argue that computer-mediated communication systems should be designed to support users beyond recommending new connections. They must also help users to communicate in the first place. IntroAssist provides an opportunity to facilitate the initiation of professional connections through written introductory help request by providing an expert-informed checklist, tagged peer examples, self-tagging, and suggested word limit. We find that expert raters consider help requests written with IntroAssist as more effective than those written without, participants are able to perform introductory help seeking skills after the tool is removed, and participants report being more likely to send help requests written with the tool. With greater skills and confidence in performing introductory help seeking, people can more effectively leverage the myriad connections Internet technologies have come to offer.

ACKNOWLEDGEMENTS

We thank Shannon Nachreiner for providing ideas and collecting data during the early stages of this project. We thank Matt Easterday and Daniel Rees Lewis for providing Learning Sciences expertise. We thank Josh Hibschan, Yongsung Kim, and Leesha Maliakal for providing programming guidance. We also thank Tawanna Dillahunt, Walter Lasecki, and Harmanpreet Kaur for providing feedback. Most of all, we thank our participants for being part of this study.

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