Using a Participatory Toolkit to Elicit Youth's Workplace Privacy Perspectives

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ABSTRACT

The rapid evolution of technology has enabled us to perform complex, interdependent, and geographically distributed work. As a result, the effective use of communication and coordination technologies is increasingly crucial to success in the workplace, raising at the same time concerns about workplace privacy. In this paper, we present a case study showing how we adapted and used a participatory toolkit to elicit the privacy perspectives of a 3D print shop's youth employees. Participants expected their managers and co-workers, rather than other third-parties, to see their data, and yet prioritized keeping their co-workers informed rather than being overly concerned about third-parties accessing their data. We found this approach effective at creating an expressive space for the youth to reflect on and share their expectations and preferences on workplace data privacy, a practice that can enhance both their workplace participation and professional communication training. We conclude with thoughts on how using open-ended participatory mechanisms can support employees' ongoing reflection on the privacy of communication and coordination technologies, leading to increased fluency and participation in workplace decision-making.

CCS CONCEPTS

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

KEYWORDS

youth, privacy, after-school employment, chatting tools

1 INTRODUCTION

Emerging digital workplace technologies are rapidly enabling us to perform work that is increasingly complex, interdependent, and geographically distributed. In recent years, we have seen shifts not only in how we perform work (e.g., artificial intelligence [33]), but also in where (e.g., co-working [27]), and when (e.g., gig-work [16]) we perform it. In response to these changes, the workforce of the future needs to adopt and develop new skills and sensitivities to navigate the informational landscape of the modern distributed workplace. A key set of skills in this space is the effective use of social technologies in the workplace [9, 10, 29]. As these tools become more prominent, so have discussions about employee privacy in the workplace [15, 26]. Beyond helping employees becoming skillful in workplace digital communication, efforts are needed to develop participatory methods that are sensitive to the data-rich environments of the modern workplace and similar to "telling activities" [8] developed by Participatory Design practitioners support employee participation and inclusion in understanding and shaping workplace communication norms and practices.

Furthermore, as work continues to change and evolve, it is important to understand the needs of youth as they transition from school into the workforce, with a view of supporting this transition by creating relevant and realistic training programs. Unlike previous generations, today's youth have spent their entire lives with exposure to inter-networked technologies [24]. Estimates suggest that up to 95 percent of youth in the United States own or have access to a smartphone, and that 45 percent are always online [2]. Additionally, 97 percent manage at least one online presence [2]. This historically unprecedented level of access to social technologies has led to some adverse experiences including cyberbullying, feeling pressure over what to post online, and risks to privacy [1, 3, 6]. While emerging research has studied youth's online decision-making in the context of home and school, research has not yet focused on their experiences in the workplace. More importantly, there is a need for easy-to-use and detailed methods and procedures for eliciting the data privacy perspectives of this population with respect to social technologies in the workplace. We acknowledge that understandings of data

privacy vary in different countries and contexts. Here, we focus on the end-user perspectives of workplace data privacy in Eastern United States.
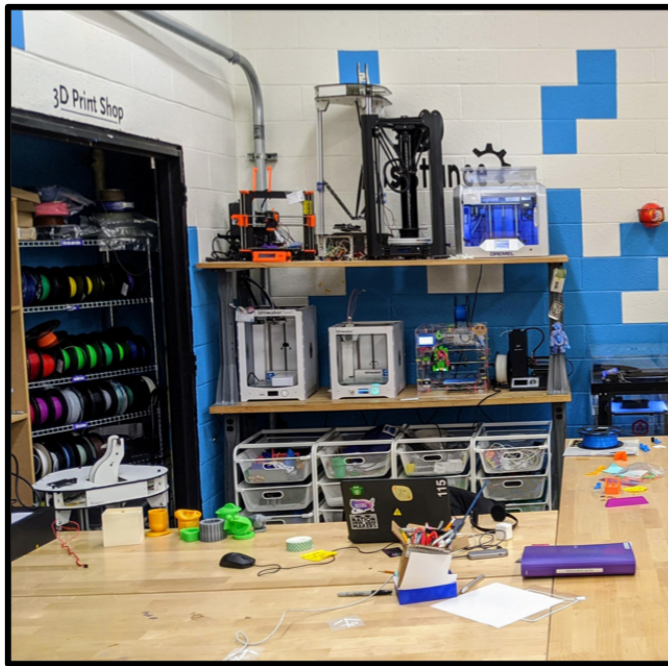

Figure 1: A side view of the Digital Harbor Foundation 3D print shop's work space: while 3D printers and ongoing and completed print jobs are visible in the shared space, it is difficult to know the status of orders or technical issues that employees in previous shifts may have encountered by simple observation. Therefore, the employees need to use coordination and communication technologies to get their job done effectively.

In this case study, we adapted and used a participatory toolkit [13] to elicit the workplace privacy expectations of a cohort of five youth employees at a 3D print shop. The youth print shop provides after-school technical employment training for urban youth and is located at a youth education center and makerspace, the Digital Harbor Foundation (DHF), in a large city in Eastern United States. At the print shop, youth use an array of 3D printers to fulfill customer orders for 3D printed goods in a variety of colors and materials (Figure 1). We share results from using the toolkit in this context, discuss participant feedback about its usability and ability to support non-expert users to reflect on and express detailed privacy perspectives, and offer future directions for how it can be improved and adapted for use in new contexts. Our motivation for the study is to find out how to better design future privacy-aware workplace training programs for youth. Furthermore, we wanted to investigate how to develop a toolkit that can help youth employees navigate the privacy aspects of increasingly complex communication and coordination tasks needed in distributed workplaces. We were interested in youth perspectives as they are often the recipients of job training programs and use multiple digital platforms to

communicate across different contexts (e.g., home, school, work). Yet, we know little about their privacy behaviors and motivations in the workplace and how to elicit them effectively. Our findings contribute to (1) knowledge on designing participatory tools for reflecting on and expressing perspectives on the privacy of workplace technologies, and (2) insights on the privacy expectations of youth employees.

The remainder of the paper is organized as follows: We will follow this section with an overview of existing research in this area. In Section 3, we provide a description of the participatory activities toolkit and how we adapted it for use in the workplace context. Next, in Section 4, we present our methodology, including data collection and analysis methods. This is followed by our findings section, where we present results on both the toolkit's usability, and the privacy perspectives shared by our participants using it. Next, in Section 6, we discuss the findings in detail. Finally, we discuss the limitations and ideas for future work, before wrapping up with a brief conclusion.

2 RELATED WORK

2.1 Eliciting End-User Privacy Perspectives

Scholars have utilized a variety of approaches – including drawings [25], interviews [12, 18], focus groups [19], surveys [30], and co-design activities [35, 36] – to elicit the privacy perceptions of users from diverse populations. With respect to visual, paper-based methods, Ray et al., asked 20 older participants to create open-ended drawings of the general concept of "privacy", as they perceive it in both digital and non-digital contexts [25]. In semi-structured interviews following the activity, participants used the drawings to describe their privacy concerns, feelings of resignation and fear, and protection strategies. In a different study, Asgharpour et al. used a novel virtual card-sorting method to elicit security mental models of experts and non-experts [4]. Participants sorted virtual cards with security-related words (e.g., "Spyware", "Spam") into categories correlating to common security mental models (e.g., "Physical Safety", "Warfare"). A comparison of these categorizations revealed significant differences between the mental models of each group. Previous efforts have further shown that visualizing privacy characteristics, for example through food-label style visualizations and comic strips [17, 28], are effective ways to engage and inform users. Other research has focused on eliciting the privacy-related values of designers through the use of visual design workbooks that bring together different design scenarios in a visual format to help designers reflect on tensions that may arise in the design of new technologies [34]. These efforts the importance of developing different elicitation methods to elicit expert and non-expert privacy perspectives with the goal of designing better systems and services.

The toolkit described in this work is adapted from our previous work, where we created a set of paper elements and interactive prototypes to elicit the privacy expectations of non-technical older adults for adaptive assistive technologies [13]. Adaptive assistive technologies monitor and dynamically respond to the activities of a user with disabilities who is experiencing difficulties when using an interactive system. We found that using the toolkit helped elicit detailed privacy preferences and expectations from their participants and helped them reflect on the types of data that adaptive assistive

technologies may collect and who may have access to them [13]. We will describe the original toolkit and how we adapted it in more detail in Section 3.

The current study builds on and contributes to previous efforts of developing participatory and inclusive tools and techniques to collect detailed end-user privacy perspectives with the goal of incorporating them in the design of future technologies.

2.2 Participatory Approaches to the Privacy of Workplace Technologies

A large body of literature has examined the relationship between privacy and social technologies in the workplace. The majority of these studies have focused on the privacy perspectives of adult employees. For example, in a 2002 study, Herbsleb et al. sought to introduce an instant messaging tool to support multi-site software development projects. During the early stages of its development process, participants expressed legal and practical concerns over the tool's awareness features which would allow users to see when others were online [15]. In another study, McGregor et al. found that journalists engaged in self-censorship over certain social technologies due to concerns over security and privacy [20]). A key concern in this space has been about companies monitoring the online interactions of their employees [26], signalling a need to better understand how employees and employers perceive workplace privacy and how can there be more discussion and communication about this important issue among stakeholders. To our knowledge, previous research has not studied the privacy expectations and concerns of youth employees and how these may impact their technology use or work performance. Understanding these perspectives and developing participatory tools that facilitate their elicitation can lead to important knowledge on both how to better train the technical workforce of the future in workplace privacy, and also how today's youth negotiate online and offline communication and coordination practices across personal and professional contexts.

2.3 Understanding the Privacy Perspectives of Youth

There is a large and growing body of work which has examined youth's online privacy (e.g., [6, 7, 14, 14, 37]). Earlier work in this space found that this population was very willing to give away personal information leading to concerns of a paradox between their privacy attitudes and behaviors [6, 14]. However, more recent evidence suggests that the reality is more nuanced [14]. Youn's 2005 survey of 326 high school students found that youth's willingness to disclose information online was positively correlated with the perceived benefits of sharing [37]. Other work has documented evidence of youth engaging in protective behaviors, such as managing who has access to their online profiles, or fabricating identifying information [7]. However, despite these privacy preserving behaviors, many youth may feel like they have limited control over their data [14]. Furthermore, research has shown a tension between parental control and youth's need for agency and self-regulation in online spaces [31, 32].

With respect to methodology, several projects have looked at developing participatory approaches for co-designing privacy applications and discussing privacy issues with children. For example,

McNally et al. [21] conducted two co-design workshops with 12 children where they redesigned privacy monitoring applications. Their study showed that while children acknowledged safety needs, they preferred designs that promoted child-parent communication and taught risk coping rather than monitoring. In another study, Ashktorab and Vitak conducted five participatory design sessions with high school students to come up with cyberbullying mitigation and prevention solutions [5]. In addition to identifying a set of possible applications to prevent and mitigate cyberbulling, the researchers and participants found the participatory approach instrumental in providing opportunities for intergenerational discussion of an important issue as well as the discovery of varied perspectives on cyberbullying.

The current work is motivated by prior research by Easley et al. at a youth-staffed 3d print shop in which interviews, focus groups, and more than one year of direct and participant observations were used to study youth's communication and coordination behavior [11]. In this previous study, researchers found that while effective communication and coordination were essential to completing large or complex job requests, this was sometimes a challenge for youth [11]. To investigate these breakdowns, researchers documented critical incidents of handoffs between print shop employees and found that communication tools like Slack were not always used to share job information when needed. This lack of activity led to eventual efforts from the print shop's managers to increase open communication between employees over Slack [11]. Motivated by prior work which has documented instances of youth engaging in protective behaviors online (e.g., [7, 14, 37]), we sought to understand if privacy concerns might be contributing to a lack of communication in the print shop.

3 AN OPEN-ENDED PARTICIPATORY ACTIVITIES TOOLKIT FOR ELICITING PRIVACY PERSPECTIVES

We adapted and utilized a participatory activities toolkit [13] to elicit the privacy perspectives of non-expert older adults towards adaptive assistive technologies that collect and respond to user performance data (e.g., typing and pointing data) by dynamically providing assistance when errors are detected. This toolkit has graphical and tangible elements specifically designed to help non-experts externalize their preferences and expectations about different use scenarios and data types [13], features that are particularly suitable for the current project's needs. In order to make the toolkit usable for the current scenario, we adapted both its content and format. With respect to content, we replaced information types that a software assistive technology system might collect, such as typing or pointing data, with message types that youth in the print shop might communicate with each other. Furthermore, we changed third parties to match individuals that the youth may interact with in their workplace rather than medical professionals or caregivers which were identified in the original study. We kept the toolkit open-ended by including blank cards in several categories (see below), and including questions in the protocol asking participants for suggestions on what additional third parties and information types to include in the activities.

Original Toolkit Component [12]	Adaptations Made for Printshop Toolkit
Scenario Cards	Renamed to "*Description*" cards as our focus is on existing technologies used by our participants, content of cards (i.e., highlighted technologies) adapted for print shop context, made aesthetic changes
Data Type Cards	Renamed to "*Information Type*" cards as our intent is for youth to reflect on their current workplace communication practices/sharing behaviors, content of cards adapted to reflect types of information commonly shared in print shop context, made aesthetic changes
Third Party Cards	Content of cards adapted to better represent the different groups that youth employees interact with in the print shop context, made aesthetic changes
Expectations Chart	Made aesthetic changes
Privacy Standard Strips	Not used/adapted to simplify activity for use during interview sessions
Wheel of Expectations	Not used/adapted to simplify activity for use during interview sessions

Table 1: Overview of changes made to adapt the original toolkit [12].

With respect to format, we simplified the toolkit by replacing questions about privacy policies and emotional responses to violations of expectations, with more detailed questions about previous experiences where youth's privacy expectations were not met. We made this change, since in contrast with the original study [13] that used the toolkit with participants who had not used the technologies being studied, our participants had experience using the tools (i.e., Slack and Email) at the time of the interviews and, therefore, could reflect on their experiences in relation to real-world scenarios.

In the following sections, we provide details about each toolkit component and the adaptations we made to make them ready for use in this research context.

3.1 Adapting the Toolkit for use in the DHF Print Shop

Our adapted toolkit consists of four components: 1) description cards, 2) information type cards, 3) third-party cards, and 4) the expectations chart. With the exception of the expectations chart, which retains its original structure, all other components have been modified to work within our unique research context. Two toolkit components – a wheel of emotions, and privacy standard strips – were not used in this study. We made this decision to streamline the activity so it could be easily completed during interviews with our participants at DHF (rather than as a standalone activity). Additionally, in our prior study evaluating this toolkit, we noted that several participants found it particularly difficult to map their emotional responses to potential privacy violations to a chart [13]. All toolkit components were printed on standard letter paper in full color. To ensure that all materials could easily be transported to-and-from our research site and reused, we opted to laminate all paper components (Figure 5). Table 1 presents an overview of the changes made to adapt the original toolkit for use in the DHF print shop context.

3.1.1 Communication Technology Description Cards. The first component of our adapted participatory activities toolkit are ***description cards*** (Figure 2). These cards serve as a tangible prompt to help users remember to focus on one specific technology at a time. We created two description cards to represent each of the print shop's primary communication tools – one for Slack, and one for email. Each card contained a brief description of the tool in question and screenshot of its interface. Figure 2 shows the description card created for Slack. We previously referred to this component as "scenario cards" because they were used to describe use cases for hypothetical technologies [13]. However, for the purposes of this study, we refer to them as "description cards" since we are examining participants' privacy perceptions for tools already in use.

3.1.2 Information Type Cards. The second component in our adapted toolkit are ***information type cards*** (Figure 3). These cards are specifically adapted to the print shop context and contain high-level representations of the types of information regularly shared by youth employees. To create these cards, we relied on knowledge gained from conducting research at the DHF print shop over the last three years – during this period, we have had numerous opportunities to directly observe, examine, and discuss (e.g., through interviews, and focus groups) youths' usage of communication tools in the workplace. In total, we created six information type cards in three categories, representing (1) updates and questions about jobs (e.g., work for clients), (2) 3D printers (e.g., printer status), and (3) administrative information (e.g., scheduling). In our design of these cards, we intentionally distinguished between updates (e.g., an employee sharing the status of an ongoing job with their coworkers), and questions (e.g., an employee asking their co-workers for help with a problem) to explore whether youths' privacy expectations shifted in response to concerns over being negatively perceived by others (e.g., asking questions publicly may lead to negative attention from others). In addition to the six predefined categories, we
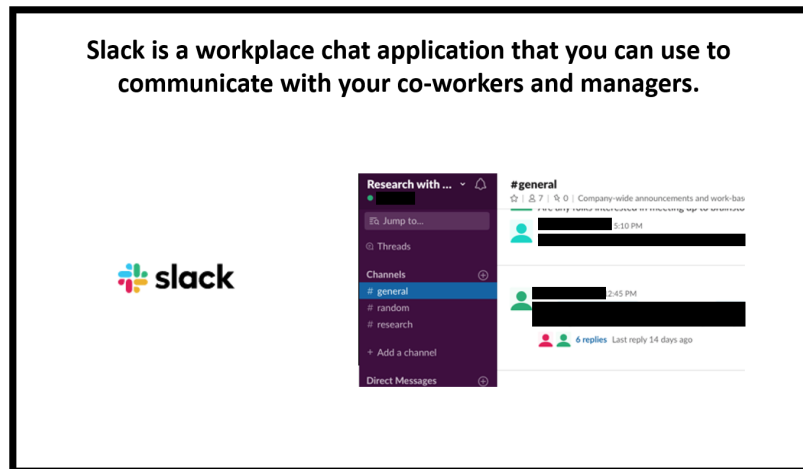
Figure 2: A description card from the participatory toolkit. This image is of the description card used to represent the Slack chatting tool.
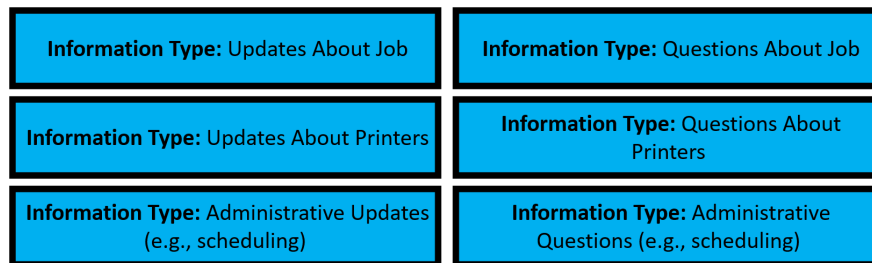

Figure 3: Information type cards: each row represents one of three main information types: Job Info, Printer info, and Admin info (respectively, from top to bottom)

brought blank cards to each interview session so that participants could add to the toolkit if desired.

The form factor of these cards were slightly modified from what was described in prior work [13]. Rather than use 2.5 x 2.5" inch cards, we opted for longer cards that could be more easily read by participants and photographed for documentation purposes. We previously referred to these components as "data type cards" [13]. However, given our specific focus on communication technologies and interest in understanding youths' privacy perceptions towards sharing different types of information, we refer to them as "information type cards" throughout this paper.

3.1.3 Third-party Cards. Our adapted toolkit also contained nine **third-party cards** (Figure 4). Each represents a category of people who may potentially have access to information shared over Slack or email – as with the information type cards, we relied on knowledge gained from more than three years of field work at DHF to create cards that were relevant for this research context. We identified third parties that the youth interact with regularly in their employment context by consulting interview and observation data from a previous study of youth coordination behavior in this

context, where researchers had asked youth about their communication practices and challenges with respect to getting their tasks done and completing job hand-offs [11].

Our final set of third-parties included groups that we observed youth regularly interacting with during work hours (i.e., friends/co-workers, managers, and clients), other groups at DHF (i.e., other adult staff members, everyone within DHF's organization), external parties (i.e., the company that built the communication tool, and advertisers), and nobody. We chose to include categories for both friends working in the print shop, and all youth employed at the print shop to better understand whether closeness of relationships with peers impacted youths' privacy expectations or willingness to share information with others. In addition to these nine predefined categories, we again brought blank third-party cards so that participants could add to the toolkit if desired.

3.1.4 Expectation Charts. The final component of our toolkit is the **expectations chart**. The expectations chart is a two column chart which is used to help elicit participants' privacy expectations during the activity (Figure 5 A, B).

The green column of the expectations chart represents parties that participants would expect to have access to information they share while the red column represents parties that they would not.
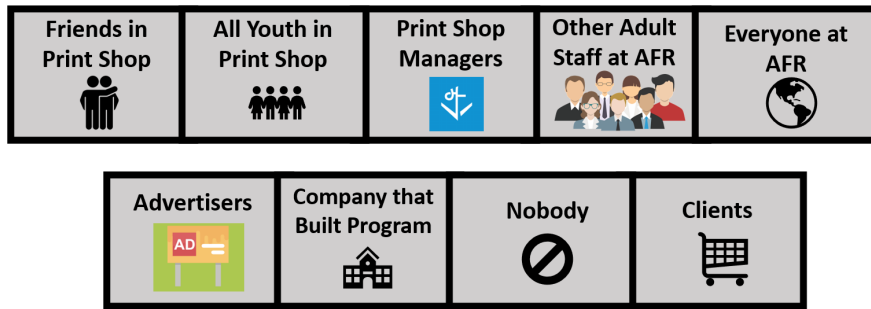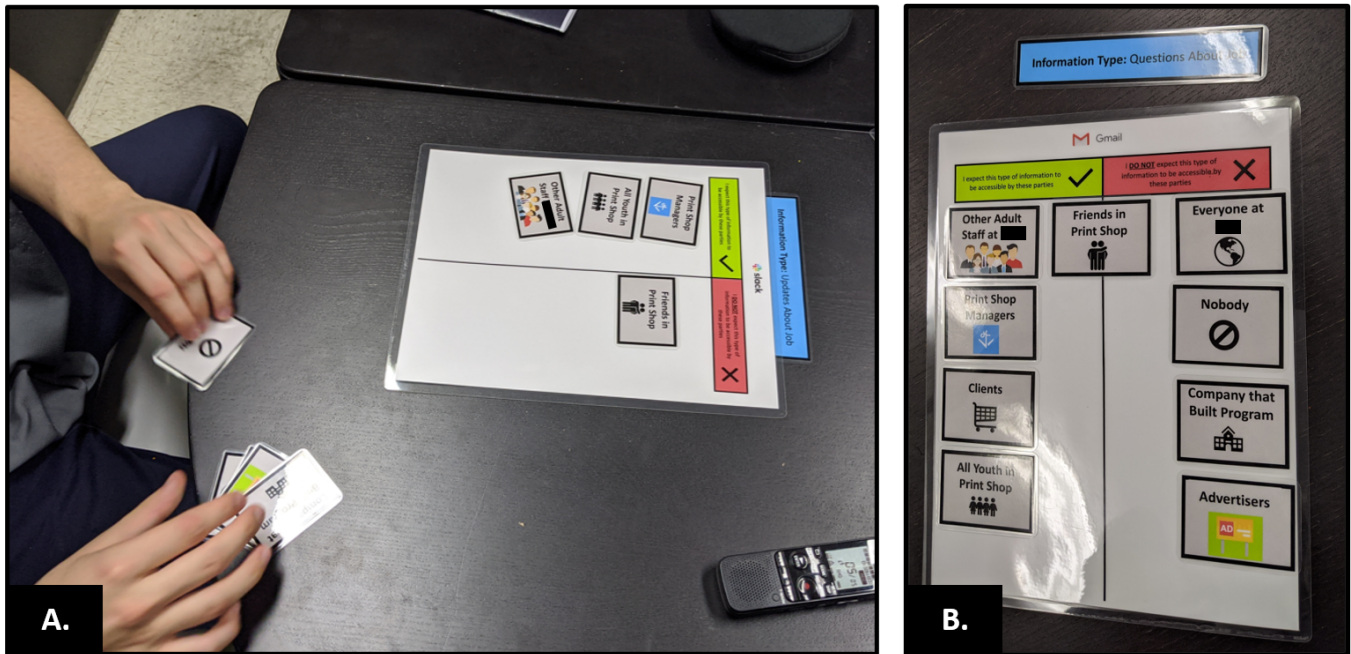
Figure 4: Third-party cards.

Figure 5: The expectations chart in use. Image A shows a participant placing third-party cards on the chart. Image B shows a completed chart with a card placed across the middle line to show that an answer was context-dependent.

We created two versions of this chart – one for Slack and one for email – to ensure that artifacts generated during this activity could be easily and quickly documented. In the following section, we will describe the participatory activity and how it was facilitated.

4 METHODOLOGY

We evaluated the participatory activities toolkit with the five youth employees at DHF's 3D print shop (Table 2). At the time of hire, participant ages ranged from 14 to 17 (avg. 15). All had worked in the shop for at least one year, while P1 and P2 had worked in the shop for almost three years. We decided to focus on these youth because they constituted the entire cohort who were working at the print shop at the time of the study and were all co-workers who communicated with each other using the Slack tool under study. All data collection occurred on-site at DHF during employees' regularly scheduled shifts. Participants did not receive compensation for

taking part in our interviews/participatory activity, but did receive their regular salary. Prior to data collection, we obtained approval from our university's Institutional Review Board, and assent and consent from all participants and their parents or guardians, respectively. We also piloted our toolkit activity procedure with two participants who were not affiliated with DHF but had experience using both communication tools. This process helped us to refine the physical design of kit components and minimize the risk of encountering unexpected issues. We conducted the interviews in Fall of 2019.

Each participant completed the toolkit activity while taking part in semi-structured interviews with our research team. These interviews covered a wide range of topics which included asking youth to reflect on the technical and professional skills gained from this work experience to more specific questions about their experiences communicating and collaborating with their peers. Approximately

Youth Employees			
ID	Age	Gender	Time Employed
P1	17	M	35 Months
P2	15	F	35 Months
P3	16	M	14 Months
P4	15	F	14 Months
P5	14	F	14 Months

Table 2: Overview of the five participants.

halfway through the protocol, we asked participants to reflect on the types of information shared over Slack and e-mail, and who they shared it with. We then introduced the toolkit activity as a way to further discuss these topics. The first author was responsible for conducting interviews and facilitating the toolkit activity. With the consent of each participant, they took notes and audio recorded each interview session. This entire process (interviews/toolkit activity) lasted approximately one hour, on average.

4.1 Toolkit Procedure

At the start of this activity, we provided each participant with a brief overview of how the procedure would work. We then asked them to review our third-party and information type cards and suggest any potential categories that may have been missed. To gain insight into their decision making processes, participants were encouraged to think aloud – or to verbally share their thoughts – as they progressed through the activity [22].

To begin the activity, the facilitator placed a description card and corresponding expectations chart (e.g., for Slack) in front of the participant. They then placed an information type card (e.g., questions about jobs) at the top of the expectations chart (Figure 5, A). We then prompted participants to arrange the third-party cards on the chart based on their privacy expectations for that information type (Figures 5, B). After they finished this task, we then photographed the completed expectations chart and asked participants to further reflect on how they would feel if their expectations were not met. This process was repeated six times – one for each information type – for each description card. From each participant, we collected 12 photographs of completed expectations charts along with audio recordings of them verbally explaining their decisions.

4.2 Data Analysis

We analyzed the photographs of completed expectations charts by recording the placement of all third party cards on the expectations chart for each information type. (e.g., how many participants expected advertisers to have access to job information shared over Slack). In addition to this, complete audio recordings of the interviews/participatory activity were fully transcribed. Transcripts were open and axially coded by the first and second authors through an iterative process. To ensure that our analysis approach was reliable and consistent, each researcher independently coded one interview before meeting to reconcile differences in approach and develop a shared list of codes. They then independently analyzed a second interview using the shared codebook and met a second time to reconcile any remaining differences before independently

analyzing the remaining transcripts. While this approach led to the development of an extensive codebook which allowed us to identify many themes in our data, we note that the primary focus and intended contribution of this work relates to the process of adaptation the participatory activities toolkit for use in this context. For this reason, only results from the toolkit activity are reported in this paper.

5 FINDINGS

In this section, we share feedback from participants on their experiences using the toolkit (Section 5.1), and summarize youths' privacy expectations when sharing job, printer, and administrative information over Slack and email (Section 5.2.1). We then share additional insights into trends in the toolkit data including findings on youth attitudes towards external companies accessing information shared by them, the impact of a professional environment on youths' privacy expectations, and youths' feelings of apathy towards maintaining privacy in the workplace (Section 5.2).

5.1 Participant Feedback on the Toolkit

During the elicitation activity, participants shared feedback about the toolkit and its design, including suggestions for how to improve and extend it in the future. Four participants shared positive remarks about the toolkit elements and procedures. P1, a senior print shop employee, expressed excitement about how the activities were set up. He also mentioned it would be better to have more categories, such as specific scenario cards. He also suggested there should be a third-party category for an employee that was not on shift that day. This indicates that P1 wanted to distinguish between specific types of communication for relating updates to co-workers who are not at the job on a given day. P1 also found the distinction between questions and updates helpful and affirmed that the toolkit activities got faster and easier as he got used to them over the course of the interview.

P4 stated that the information types in the toolkit corresponded well to the types of information that were communicated in the print shop. She also stated that the activities were not difficult to complete. P5, similarly noted that the toolkit was *"a good way to lay things out."* When the interviewer responded that these types of questions were difficult to discuss in a traditional interview setting, P5 agreed, stating *"Yeah, especially if you have to go through all the [third] parties."* She recognized the ease with which she could discuss her privacy expectations about various third-parties with regards to different types of information using the toolkit exercise, versus the tedium and confusion that could arise by verbally giving responses to these types of questions. One limitations of the toolkit pointed out by participants was a lack of clarity on how to complete the activity if their answer was situational. For example, when asked to reflect on their privacy expectations for sharing job updates, P5 expressed confusion about where to place the "All Youth in Print Shop" card, stating that this would depend upon the given job. In response, the interviewer told the participant they could place the card on the line in the middle of the chart to indicate that the answer could be yes or no, depending on the situation. Several participants used this same approach to indicate that their privacy expectations were dependent on the situation.

Additionally, we observed that participants frequently abstained from using the "Nobody" third-party card from their completed expectations charts. Approximately halfway through the toolkit exercise, P2 explained that the purpose of this card was a lingering point of confusion: *"Oh, now I see what the nobody card is for. Because that's just really been sitting there, I've been confused about that."* We note that this may have been the case for other participants as well.

Finally, we also found that the qualitative insights captured through this elicitation tool provided a window into youths' general attitudes towards external companies accessing their data, the impact of a professional environment on their privacy expectations, and feelings of apathy towards privacy in the workplace. We will unpack these findings next.

5.2 Youth Employees' Privacy Expectations in the Workplace

5.2.1 Reflecting on Access to Workplace Communication Data. Table 3 summarizes how youth completed the expectations chart during the participatory activity. Results are broken up by information type (counts for questions and updates are combined), third-party, and communication tool. Furthermore, each of the three information categories correspond to a row (with two subcategories) in Figure 3. While we originally only had two options for whether participants prefer their information to be shared with third parties, comprising of "yes" or "no", we observed that many participants also chose "both" as an option to signal that their choice depended on specific situations (see below). Therefore, we decided to include a third category in the table. Our results show that regardless of the communication tool, youths' privacy expectations generally remained consistent across information types.

There was a general consensus among participants that co-workers (including friends who worked with them), managers, and other adult staff members at DHF would have access to any kinds of information shared by them – based on our field work in this context, we note that members from these groups are likely to interact with print shop employees on a regular basis. Youth employees also shared the expectation that external parties including advertisers, the company that built the communication tool, and everyone else at DHF (i.e., youth participating in after-school courses) should not have access to any information shared by them over Slack and email. P1, for example, expressed "disappointment" at the thought of Google or other advertising companies having access to information about jobs that they worked on.

> *"Slightly disappointed that Google is looking at jobs about print shop or advertisers as well... that's kind of disappointing."* (P1)

One interesting finding in the expectations chart data was related to youths' privacy expectations for interacting with clients. There were eight instances where participants noted that it would be appropriate for clients to have access to job information shared by them over email, and four instances with Slack. This shows a strong preference for communicating with clients over email. In addition, we found that most youth did not feel that clients should have access to any printer or administrative information shared by them. P4, however, diverged from their peers and offered a

unique perspective on why it might valuable to start sharing more information with clients.

> *"Clients, I'd say yes, just in case they have any questions about how we print stuff or anything like that."* (P4)

There were eight instances where participants explicitly noted on the expectations chart (by placing third party cards over the center line) that their privacy expectations were situational and might differ based on context (Table 3, "both" column). We also observed numerous instances where participants would carefully consider both options before placing a third party card on the chart. In these situations, participants thinking aloud provided us with rich insight into the situational factors influencing their decisions. For example, consider the following quote from P5:

> *"Well actually I'm going to keep this one over here because if it's an update about a job through email than it probably would be a bigger job, so I'm also going to keep this one over here I guess. That has happened before when we made the [name of job for client]... but a lot of information was sent on email through that because everybody was working on it."* (P5)

In this case, while moving the cards around the expectation chart, P5 draws on a concrete example from their practice and refers back to a prior experience where they used email to coordinate work on a large request and reconsider where to place the corresponding card in the light of this new consideration.

5.2.2 Navigating Workplace Communication Needs. Our results also indicate that participant expectations for privacy were influenced by their understanding of who may need access to information shared by them. For this reason, youth generally made no distinction between their friends working with them in the shop and the rest of their co-workers – on several occasions, they even opted to not use the "Friends in the Print Shop" third party card at all (shown in Table 3). In one example, we noticed that P2 would always place the "Friends in the Print Shop" and "All Youth Employees" cards on the expectations chart side-by-side. When asked to elaborate on whether this was an intentional choice, P2 talked about the importance of not allowing personal relationships to impact how they communicate with others at work. She further explained that a failure to do so might negatively impact the shop's overall productivity.

> *"It would be very unprofessional to provide only specific people with access to a job or information about the job... it shows a level of immaturity like 'hey I'm going to tell this person about it.' You need to make sure that everyone can communicate effectively. Because why ask one specific person... just because your friend might not know it doesn't mean somebody else might not know it."* (P2)

Three participants (P2, P4, P5) described the value in ensuring that certain pieces of information, such as whether 3D printers were functioning, remain hidden from clients in order to maintain a professional image. For example, consider the following quote from P4:

> *"Again you wouldn't really want [clients] knowing that there was something [wrong]. If it was like a printer was*

Third Party	Tool	Job Info			Printer Info			Admin. Info		
		Yes	No	Both	Yes	No	Both	Yes	No	Both
Print Shop Managers	*Slack*	10	0	0	10	0	0	8	1	0
	Email	10	0	0	9	1	0	10	0	0
All Youth in Print Shop	*Slack*	9	0	1	10	0	0	7	2	0
	Email	10	0	0	9	1	0	9	1	0
Other Adult Staff at DHF	*Slack*	6	4	0	7	3	0	6	3	0
	Email	6	4	0	6	3	1	6	3	1
Friends in Print Shop	*Slack*	6	1	1	8	0	1	6	2	0
	Email	7	0	1	5	3	1	7	1	0
Clients	*Slack*	4	4	0	1	7	0	0	8	0
	Email	8	1	0	2	6	0	2	6	0
Company that Built Tool	*Slack*	4	6	0	2	6	0	1	8	0
	Email	2	8	0	1	8	0	1	8	0
Advertisers	*Slack*	2	8	0	2	8	0	2	8	0
	Email	2	8	0	2	8	0	2	8	0
Everyone at DHF	*Slack*	1	7	0	2	6	0	1	7	1
	Email	2	8	0	1	9	0	2	8	0
Nobody	*Slack*	0	2	0	0	3	0	1	3	0
	Email	0	4	0	1	4	0	0	2	0

Table 3: Overview of where participants placed third party cards on the expectations chart. Each of the three information categories corresponds to a row in Figure 3.

down or something, we need to fix that because there
might be a little bit of little alarming for the client." (P4)

In this case, P4 recognizes that it is important to keep some of the information about the internal processes within the print shop from clients to preserve a professional image and to reduce anxiety about the status of specific job requests.

5.2.3   Attitudes Towards External Companies Accessing Work Data.
As previously mentioned, participants generally did not want external parties – such as advertising agencies, or the companies who built communication tools – accessing their work information (Table 3). P2 felt strongly about this and mentioned that it was "below" companies to read her messages. However, despite these strong convictions, most youth also seemed resigned to the fact that their expectations for privacy may not align with reality. This is reflected in participants sharing with us their beliefs that certain companies do more to preserve the privacy of users than others. In one example, P3 expressed uncertainty over whether their Slack data was being used in advertisements.

"Slack... I don't think Slack really has that, but I would
assume... I guess they'd probably share stuff." (P3)

During a later stage of the activity, he then went on to explain that his expectations for privacy were different when communicating over email stating that *"I would assume Google reads my email."*

Despite potential disparities between their expectations and reality, most participants felt that they would not be very upset in the event that their privacy expectations were not met in the

context of work. P3, in comparison to their co-workers, was the most apathetic towards workplace privacy. Through most stages of the activity, he opted to leave the "do not expect" column of the expectations chart almost entirely empty.

"Yeah. I can't really think of anybody that I wouldn't
want to see it because I can't think of anything that I
wouldn't want to share with anybody." (P3)

When asked to elaborate on this decision, he explained that he would not be concerned if other parties gained access to any work-related information because none of it is really private or sensitive.

6   DISCUSSION

6.1   The Toolkit as a Privacy Elicitation and Reflection

The adaptations we made to the original toolkit consisted primarily of changing content to make it more relevant to our research context, and removing some components for a more simplified experience. We found that the resulting activities were easy to learn for our participants and a valuable way to help them deeply reflect on their interactions with technology (Section 5.1). While there is room for improvement, overall, we found the toolkit an easily extensible and effective method to elicit detailed insights into participants' privacy expectations.

For example, we found that youths' privacy expectations for communication tools in the workplace were largely influenced by practical considerations of who might require access to information

shared by them rather than significant concerns over an unexpected third-party gaining access. While we anticipated that some youth might describe engaging in protective behaviors [7, 14, 37] such as intentionally limiting access to information (e.g., asking questions of their co-workers, but not managers), our participants instead focused on how it was more important to carry themselves in a professional manner. Confirming results from prior work, we also saw indications that participants were aware of potential risks associated with using mainstream communication tools (e.g., having advertisers target them based on their email), but resigned in their limited ability to do anything about it [14].

We also found evidence that youths' privacy expectations are often context-dependent, a finding in line with Nissenbaum's theory of Contextual Integrity [23] that recognizes the role of social norms on privacy behavior. When completing the activity, participants would sometimes feel limited by the binary choices offered on the expectations chart and search for an alternative answer. While this tension was often resolved by placing the third-party card over the center column of the chart (Figure 5), participants also shared stories about experiences/factors that impacted their privacy expectations (Section 5.1). We believe that these discussions were valuable in developing a deeper understanding of not only participants' privacy expectations, but also their work environment and the norms governing it. In response to this observation, we have modified the Expectation Chart to have an additional middle column, titled "Under certain conditions, I expect this type of information to be accessible by these parties", that explicitly provides space for discussing conditional situations for specific cards and that we plan to evaluate in future research.

6.2 Reflecting on the Toolkit Elements Collaboratively

Throughout the study, we observed that in order to elicit meaningful reflections, participants had to continually examine and extend the meaning of the toolkit elements to ensure they are localized to the particular circumstances in the print shop and correspond to knowledge rooted in their practice. For example, we observed that at the beginning of the activity participants went through each of the information type cards (Figure 3) to ensure they know what they correspond to in their practice. This is important because, as Table 3 shows, participants largely had different preferences for who should see each data type.

While we explicitly went through the information type cards at the beginning of the activity and as part of our protocol, we did not do so for the third party cards, since they seemed self-evident at first. However, we found that participants rarely engaged with the "Nobody" third-party card and that few included it in their completed expectations charts (Table 3). We even observed that P2 found this element to be a consistent source of confusion. Therefore, in the future, it is important to include explicit steps in the protocol to go through each element of the toolkit and collaboratively discuss its meaning with each participant. Furthermore, we believe this discussion should be grounded in concrete examples from participants' local practice to ensure it captures their real-life perspectives, and also provide space for identifying blind spots in a specific iteration of the toolkit, and remedy them by extending

and adapting it to specific localized circumstances. We view this part of the activity also as an important elicitation and reflection component that can further improve user participation.

6.3 Youth's Perspectives towards the Privacy of Workplace Communication Tools

Our findings show that youth employees expected co-workers and managers to have access to their workplace communication data. They also expected some of their email communications to be shared with the print shop's clients. However, they did not expect other third-parties to access their communication data and were dismayed at the thought of advertisers or companies developing the tools to have this access. Despite these expectations, youth also expressed resignation and apathy towards third parties accessing their workplace communication data. Furthermore, youth employees described the ability to effectively and professionally navigate workplace coordination and communication tasks as important professional skills. They described how they considered the relevance of a particular piece of information (e.g., a specific job or printer update) for co-workers, managers or clients before choosing the appropriate communication tool for it. This reasoning also shows they were aware that they had limited control over who sees their workplace communication, compared to personal communication.

These findings show that youth have a clear understanding of the need to share relevant data with others in the workplace and are also aware that their online data may be collected and used by companies that develop communication technologies. While they generally preferred companies not to collect or share their data, they were aware that this is a possibility, an awareness that may have impacted the content of what they share using workplace communication tools.

These findings also mirror results from previous workplace communication research that underline the nuances involved in effectively navigating workplace communication needs [15, 26]. They furthermore point to an opportunity to incorporate privacy-aware workplace communication training in professional development programs designed for youth. As mentioned before, a key strength of the toolkit was to help users reflect and think in detail about the type of information they were sharing with their coworkers, managers, clients and other third-parties and the assumptions they were making about who sees this information. Several youth commented that before using the toolkit they had not considered what data a communication tool or other online software may collect and who may have access to this data. Youth also mentioned that using the toolkit allowed for a systematic review of assumptions about data types that are generated and collected at work. These point to a design opportunity for developers of workplace communication platforms to provide better contextual cues (e.g., visual icons, color schemes, etc.) for workers so they know what context they are operating in and act accordingly.

7 LIMITATIONS AND FUTURE WORK

The current study has several limitations. First, we collected data from a small number of participants who were all employees at the print shop. While this approach allowed us to collect and analyze detailed qualitative data, future studies can involve multiple

stakeholders (e.g., employers, customers, etc.) in a similar setting to complement the current study. Future research on a larger scale can also study how using the toolkit can inform workplace practice and collaborative decision-making in general and across different communities (e.g., adult employees working remotely, etc.).

Second, the primary sources of data informing this study were audio recordings of interviews and photographs of participants' completed expectations charts. While we did not encounter issues with glares during our pilot testing, we did in the field. As a result, we often found it challenging to photograph participants' completed expectations charts (Figure 5B). We also found it sometimes challenging to correlate data from audio recordings to photographs. Without access to a higher fidelity form of data, such as video recordings, it was not always possible to follow every step of each participants' decision making process through correlating their think aloud while vacillating between options. In the future, using video can alleviate some of these challenges and also better capture instances when participants sought to emphasize a point [13] by gesturing or pointing, or even changed their mind about where to place a card.

Finally, we envision several future uses for the toolkit: First, it can be used as an effective way to elicit data privacy perspectives towards existing or future adaptive technologies from non-experts. Second, future youth employment training program can also use its ability to facilitate reflection to train incoming youth on the data characteristics of different workplace communication tools. While the specific rules and practices of using each tool may be different depending on each workplace context, the process of systematically reflecting on types of data and who should access them can help employees and organizations make their assumptions and expectations explicit and transparent to ensure they are on the same page with respect to data privacy. The toolkit also provided an opportunity for the youth to share their perspectives with others (in this case, the researchers), a possibility that can be used to support participation in workplace decision-making in the future. In the future, it would be interesting to study how increased opportunity for workplace co-design also requires employees to deal with the power dynamics between themselves and managers, adult staff, and others, when attempting to share more nuanced perspectives through design activities.

8 CONCLUSION

Emerging digital workplace technologies are rapidly enabling us to perform work that is progressively becoming more complex, interdependent, and geographically distributed. As work continues to change and evolve, it has become increasingly important for employees to be able to effectively use social technologies in professional contexts. However, the emergence of these technologies have also led to concerns about the privacy of workers. Given that today's youth have grown up with significant levels of exposure to social technologies, we believe that is important to understand the needs of this population as they transition out of the classroom and into the workforce. In an effort to close this gap, our research seeks to better understand youths' privacy expectations for workplace communication technologies through the adaption of a participatory activities toolkit.

In this study, we described how we adapted and utilized a participatory toolkit for evaluation of youth privacy perspectives at a 3D print shop. We shared results from using the toolkit with the shop's employees, discussed feedback received about its usability and ability to elicit detailed privacy expectations from non-expert users, and offered directions for how this method can be used in future contexts. Our findings show that the youth used the toolkit effectively to reflect on and share their privacy expectations and preferences, and to think through their assumptions about who accesses and interprets their online messages and how this may impact their communication and coordination behavior in the future. Our hope is that using such toolkits in technical training programs may increase opportunities for employees' participation in workplace decision-making processes by educating them about the privacy of coordination and communication tools and procedures. Beyond the workplace, our results can also inform the work of researchers and designers creating participatory and inclusive approaches for incorporating diverse perspectives into the design of privacy-aware future technologies.

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