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LOOKING BENEATH THE TIP OF THE ICEBERG: THE TWO-SIDED NATURE OF CHATBOTS AND THEIR ROLES FOR DIGITAL FEEDBACK EXCHANGE

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Research paper

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Abstract

Enterprises are forecasted to spend more on chatbots than on mobile app development by 2021. Up to today little is known on the roles chatbots play in facilitating feedback exchange. However, digitization and automation put pressure on companies to setup digital work environments that enable reskilling of employees. Therefore, a structured analysis of feedback-related chatbots for Slack was conducted. Our results propose six archetypes that reveal the roles of chatbots in facilitating feedback exchange on performance, culture and ideas. We show that chatbots do not only consist of conversational agents integrated into instant messenger but are tightly linked to complementary front-end systems such as mobile and web apps. Like the upper part of an iceberg, the conversational agent is above water and visible within the chat, whereas many user interactions of feedback-related chatbots are only possible outside of the instant messenger. Further, we extract six design principles for chatbots as digital feedback systems. We do this by analyzing chatbots and linking empirically observed design features to (meta-)requirements derived from explanatory theory on feedback, self-determination and persuasive systems. The results suggest that chatbots benefit the social environment of conversation agents and the richness of the graphical user interface of external applications.

Keywords: Digital Feedback, Digital Work, Chatbot, Slack, Instant Messenger.

1 Introduction

Digitization and automation put pressure on companies to empower employees to acquire new skills (Trilling and Fadel, 2012; Brynjolfsson and McAfee, 2014). In fact, forecasts in the future of jobs report of the World Economic Forum suggest that 54% of employees require significant re- and upskilling by 2022 (Leopold, Ratcheva and Zahidi, 2018). To meet these requirements, organizations need to engage in digital work design to setup supporting digital work environments (Richter, Heinrich, Stocker and Schwabe, 2018). Thereby, feedback is well-known as an effective instrument to improve work performance: Feedback has motivating and confidence increasing effects that can encourage employees to more task commitment and performance improvement (Payne and Hauty, 1955; Locke, 1968; Prussia and Kinicki, 1996; Bandura and Locke, 2003). Employees are motivated to "experience the satisfaction and joy inherent in their work" (White, 1959; E L Deci, 1971; Vallerand, 1997, p. 271). In turn, motivated employees spend more time on corresponding activities and have an increased willingness to learn (Parayitam, Desai, Desai and Eason, 2010). However, feedback processes and systems are also confronted with the ongoing transformation towards digital work environments (Stoeckli et al., 2019). Traditional performance feedback, which has mainly taken place in top-down settings (Levy and Williams, 2004; Levy, Tseng, Rosen and Lueke, 2017), needs to

adapt to the new requirements of digital work, which is enabled through and increasingly relies on digital work tools (Durward, Blohm and Leimeister, 2016). As such, prior research suggests that chatbots have become an important part of digital work contexts and that they offer feedback-related value potentials such as receiving metrics and key performance indicators or getting nudges within instant messengers (Stoeckli, Uebernickel and Brenner, 2018). In fact, various feedback facilitating chatbots are becoming available for enterprise instant messengers. For example, Lyte allows collecting frequent feedback through pulse surveys that gauge employee engagement and that reveal what is moving project teams ('Lyte Slack Integration', 2018). Or the chatbot Happierco which provides employees with status reports of performance targets ('Happierco Slack Integration', 2018).

However, while prior research elaborates how enterprises are introducing dedicated feedback apps (Stoeckli et al., 2019), little research investigates the roles of chatbots as alternate digital work tools to facilitate feedback exchange. Therefore, we pose the following first research question:

RQ1: What roles do chatbots play in the exchange of feedback in digital work environments?

To address this question, we conduct a structured review of feedback-related chatbots from the Slack apps and integrations repository. This is relevant for practitioners and scholars alike, since it responds to calls for research to increase the understanding of day-to-day feedback exchange (Ashford and Cummings, 1983; Ashford, Blatt and Walle, 2003; Levy, Tseng, Rosen and Lueke, 2017), as well as on digital work (Durward et al., 2016; Richter et al., 2018). Though the majority of enterprises are forecasted to spend more on chatbots than on traditional mobile app development by 2021 (Panetta, 2017), prior research on chatbots in the enterprise context is scarce (Io and Lee, 2017). The existing body of knowledge in this field incorporates research that reveals how chatbots are used in the enterprise context (Lebeuf, Storey and Zagalsky, 2017; Stoeckli et al., 2018; Stucki, D'Onofrio and Portmann, 2018) and how to design chatbots as cooperative and social conversational agents (Gnewuch, Morana and Mädche, 2017). However, prior research mostly takes for granted that chatbots are only user-facing front-end systems and, at the same time, little is known about the nature of user interactions with chatbots. Accordingly, we state our second research question as follows:

RQ2: How can the identified feedback-related chatbots be characterized in terms of user interaction?

A vast body of literature offers explanatory knowledge on feedback (i.e., what makes feedback effective), self-determination theory (i.e., what is required to increase intrinsic motivation) and persuasive systems (i.e., what is needed to increase persuasion of systems). However, there is little research that derives prescriptive knowledge from these theories and investigates how empirically observable chatbots can implement it. As such, we state the following third research question**:**

RQ3: What are design principles for feedback-related chatbots and how can they be empirically observed?

We address this by deriving (meta-)requirements from kernel theories to analyze chatbots through the theories' lens and link the identified explanatory statements with empirical observations of chatbots, resulting in a set of design principles as justified prescriptive statements (Goldkuhl, 2004).

2 Background

2.1 Performance Feedback and Chatbots in the Context of Digital Work

Performance feedback is information (1) that individuals receive about the quantity or quality of their past performance (Prue and Fairbank, 1981), (2) that responds to a particular performance (Sulzer-Azaroff and Mayer, 1991), (3) that reveals what and how well an employee does (Rummler and Brache, 1995), and (4) that allows an individual to adjust his performance (Mitchell et al., 1994). To do so, feedback must provide the receiver with information that elaborates the reference level, the actual performance level, and enables him to compare the two (Ramaprasad, 1983). Feedback, which is used to achieve previously set goals, has a positive effect on the perceived self-efficacy, self-imposed goals and supports self-satisfaction (Bandura and Locke, 2003). Feedback can therefore

contribute to performance improvement by setting goals (Locke, 1968) as well as by motivating the feedback recipient by enhancing the feeling of well-being (Edward L Deci and Ryan, 2008).

With the advent of digital work, it is "[an] effort to create digital goods or that makes substantial use of digital tools" (Durward et al., 2016, p. 283), organizations increasingly introduce enterprise instant messenger to facilitate collaboration (Riemer, Schellhammer and Meinert, 2018; Stoeckli et al., 2018). These messengers not only enable chat-driven communication and collaboration between humans, but also *chatbots* as ''machine conversation system[s] [that] interact with human users via natural conversational language'' (Shawar and Atwell, 2007, p. 489). As such, chatbots are text-based *conversation agents* that engage in conversations with humans (Timm et al., 2006; Gnewuch, Morana and Mädche, 2017), whereas *agents* are computer-based entities that exhibit autonomous behavior in the form of automated conversations via chat services (Gianvecchio, Xie, Wu and Wang, 2011; Seymour, Riemer and Kay, 2018). Prior research on chatbots mainly focuses on education, psychology, and linguistics, while research on chatbots in the enterprise context is scarce (Io and Lee, 2017). However, prior work on chatbots in the enterprise context does include research related to customer service chatbots (Gnewuch et al., 2017), chatbot design features (Rietz, Benke and Maedche, 2019), chatbots that assist communication in collaborative networks (Frommert, Häfner, Friedrich and Zinke, 2018), chatbot use cases (Stucki et al., 2018) and investigations of how chatbots are used by software developers (Lebeuf et al., 2017) and within enterprises (Stoeckli et al., 2018). Among other affordances, the latter work suggests that chatbots enrich instant messengers with feedback-related affordances such as receiving metrics and key performance indicators or getting nudges within conversational threads of instant messenger systems (Stoeckli et al., 2018).

2.2 Self-Determination Theory and Persuasive Systems

Decades of research on performance management has shown that employees are often reluctant and cautious to give and seek feedback (Fisher, 1979; Ashford and Cummings, 1983; Ashford et al., 2003). Therefore, we ground our analysis of feedback-related chatbots on self-determination and persuasive systems to examine if and how chatbots may motivate and persuade employees to exchange feedback. First, for a genuine perception of the concept of motivation and its impact on work performance, we draw on self-determination theory after Ryan and Deci (2000). The core message of this theory is that people have a basic tendency to be intrinsically motivated, to assimilate their social and physical world, to integrate external regulation into self-regulation, and thus to integrate into a larger social whole (Edward L Deci and Ryan, 2000). Intrinsic motivation is a drive that "deals with behavior performed for itself, in order to experience pleasure and satisfaction inherent in the activity" (Vallerand, 1997, p. 271). Furthermore, it relates to the willingness of the individual to spend more time on a task, creates an affective mood, leads to effective learning, and leads to a particular behavior (Ho and Kuo, 2010; Parayitam et al., 2010; Hung, Durcikova, Lai and Lin, 2011). Extrinsic motivation, on the other hand, is a drive that consists of "performing behavior in order to achieve some separable goals, such as receiving rewards or avoiding punishment" (Vallerand, 1997, p. 271). Both intrinsic and extrinsic motivation determine performance, which drives humans to meet the three basic needs: Autonomy, competence and relatedness. *Autonomy* is referred to as "self-rule" (Ryan and Deci, 2006, p. 796). Autonomous attitudes are those that a person willingly supports (Ryan and Deci, 2006). *Competence* is understood as fitness or ability, while synonyms include capacity, efficiency, proficiency, and skill (White, 1959). It is further a concept of motivation: behavior that leads to efficiency and performance "is not random behavior", but rather "directed, selective, and persistent", which "satisfies an intrinsic need to deal with the environment" (White, 1959, p. 317). *Relatedness*, as the third category of self-determination theory, refers to "the need to establish close, stable, nurturing, and protective relationships" (Ashford et al., 2003; Winnicott, 2014). Second, persuasive systems literature informs our study about how chatbots may be designed to change human behavior so that intrinsic motivation is increased (Oinas-Kukkonen and Harjumaa, 2008; Meske and Potthoff, 2017; Mirsch, Lehrer and Jung, 2017). Persuasive systems are conceptualized as "computerized software or information systems designed to reinforce, change or shape attitudes or behaviors or both without using coercion or deception" (Oinas-Kukkonen and Harjumaa, 2008, p. 202). In particular, prior

research emphasizes four distinct functionalities of persuasive systems (Oinas-Kukkonen and Harjumaa, 2008). *Primary Task Support* supports the execution of the user's main task. *Dialogue Support* helps users to further focus on their goal or target behavior. *System Credibility Support* refers to the way these systems are designed to increase credibility and persuasive power. Finally, *Social Support* motivates the user through social features (Oinas-Kukkonen and Harjumaa, 2008). In the context of our research, the targeted behavior is facilitating feedback exchange along the activities of providing, seeking and using feedback.

3 Research Method

This study adopts an explorative and qualitative research design (Klein and Myers, 2001; Yin, 2008) to explore feedback-related chatbots in the enterprise context. To do so, we conduct a structured online analysis of publicly available chatbots. By analyzing chatbots through the lens of (meta-)requirements from kernel theories, we link explanatory statements with empirical observations to extract justified prescriptive statements in the form of design principles (Goldkuhl, 2004). As such, this research is linked to design science research (Hevner, March, Park and Ram, 2004).

3.1 Structured Research Process

To increase rigor, we structure our online analysis along the steps of a well-established framework for literature reviews (Vom Brocke et al., 2009) and follow Webster and Watson (2002). Specifically, in our research endeavor we undertake the following activities (see Figure 1): definition of scope, conceptualization of topic, search as well as analysis and synthesis (Vom Brocke et al., 2009).

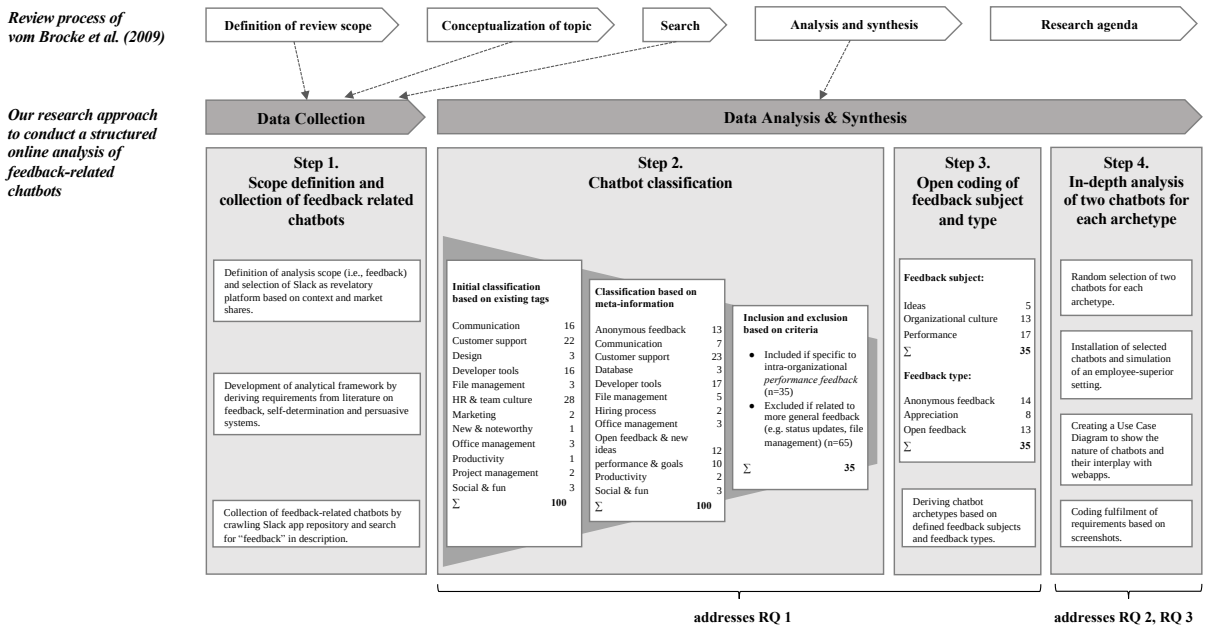

Figure 1. Overview of data collection and analysis.

First, we defined the scope and developed an analytical framework for the in-depth analysis of chatbots by drawing on literature. While the latter is elaborated later on (see Section 3.2), we now disclose the former procedure. By adopting purposeful sampling (Patton, 2002), we selected an instant messenger platform that is information rich and illuminative in that it is relevant for the enterprise context, is convincing in regard to market share and offers useful manifestations of the phenomenon of interest (i.e., feedback exchange). To do so, we limited possible platforms to the ones that focus on the enterprise context rather than the consumer context. Then, we applied a market-oriented perspective based on the criteria of market share and growth. The market for workstream collaboration solutions (WCS) is forecasted to increase at an annual growth rate of 96% between 2016 and 2021 (Gyanee

Dewnarain, Daniel O'connell, 2017). The WCS market includes pure WCS-vendors such as Atlassian HipChat and Slack, unified communication service vendors like Mitel and Cisco as well as cloud office vendors such as Google and Microsoft (Gyanee Dewnarain, Daniel O'connell, 2017). Finally, we selected Slack, because of its leading market-position with an annual recurring revenue of over $200 million (Gyanee Dewnarain, Daniel O'connell, 2017). Also, prior research reveals that Slack provides various possibilities to receive and send feedback through chatbots (Stoeckli et al., 2018) that can be installed as add-on functions (Slack App Repository, 2018). Subsequently, we used the web crawling tool Octoparse to collect the list of publicly available Slack apps and integrations on April the 19th of 2018 (Slack App Repository, 2018). Next, we conducted a search throughout the existing chatbots to extract a list of chatbots that contained the keyword "feedback" in their app description. This resulted in an initial list of chatbots (n=100). For each chatbot the following meta-information was scraped from the chatbot repository: name, categorial tags, description, website and logo.

Second, we started the data analysis and synthesis by drawing on the existing tags available from the crawled repository to derive an initial classification of chatbots. Then, we continued with an open coding procedure in which we inductively coded concepts based on the available meta-information (i.e., names and descriptions) of the chatbots. Next, we defined inclusion and exclusion criteria to narrow down the scope to chatbots that are relevant for this research in terms of their functionalities that facilitate performance-improving feedback exchange in work environments. More specifically, we included chatbots that facilitate intra-organizational performance feedback (n=35) and excluded those that mediate more general feedback (e.g. status updates, file management) (n=65).

Third, we continued the open coding procedure to classify the scope of the 35 chatbots in regard to feedback subjects and feedback types. These were then used to derive archetypes that are characterized by the topic and type of feedback of the chatbots.

Fourth, we used Microsoft Excel to select a subsample of chatbots by randomly including two chatbots for each archetype leading to twelve chatbots to be analyzed in a subsequent in-depth analysis. To do so, each of the selected chatbots was installed and tested by simulating an employee-superior setting. Specifically, we examined the possible user flows and analyzed each selected chatbot through the lens of our analytical framework that is introduced in Section 3.2 and visualized in Figure 2. The analytical framework comprises (meta-)requirements for the design of feedback-related chatbots grounded in literature on feedback (FB), Self-Determination Theory (SDT) and Persuasive Systems (PSD) that serve as kernel theories. Meta-requirements refer to classes of goals to which the theory applies (Walls, Widmeyer and El Sawy, 1992). In turn, our empirical observations from testing the chatbots resulted in a set of screenshots for each selected chatbot. Subsequently, we analyzed each screenshot regarding *design features* (i.e., specific capabilities of artefacts to meet requirements (Meth, Mueller and Maedche, 2015)) and coded the screenshots accordingly. This means, we examined how the derived (meta-)requirements of our analytical framework are addressed by the empirically observed chatbots. Based on this, we extracted prescriptive knowledge in the form of *design principles* (i.e., generic capabilities of artefacts to meet requirements) (Meth, Mueller and Maedche, 2015). We formulate the design principles as follows: "perform act A in order to obtain goal G" (Goldkuhl, 2004, p. 63). To justify the extraction of these design principles, the prescriptive statements are grounded in explanations of the underlying kernel theories and linked to empirical observations (Goldkuhl, 2004).

3.2 Analytical Framework

To structure our in-depth analysis of chatbots we built an analytical framework from three literature streams. First, we included feedback literature in order to understand how feedback can transmit information about one's performance that motivates the feedback receiver to improve his performance. Second, we built on literature of self-determination theory to examine how chatbots support competence, autonomy and relatedness by focusing on requirements that facilitate the pursuit of an activity because of its inherent interest and enjoyability. These requirements enable the basic psychological needs that are the foundations of personal growth as manifest in intrinsic motivation, as well as integrity as manifest in integrative processes and well-being (Ryan and Deci, 2006). Third, we

grounded our research on persuasive system theory to investigate how chatbots may reinforce, change or shape attitudes and behaviors without using coercion or deception (Oinas-Kukkonen and Harjumaa, 2008). Figure 2 presents an overview of requirements for each meta-requirement (MR). The meta-requirements are each based on the definition of their underlying theories: A first distinction was made between *giving feedback* and *seeking feedback* (Ashford and Cummings, 1983). Feedback is a valuable source of information for those who receive feedback and those who seek feedback. In addition, the meta-requirement *use feedback* adds a third level to underline the importance of acting on the feedback given to improve performance. Second, the categories *competence*, *relatedness* and *autonomy* show how intrinsic motivation can be achieved. They result from the dimensions of self-determination theory. Third, four meta-requirements are derived from persuasive systems theory showing how chatbots can be made persuasive with *social support, system credibility support, primary task support* and *dialogue support* (Oinas-Kukkonen and Harjumaa, 2008).

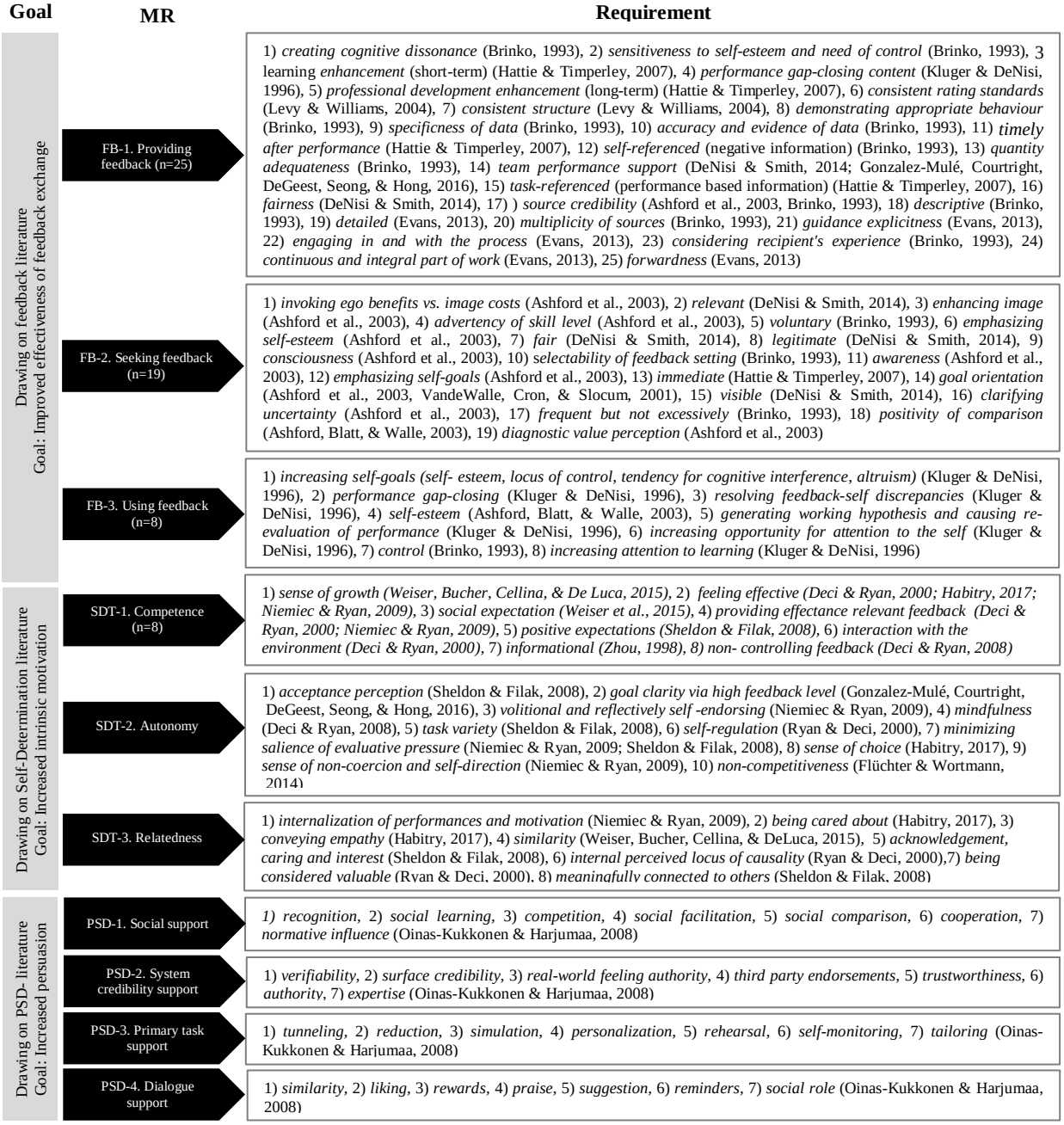

Figure 2. Meta-requirements (black arrows) and requirements derived from literature.

4 Results

4.1 Six Archetypes of Feedback-Related Chatbots

Based on our structured analysis of feedback-related chatbots, we derive six emergent archetypes (AT) that elucidate roles of chatbots in the exchange of feedback (RQ1). They differ in the feedback subject (i.e., *performance*, *organizational culture*, and *ideas*) as well as the type of facilitated feedback: anonymous feedback, appreciation, and open feedback. Figure 3 links the investigated chatbots to the six emergent archetypes and integrates these into existing literature streams.

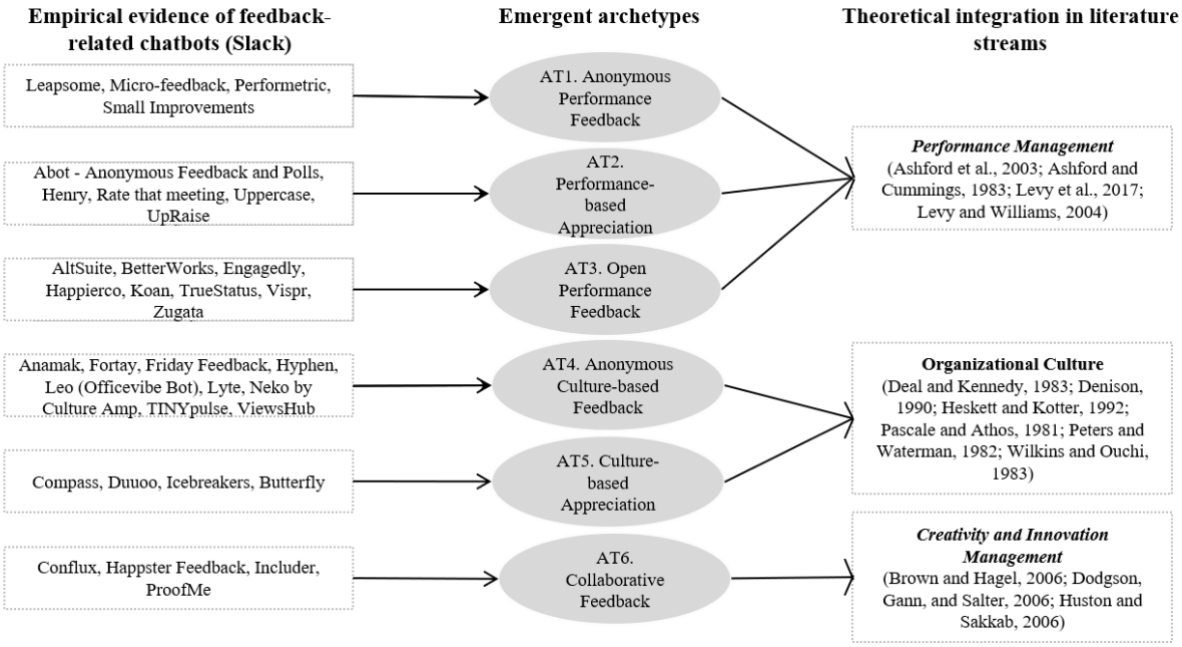

Figure 3. Chatbots classified in six emergent archetypes and integrated into literature streams.

Anonymous Performance Feedback (AT1) chatbots offer their users the opportunity to anonymously give and demand feedback related to their work performance in order to increase performance effectiveness and productivity. *Performance-based Appreciation* (AT2) chatbots can be used to show performance-related appreciation in order to increase the user's sense of well-being and intrinsic motivation. *Open Performance Feedback* (AT3) chatbots facilitate public performance feedback that can be viewed by other team members. These three archetypes can be linked to the literature on performance management that discusses the value and beneficial impact of technology for performance management (Ashford and Cummings, 1983; Levy and Williams, 2004; Levy et al., 2017). *Anonymous Culture-based Feedback* (AT4) chatbots provide feedback on topics that can be associated with the organizational culture to improve performance through improved embedding of the feedback recipient into the corporate culture. A concrete example is the chatbot Lyte, which addresses employee engagement, team satisfaction and work culture (‘Lyte Slack Integration’, 2018). Specific appreciation in this topic area is achieved with chatbots of the archetype *Culture-based Appreciation* (AT.5). These two archetypes (AT4, AT5) can be associated with research that argues that organizational culture can lead to increased performance (Pascale and Athos, 1981; Peters and Waterman, 1982; Deal and Kennedy, 1983; Wilkins and Ouchi, 1983; Denison, 1990; Heskett and Kotter, 1992). Finally, *Collaborative Feedback* (AT.6) chatbots stand for feedback that promote cooperation. It can be associated with literature on crowdsourcing and open innovation, which examines the value of technology-based crowdsourcing that improves performative behavior (Brown and Hagel, 2006; Dodgson, Gann and Salter, 2006; Huston and Sakkab, 2006).

4.2 The Two-Sided Nature of Chatbots and Their Interplay with Web Apps

Our in-depth analysis of twelve chatbots (i.e. two of each of the six archetypes) emphasizes that Slack apps and integrations are characterized by a two-sided nature (RQ2). Like an iceberg, the chatbot entity as conversational agent is "above water" in that it is visible within the corresponding instant messenger. But as the majority of an iceberg is below water, many user interactions of feedback-related chatbots are only possible in alternate user interfaces outside the conversational thread. Namely, the majority of analyzed chatbots consist not only of (1) a bot as a user interface integrated into an instant messenger platform, but also of (2) mobile and web applications as user interfaces outside the instant messenger platform. Figure 4 illustrates along two of the twelve chatbots how the two subsystems continuously interact and how chatbots unfold their full potential only in combination.

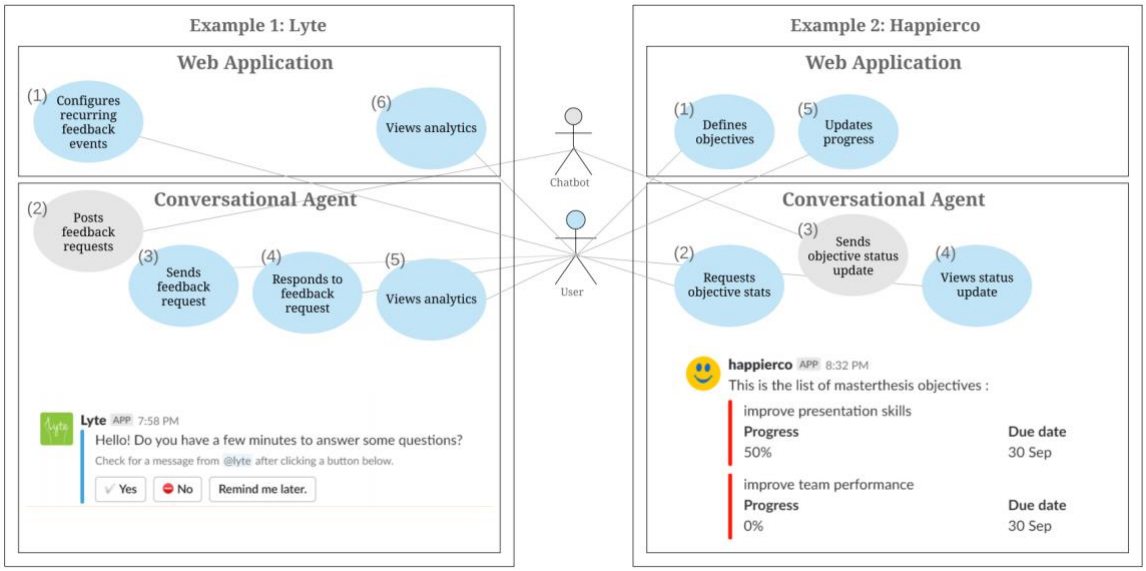

Figure 4. Use Case Diagram showing the interplay between Chatbots and Web applications.

First, *Lyte* enables feedback requests from admin users to be configured (formulated, highlighted and activated) in a web application. These requests are then automatically posted to Slack by the Lyte Slack integration. Other employees can then answer these questions. A feedback evaluation based on the users' responses to the posted feedback requests can be viewed both in the web app and in the slack integration. Second, *Happierco*, enables employees to set objectives that are configured and updated in the web application. The chatbot triggers the user by introducing updates of these objectives within Slack, while the update process itself is performed in the web application. The view of objective statuses is thus directly related to the publication of the statuses. In some process steps the chatbot can take an active, triggering, or passive, triggered role: With *Lyte*, the chatbot is only involved in the process by being triggered by the user's configuration; it posts the feedback request into the Slack channel. In the case of *Happierco* the chatbot takes the active role, triggering the user by posting the objectives. Answering RQ2 the study reveals that the chatbot itself induces social credibility and persuades the user triggering him with automated commands and postings, while the web application provides and processes feedback with a high content density due to its system credibility.

In the in-depth analysis of the twelve chatbots we find four different ways to interact with the digital feedback systems, that is, within Slack channels, within direct messages with the bot, within separate web applications as well as separate mobile apps. We find that only 33% of chatbots use Slack channels as communication tunnel, while the remaining 67% offer no features within channels. Furthermore, 75% of chatbots introduce a bot identity within Slack that facilitates feedback exchange. Only one chatbot out of these 75% operates without as a stand-alone chatbot, while all others consist of an integration and a web application. All in all, 75% of chatbots use web applications, whereas 17% use a mobile app to process their main content.

4.3 Design Principles for Feedback-Related Chatbots

Our in-depth analysis reveals how feedback-related chatbots fulfil six design principles that address (meta-)requirements from literature on feedback, self-determination and persuasive systems (see Figure 5). Therewith, we address RQ3 by linking identified explanatory statements with empirical observations of chatbots resulting in a set of extraction of justified design principles.

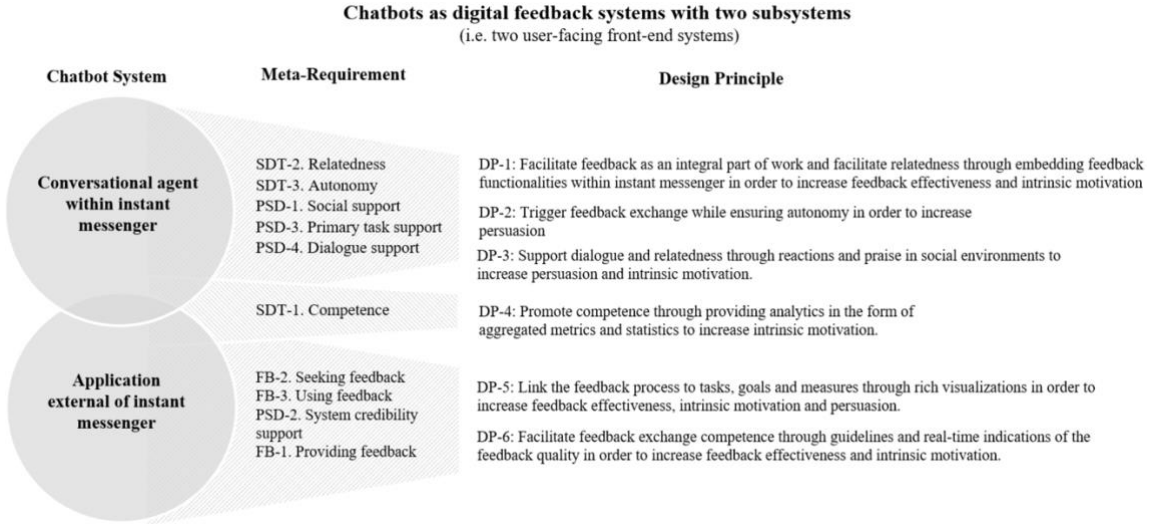

Figure 5. Chatbots addressing meta-requirements through Design Principles.

As elaborated in Section 4.2, feedback-related chatbots are digital feedback systems that consist of both a conversational agent within the instant messenger as well as a mobile or web application external to the instant messenger. Our analysis shows that both of the two subsystems contribute to address the identified requirements relevant in order to facilitate effective feedback exchange, to increase intrinsic motivation as well as persuasion to exchange feedback. In fact, both subsystems offer advantages and disadvantages in fulfilling these requirements (see Figure 5 that refers to the meta-requirements of our analysis framework in Figure 2). On the one hand, it is noteworthy that conversation agents are the primary subsystems to facilitate feedback exchange by meeting the requirements of persuasive systems through dialogue support, primary task support and social support (see Figure 5, above). They increase intrinsic motivation through their social context, especially by stimulating autonomy and relatedness. However, we identify features of both subsystems that contribute to address the meta-requirement of competence to increase motivation. On the other hand, mobile and web applications as the second subsystem, offer a much richer graphical user interface that help facilitating the exchange of effective feedback. More specifically, requirements related to seeking, providing and using feedback are addressed through environments characterized by a high system credibility (see Figure 5).

DP-1. Facilitate feedback as an integral part of work and relatedness through embedding feedback functionalities within instant messenger in order to increase feedback effectiveness and intrinsic motivation. Our analysis indicates that conversational agents offer advantages over external applications through their embeddedness in instant messengers such as Slack. Given an organization uses their instant messenger as a central communication and collaboration platform, the feedback exchange facilitated by the corresponding chatbots becomes *an integral part of work*. Therewith, chatbots offer an advantage in facilitating effective feedback exchange (Evans, 2013). Further requirements of enabling effective feedback exchange are met by automatic postings that enable *cognitive dissonances* (Brinko, 1993). This can be achieved by *specificness* (Brinko, 1993), *accuracy and evidence of data* (Brinko, 1993) and *consistent structuring* (Levy and Williams, 2004) which corresponds to the requirements *source credibility* (Brinko, 1993; Ashford et al., 2003) and *multiplicity of sources* (Brinko, 1993). Relatedness, as one of the key elements to achieve intrinsic motivation, is facilitated by i*nvoking internalization* (Niemiec and Ryan, 2009) and providing the

feeling of acknowledgement, caring and interest (Sheldon and Filak, 2008). Chatbots achieve this by asking for the user's opinion or showing him his achievements via status reports (Figure 6). The feeling of acknowledgement can also be supported by giving the user the choice of how (e.g. reply anonymously or reply as you) to respond to a feedback request. Furthermore, intrinsic motivation is facilitated through various social features available within Slack (e.g., emoji reactions, comments).

DP-2. Trigger feedback exchange while ensuring autonomy in order to increase persuasion. Our findings suggest that conversational agents offer advantages over external applications through triggering feedback exchange, thus, increasing persuasiveness. As shown in the examples in Figure 6b, employees are triggered by incoming messages from the corresponding feedback-related chatbot with suggestions to exchange feedback such as to participate in a survey. Thus, users are persuaded to exchange feedback without having actively initiated it beforehand. This result is in line with prior research that suggests that chatbots facilitate receiving status notifications and updates, as well as getting nudges to action and resolve it (Stoeckli et al., 2018). Not only persuasive systems are designed so that they persuade without using coercion and deception, but also self-determination theory emphasizes the relevance of autonomy to facilitate intrinsic motivation. In this regard, identified chatbots offer their users the possibility to decide freely whether they want to participate by starting the survey only after clicking on the "Start" button. In fact, users can also refuse to participate by clicking "no". The chatbot thus increases the user's sense of autonomy because he can decide for himself whether he wants to participate. Autonomy is further increased by enhancing persuasion facilitating *system credibility* and pr*imary task support* (Oinas-Kukkonen and Harjumaa, 2008). Lastly, we identified chatbots that (1) give users the option to exchange feedback without enforcement (e.g., choose no as in Figure 6) and (2) offer base functionalities such as deactivating notifications and unsubscribing channels. Thus, autonomy as key aspect of intrinsic motivation is supported. Similarly, the following requirements are met: *invoking a sense of choice* (Habitry, 2017), *enabling a sense of non-coercion as in self-direction* (Niemiec and Ryan, 2009), *minimizing salience of evaluative pressure* (Sheldon and Filak, 2008; Niemiec and Ryan, 2009) and *being volitional and reflectively self-endorsing* (Niemiec and Ryan, 2009).

DP-3. Support dialogue and relatedness through reactions and praise in social environments to increase persuasion and intrinsic motivation. Our findings suggest that conversational agents offer advantages over external applications through facilitating praise in a social environment. Specifically, relatedness is increased by chatbots that facilitate providing and receiving praise as shown in Figure 6c. With this function, employees can share their appreciation with other colleagues for particularly good performance. This praise will then be shared visibly in the chatbot. Through praise, chatbots foster a sense of acceptance and compassion by meeting the requirements for enabling *acceptance perception* (Sheldon and Filak, 2008), *conveying empathy* (Habitry, 2017), *being meaningfully connected to others* (Sheldon and Filak, 2008) and *being considered valuable* (Niemiec and Ryan, 2009) and *cared about* (Habitry, 2017). Relatedness can thus be made possible by social reward stimulation meeting the requirements of *supporting team performance* (DeNisi and Smith, 2014; Gonzalez-Mulé et al., 2016), *positivity of comparison* (Ashford et al., 2003), *enhancing the image* (Ashford et al., 2003), *mindfulness* (Edward L Deci and Ryan, 2008). These requirements are supported in particular by dialogue support, which evokes persuasion through the deepening of the social role (Oinas-Kukkonen and Harjumaa, 2008; Weiser, Bucher, Cellina and De Luca, 2015). This is additionally triggered by *surface credibility* and social support facilitation through *recognition* and *cooperation/competition* (Oinas-Kukkonen and Harjumaa, 2008).

DP-4. Promote competence through providing analytics in the form of aggregated metrics and statistics to increase intrinsic motivation. Both subsystems of chatbots, i.e., the conversational agent and external applications, provide analytics. On the one hand, analytics occur in the form of summaries and statistics of feedback exchange activities. On the other hand, analytics occur in the form of summaries and statistics on performed tasks. As shown in Figure 6d, the user has an overview of the current status of his previously defined goals. By doing so, chatbots stimulate *achievement orientation* (Zhou, 1998) and *social rewards* (Oinas-Kukkonen and Harjumaa, 2008), showing how

the feedback exchange was improved or which employees used which functionalities of the respective chatbots. These analytics address the requirements of *positivity of comparison* (Ashford et al., 2003) and being *visible* and *immediate* (Hattie and Timperley, 2007; DeNisi and Smith, 2014). By that *self-esteem* (Brinko, 1993; Ashford et al., 2003) is emphasized, which triggers a *sense of growth* (Weiser et al., 2015) and the *feeling of effectiveness* (Edward L Deci and Ryan, 2000; Niemiec and Ryan, 2009; Habitry, 2017) facilitating an increase in competence.

DP-5. Link the feedback process to tasks, goals and measures through rich visualizations in order to increase feedback effectiveness, intrinsic motivation and persuasion. External mobile and web applications offer advantages over conversational agents, in that their rich graphical user interfaces provide better support for onboarding and tunneling as well as to link feedback with tasks, goals and measures. On the one hand, onboarding features are provided that include suggestions that help employees with sending, seeking and using feedback as well as enable simulations and guidance through a particular feedback process. Thus, increasing persuasion by providing primary task support through simulations and tunneling (Oinas-Kukkonen and Harjumaa, 2008). At the same time, we find that demonstrating expertise to increase system credibility is also better achieved in external applications due to their richer visualization of the feedback exchange process. In addition, *system credibility* is facilitated by rewarding the user for following the guided process steps (Oinas-Kukkonen and Harjumaa, 2008). On the other hand, features are offered that link tasks, goals and measures together, which supports the effectiveness of feedback exchange. This link enables continuous *goal specifications* (Gonzalez-Mulé et al., 2016) and *achievement orientation* (Zhou, 1998), which further addresses the requirements of *closing the performance gap* (Kluger and DeNisi, 1996), enabling *learning enhancement* (Kluger and DeNisi, 1996), respecting the *skill level* (Ashford et al., 2003), providing *guidance explicitness* (Evans, 2013) and *emphasizing self-goals* (Ashford et al., 2003). Given a common feedback process with a guided framework for goals and measures, our research suggests that also intrinsic motivation is facilitated by increasing competence through *positive expectations* (Sheldon and Filak, 2008) and a *sense of growth* (Weiser et al., 2015). This can also be seen in the example of Figure 6. By visualizing the status, metrics and performance progress related to previously defined goals employees are supported in their development.

DP-6. Facilitate feedback exchange competence through guidelines and real-time indications of the feedback quality in order to increase feedback effectiveness and intrinsic motivation. External mobile and web applications may offer advantages over conversational agents in supporting employees to provide and seek feedback in an effective way. Similar to the design principle DP-5, both guidance as well as feedback on feedback are better visualized within external mobile and web applications. Specifically, competence to provide and request feedback can be increased by providing employees guidelines and real-time indications of the feedback quality. As such, the creation of cognitive dissonance may be enabled, that is, the discrepancies between one's self-perception and the perception of others becomes salient (Brinko, 1993). Furthermore, our empirical observations suggest that this process is *non-controlling* (Edward L Deci and Ryan, 2008) and *informational* (Zhou, 1998). This gives a feeling of *effectiveness* (Edward L Deci and Ryan, 2000; Niemiec and Ryan, 2009). However, the investigated web applications provide the user with a variety of selectable *feedback settings* (Brinko, 1993), which supply the feeling of *voluntariness* (Brinko, 1993) and *a sense of choice* (Habitry, 2017). Aside from guidance, the chatbot in Figure 6e, for example, additionally offers an emotionalized feedback on the sentiment of the provided feedback (Figure 6). However, this visualization appears only after an employee has already shared the feedback within the conversational thread. In contrast, web applications offer much richer graphical user interfaces that allow for real-time feedback during entering a feedback message. This increases the *trustworthiness* of the chatbot (Oinas-Kukkonen and Harjumaa, 2008). By indicating the quality of the feedback content through emojis and scales, feedback exchange is facilitated. For example, showing how motivating the written feedback is (see Figure 6e). By providing feedback on feedback, *positive expectations* (Sheldon and Filak, 2008) are encouraged and *a learning enhancing environment* (Hattie and Timperley, 2007) that offers a *sense of growth* (Weiser et al., 2015) is established. In turn, by evaluating the content of the feedback itself, competence can be increased, and thus, the intrinsic motivation to provide feedback.

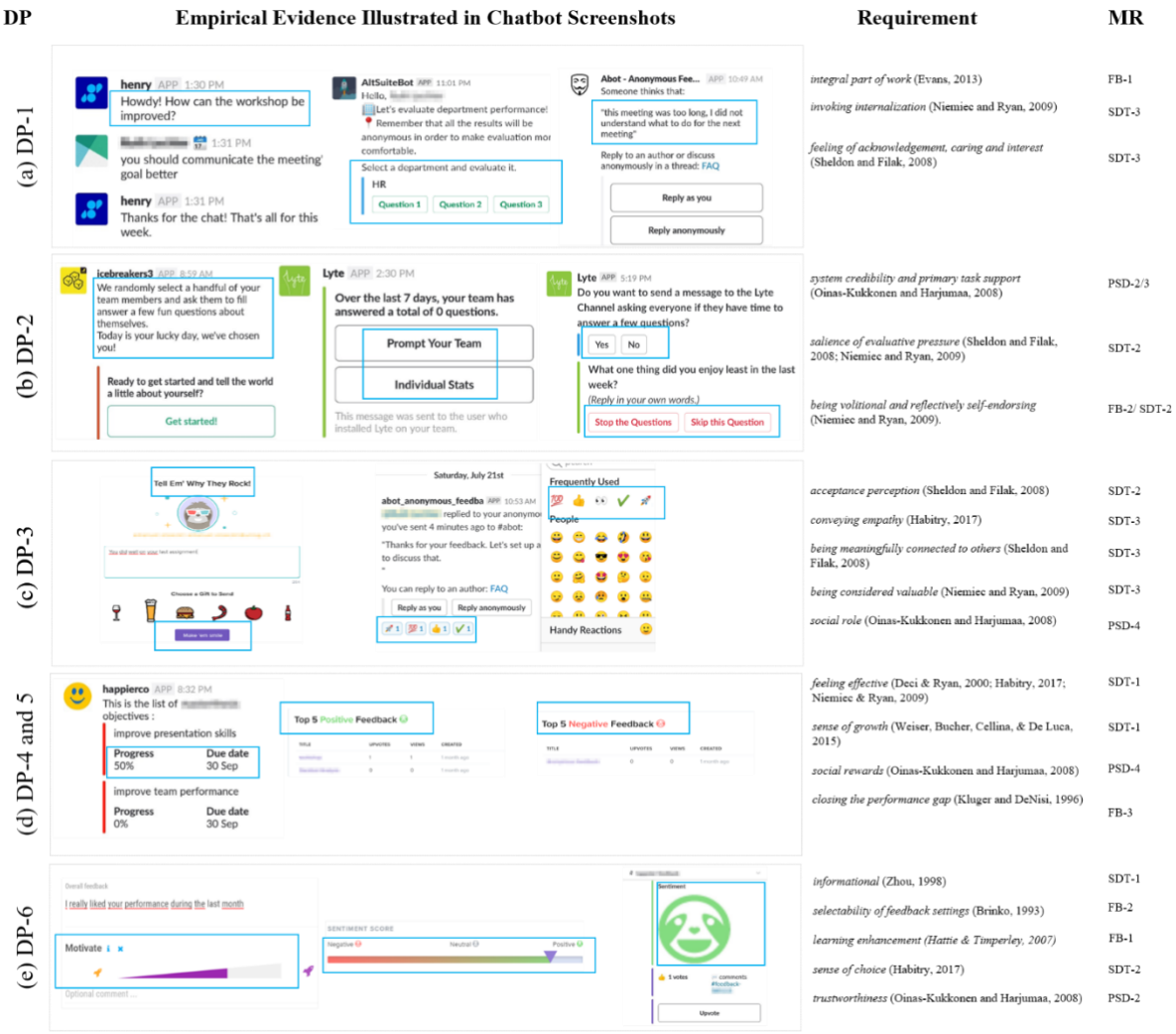

Figure 6. Illustration of chatbot screenshots with codes of design features that address (meta-) requirements (MR) from the analytical framework and link to design principles (DP).

5 Discussion

5.1 Implications for Theory

Our research contributes to literature in three ways. First, we contribute to literature on digital work by responding to calls for research to investigate digital work tools as well as to provide corresponding design principles (Durward et al., 2016; Richter et al., 2018). Namely, by proposing six archetypes of feedback-related chatbots, by elaborating on the two-sided nature of chatbots, and by proposing six design principles, we offer a valuable new perspective on the role of social media and chatbots to help organizations overcome major challenges such as enable reskilling and facilitating feedback exchange. Second, we address calls for research to improve our understanding of informal performance feedback and how it is facilitated by novel technologies (Ashford and Cummings, 1983; Ashford et al., 2003; Levy et al., 2017). We want to emphasize that this a fruitful area of future research, because investigating technology in performance management (Levy et al., 2017) and considering the social context in which performance management takes place (Levy and Williams, 2004) gains in relevance. We hope to encourage information systems scholars to investigate further roles of technology in facilitating performance feedback and deepen our understanding of the identified archetypes. Third, we contribute to literature on chatbots by providing prescriptive knowledge in the form of design principles and by illustrating how chatbots are tightly coupled to other front-end systems external to

the instant messenger (e.g., mobile and web applications). Previous research has not highlighted this two-sided nature and often adopts a monolithic perspective on chatbots that is limited to interactions of users within the conversational thread (Gnewuch et al., 2017; Io and Lee, 2017; Watson, 2017; Rzepka and Berger, 2018; Stucki et al., 2018). An implication for the design of chatbots is that the considered interaction flows should not be limited to the conversational interface as it is widely done in present research (e.g., Stucki et al., 2018). In contrast, our research suggests to wisely integrate user interactions within the conversational thread with external mobile and web applications to implement the design principles. Lastly, this two-sided perspective on chatbots is in line with prior research that suggests that, in practice, value from chatbots in organizational settings is often realized from integrating traditional enterprise systems with social software (Stoeckli et al., 2018).

5.2 Implications for Practice

Despite the increased need to setup digital working environments that facilitate feedback exchange and enable reskilling of employees, digital performance feedback systems in general and feedback-related chatbots in particular are not yet well understood. Our results suggest that organizations can benefit from chatbots in that they trigger feedback exchange and facilitate relatedness and social credibility through social features, thus, may increase intrinsic motivation. However, rather than viewing chatbots as monolithic systems, practitioners should be aware that chatbots are usually tightly coupled to mobile and web applications external to the instant messenger. This is not necessarily bad, because they offer the advantage of richer graphical user interfaces with increased system credibility and process support to facilitate effective feedback exchange. Finally, the identified design principles as well as the (meta-)requirements are valuable for practitioners to develop digital feedback systems.

6 Conclusions

In this research, we conducted a structured analysis of publicly available feedback-related chatbots for the instant messenger platform Slack. Our results reveal that chatbots facilitate feedback exchange by means of six archetypes: anonymous performance feedback, performance-based appreciation, open performance feedback, anonymous culture-based feedback, culture-based appreciation and collaborative feedback. By taking a closer look at the facilitated user interactions, our research reveals a two-sided nature of chatbots. We show that chatbots do not only consist of conversational agents integrated into instant messenger but are tightly linked to complementary front-end systems such as external mobile and web applications. Like an iceberg, the conversational agent is above water and visible within the chat, but many user interactions of feedback-related chatbots are only possible outside the instant messenger. Accordingly, feedback-related chatbots need to be seen as digital feedback systems that consist of two components. The advantage of the former, i.e., conversational agents, lies in enabling dialogue support, primary task support and particularly social support, while increasing intrinsic motivation through facilitating relatedness. The advantage of the latter, i.e., mobile and web applications, lies in enabling feedback effectiveness and increasing intrinsic motivation through process support that facilitates competence. However, our results need to be interpreted in the light of limitations. First, due to the qualitative and interpretive nature of our research, our results may not be exhaustive. With this work, we have just begun to scratch the surface of feedback-related chatbots. Consequently, novel archetypes may evolve and feedback-related chatbots may be analyzed from different viewpoints. Second, our results might suffer from selection bias. Even though we carefully und purposefully selected Slack a as relevant instant messenger platform, chatbots of other platforms may entail different characteristics. Also, the selection of two random chatbots within each archetype yield a sample of twelve chatbots that may suffer sample bias. Consequently, additional research is required before generalizing the results to a further extend. Third, though the design principles are grounded in explanatory theories and linked to empirically observed design features (Goldkuhl, 2004), proof of value is left to future work that investigates if the desired consequences occur in practice (i.e., increased feedback effectiveness, intrinsic motivation, and persuasion) (Nunamaker, Briggs, Derrick and Schwabe, 2015).

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