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Reflective Questioning in Management Education

LESSONS FROM SUPERVISING THESIS PROJECTS

Inge C. M. van Seggelen-Damen\textsuperscript{1} A. Georges L. Romme\textsuperscript{2}

\textsuperscript{1}Open University of the Netherlands, The Netherlands

\textsuperscript{2}Eindhoven University of Technology, The Netherlands

Inge C. M. van Seggelen-Damen, Faculty of Psychology and Educational Sciences, Open University of the Netherlands, P.O. Box 2960, 6401 DL Heerlen, The Netherlands. Email: inge.vanseggelen@ou.nl

ABSTRACT

Reflective questioning is a critical activity in management learning and education. This article describes research on the nature of reflective questioning in groups of management students working on final MSc projects. Drawing on content analysis of recorded meetings, we identify the following key dimensions of reflective questioning: provocation, need for cognition, epistemology, locus of cognition, logic, heuristics, level of abstraction, and cognitive complexity. The data suggest that individual reflection by students and collective reflection in group meetings are highly complementary in management education. In particular, individual reflection by students combined with meetings that support and provoke collective reflection may create substantial synergies between individual and collective learning. We also discuss the implications of these findings for management education.
INTRODUCTION

Many management educators believe that reflection is critical to management learning and education (e.g., Cotter & Cullen, 2012; Cunliffe, 2004; Gray, 2007; James, 1996; Miller, 2004; K. Y. Ng, Van Dyne, & Ang, 2009; Raber Hedberg, 2009; Reynolds & Vince, 2004; Vince, 2002). Reflection involves questioning and uncovering (or learning to uncover) basic assumptions and blind spots in one’s thinking (Gavelek & Raphael, 1985; Nesbit, 2012; Wetzstein & Hacker, 2004). This type of questioning activity may occur in silent contemplation as well as during social interaction (cf. Raelin, 2001; Raber Hedberg, 2009)—defined here respectively as individual and collective reflection. However, there is no systematic knowledge on how and when questioning is (and should be) practiced in management education (cf. Carson & Fisher, 2006; Cunliffe, 2004). As such, the potential for developing a true culture of reflection remains largely untapped in management education (Cunliffe, 2004; Gosling & Mintzberg, 2006; Roglio & Light, 2009).

In this inductive study, we examine what reflective questioning is and how it is cognitively processed. As such, we provide two main contributions to management education theory and practice. First, our study provides a set of indicators—such as provocation, need for cognition, epistemology, locus of cognition, logic, heuristics, level of abstraction, and cognitive complexity—that may serve to discriminate between educational practices characterized by reflection and those that are not. Moreover, we find that reflective questioning—as an advanced learning strategy—involves substantial interaction and synergy between individual and collective reflection. The set of indicators developed in this article provides a framework for constructing educational processes and practices that help management students learn how to question their own and others’ arguments.

Our findings imply that reflective questioning can be learned and trained among graduate management students, and conditions positively affecting this type of questioning can be deliberately created. Existing training tools in the area of the inference ladder (Argyris, Putnam, & McLain Smith, 1985), responsible and constructive feedback (Nesbit, 2012; Roglio & Light, 2009), and passive and active listening (e.g., Burley-Allen, 1995) are widely used, but tend to ignore the locus dimension identified in this study—which emphasizes the importance of thought-provoking peer review and mentorship.
A systemic and more inclusive approach toward reflective questioning has a number of implications. First, investing in a culture of reflective questioning is best done in an educational setting that truly challenges students—such as work on authentic business problems or final graduation projects. Moreover, before engaging in this type of project, students need to be trained in listening skills, problem-solving heuristics, and the ladder of inference, to create awareness and basic skills in these areas. Third, our study implies that professors and other management educators, when they want to promote reflection and reflective questioning in their classrooms, must be aware of the impact of their own mentorship style and exemplary behavior as well as the inspirational role of inquisitive students acting as role models. If students face high barriers in speaking up in educational settings, almost all efforts to engage in reflective questioning are pointless.

Overall, our findings enhance the idea that team dialogue and collective reflection practices may be more productive than learning alone, particularly in the face of ill-structured managerial issues and problems (e.g., Roglio & Light, 2009). In this respect, engaging in critical reflection on a purely individual basis—for example, by writing essays or a personal diary—helps make sense of experiences and provides ideas about how to deal with the more negative ones (Gray, 2007; Learmonth, 2007; Reynolds, 1999a, 1999b). However, this type of reflection can be substantially reinforced and deepened by engaging in collective reflection in group settings with low barriers to speak up (cf. Solitander, Fougère, Sobczak, & Herlin, 2012; Thompson, 2000).

The remainder of this article is organized as follows. First, we elaborate on the theoretical perspective driving our research endeavor into reflection. Next, we describe the research design of our empirical study. We then present the main results. Subsequently, we interpret and discuss these findings in terms of relevant concepts from the management, education, and psychology literatures and also outline the implications of this study.

**THEORETICAL BACKGROUND**

Critical observers of educational practices have time and again argued that critical and reflective thinking skills should be central to how young people are prepared for their professional lives and careers. Prominent advocates of critical thinking include John Dewey, Paulo Freire, and Jürgen Habermas (Dewey, 1933; Freire, 1973; Habermas, 1968). As such, critical thinking has been discussed in a variety of disciplines, such as psychology (e.g., Facione, 1990; Facione, Giancarlo, Facione, & Gainen, 1995; King &Kitchener, 1983, 1994), health care and social work (e.g., Fook & Askeland, 2007; Fook, White, & Gardner, 2006; Hickson, 2011), management and human resource management (e.g., Cotter & Cullen, 2012; Cunliffe, 2004; Gray, 2007; Reynolds, 1999a, 1999b, 2011; Reynolds & Vince, 2004; Van Woerkom, 2004, 2010; Vince, 2011; Reynolds & Vince, 2011).
2002), and education (e.g., Brookfield, 1985; Brookfield, 1988; Carson & Fisher, 2006; Dewey, 1933; Fisher, 2003; Kolb, 1984; Mezirow, 1997, 1998; P. K. Ng & Tan, 2009; Schön, 1983, 1987). The notion of critical thinking refers to reflective observation, understanding, and assessment of influential events and processes. Reflective thinking can for example serve to create political and social sensitivity (e.g., Reynolds, 1999a, 2011), develop legitimacy or acceptance of a decision (e.g., Vince, 2002), or enable social and societal transformation (e.g., Habermas, 1968); it can also be instrumental in the context of research methodology and theory development (Fook et al., 2006; Harley, Hardy, & Alvesson, 2004).

Critical thinking has been used to describe the learning capacity or resilience of individuals, groups, or society. For example, Facione (1994), Facione et al. (1995), Kitchener (1983), and King and Kitchener (1994) approach critical thinking from an individual point of view. Facione et al. (1995) depict critical thinking as the consistent internal motivation to employ one's own critical thinking abilities in judging what to believe or do in any situation. Similarly, critical thinking has been defined as “reflective and reasonable thinking that is focused on deciding what to believe or do” (Leaver-Dunn, Harrelson, Martin, & Wyatt, 2002, p. 147). Thus, critical thinking appears to demonstrate intellectual skepticism and a person’s inclination to doubt (DeNitto & Strickland, 1987; Zechmeister & Johnson, 1992). From a social point of view, Brookfield (1985) considers critical thinking to be “a social process in which assumptions are uncovered deliberately, consistently and systematically” (p. 37). This type of thinking occurs in social interaction and requires input from the collective mind (Vince, 2002).

A critical perspective is also omnipresent in the literature on reflection, reflective practice, and reflective questioning (Fook et al., 2006). Reflection is not identical to critical thinking. Reflection involves some level of self-orientation (King & Kitchener, 1994), whereas critical thinking does not necessarily incorporate self-orientation. When you think critically, you need not be thinking about yourself or self-related matters. In terms of cognitive change, critical thinking involves applying one’s frame of reference to the work, actions, or experiences of others. To avoid any confusion and incorporate the notion of self-criticism, we adopt the broader term "critical reflection" (instead of critical thinking) in the remainder of this article.

As such, critical reflection involves questioning assumptions and taken-for-granted ideas to make sense of, legitimize, or transform social and political processes (Fook et al., 2006; Reynolds, 1999a, 1999b, 2011). The need for critical reflection in management education arises from the substantial influence that managers (to be) have on other people’s lives in organizational and work settings as well as society in general (Reynolds, 2011). At the individual level, critical reflection helps to question personal taken-for-granted assumptions and overcome personal knowledge boundaries. Here, reflective questioning serves to reconsider influential events or
actions by means of a dialogue with self (Raelin, 2001). Self-questioning thrives on iteratively testing and challenging provisional conclusions in open and constructive discussions with peers (cf. Dewey, 1933). As a collective activity, critical reflection invokes and draws on social and political processes, thereby ensuring a sense of empowerment and commitment among participants (Cotter & Cullen, 2012; Reynolds, 1999a; Romme, 1997). This requires profound, non-hostile, and respectful discussions about assumptions regarding power, ideology, or relational issues (Fenwick, 2008; Reynolds, 1999a, 1999b). In group settings, critical reflection is beneficial because it helps to collectively construct meaning, make sense of experienced differences, and create acceptance (Elliott & Reynolds, 2012; Keevers & Treleaven, 2011; Vince, 2002). As such, alternating between individual and collective reflection can leverage experiences in the context of personal or organizational transformation.

RESEARCH DESIGN

The educational setting studied in this article was deliberately designed to induce reflection. This setting involves graduate students, studying for a MSc degree in Management, who discuss their ongoing work on final MSc projects in so-called thesis circles. A thesis circle consists of at least one academic supervisor and a number of students who share control and responsibility for the supervision process (Romme, 2003; Romme & Putzel, 2003). Each student works on, and is accountable for, his or her individual project, and the thesis circle provides and shares informational, procedural, and emotional support. Thesis circles typically include about 6 to 12 students and one or two academic supervisors. The latter monitor and contribute to the discussion on each individual project by drawing on specific expertise in the domain of the thesis circle (e.g., organizational behavior and leadership), but share the control of the meeting processes. Circle meetings take place once every 3 weeks (on average), with a student chairing a series of meetings (e.g., 5 meetings). Another student acts as scribe (Romme, 2003).

Given the explorative nature of this study, theoretical sampling was adopted to select thesis circles and participants. To ensure conceptual saturation, the sample involves representative and contrasting units of observation (Miles & Huberman, 1994; Strauss & Corbin, 1998). The sample includes 12 thesis circles, involving a total population of 94 management students working on their MSc thesis in 1 college year. The interactions in some thesis circles were characterized by frequent instruction, whereas interactions in other circles highly relied on coaching. In the case of instruction-oriented thesis circles, meetings were more frequent (about twice a month) and were relatively short (an average of 2 hr); knowledge exchange in these meetings was more centered around the academic supervisor, who frequently “explained” theories, methods, and standards. By contrast, the coaching-oriented circles more emphasized
student empowerment. These circles met less frequently (about once a month) and each meeting was substantially longer (an average of about 3 hr); in these meetings, students did most of the talking and non-rhetorical questioning by both students and supervisors was much more pronounced than in the instruction-oriented circles.

Data were collected by means of observations and interviews. Our observations focused on those interactions in thesis circles in which thinking is shared and stimulated by supervisors and other students. We used a checklist to avoid sensory overload and provide some focus in observations. To focus on interaction content and systemize note taking, this checklist included Bales’ (Bales, 1950, 2002) category system of social interaction. We classified meeting events into who (student names), says what (in terms of topic), and how (formulation). Bales’ (1950) category system of interaction reveals patterns in the dynamics of social interaction. Interaction process analysis is based on extensive observations in small groups (Bales, 1950, 2002).

Validity and reliability were optimized by identifying small thought units or “unit acts” (cf. Forsyth, 2006) and taking verbal signals such as interrogative word order, negative adverbs (e.g., “not”), imperative tone of voice (e.g., “consider this”), and verbs of perception (e.g., “I believe”) into account (cf. Bakeman in Reis & Judd, 2000). We used the positive, neutral, and negative categories of interaction to distinguish between references to task activities and relationship activities (Forsyth, 2006). By categorizing interaction content, observation data were coded along the dimensions of tasks and relationships. Each thesis circle was observed 3 times, resulting in 36 observations, each observation lasting between 2 and 3 hr.

The interviews provide more information about perceived thinking and inquiry processes recalled in retrospect. By interviewing students about their perceived thinking, we were able to identify how participants perceive reflection. These perceptions represent their espoused theory (Argyris, 1976; Argyris et al. 1985). Interviews allow flexible questioning and provide the opportunity to let interviewees reflect instantaneously (cf. Lyles & Mitroff, 1980). As individuals may vary in their disposition to share their thinking in public, we asked them about this in retrospect. Structured questioning in interviews often runs the risk of becoming an interrogation characterized by suggestive questions and socially desirable answers (Kahn & Cannell, 1965). To avoid such biases, interview questions were limited in number and formulated in an open way to stimulate a conversation in which the interviewee spoke most (Rubin & Rubin, 1995). Guided by the sensitizing concept of reflection and observation results, interview questions focused on thinking induced by questioning behavior. The interview questions referred to a specific object of thinking, that is the thesis or end project. Questions focused on the process of writing the thesis, including the discussion of work in progress with supervisors and peers. We addressed three topics regarding thinking: (a) private thinking, which comes to mind when writing on the thesis; (b) thinking in public, provoked both by listening to discussions as well as by participating in
discussions; and (c) thinking about the process of thinking, or instant reconsideration of the meaning and practice of thinking.

Observational and interview data were transcribed for processing, and the transcripts (more than 900 pages) were then reduced to codes to facilitate analysis. Subsequently, we developed a grounded theoretical model by identifying a set of categories and properties that characterize reflective questioning (Dougherty 2002; Glaser, 1978; Glaser & Strauss, 1967). The coding process included open, axial, and selective coding (cf. Morse, Barrett, Mayan, Olson, & Spiers, 2002; Wester & Peters, 2004). First, coders were invited to identify an initial set of codes. The next step, axial coding, served to sort and extend codes into subcodes. By probing for answers and further studying (sub)codes, we revealed eight themes regarding the act of questioning: what provokes questioning, who questions, why are questions raised, target of questions, what kind of questions are raised, how does questioning work, to what extent do questions disclose paradox, and what outcome does questioning produce? Finally, by means of selective coding and revisiting the literature, we identified three code families (within-dimension comparison, for example, individual reflection) and eight code patterns (between-dimension comparison, for example, level of abstraction). More detailed information on the data analysis is available upon request from the authors.

RESULTS

We now turn to the inquiry processes of management students when they recall the process of writing their final MSc thesis. The analysis of the observational and interview data resulted in eight patterns or dimensions of reflective questioning. Reflective questioning

1. is provoked by a challenging event or task;
2. is based on the willingness to engage in effortful thinking;
3. explores the nature of knowledge and the act of knowing;
4. targets a particular individual (self or other), group, or artifact such as literature, from which answers are expected;
5. examines the premises that constitute or drive argumentation;
6. draws on heuristics for exploration and problem solving;
7. differentiates between levels of abstraction and inference, given the effort needed; and
8. produces cognitively complex outcomes.
After outlining each dimension of questioning, we draw on the management, education, and psychology literatures to ground it theoretically. Figure 1 presents the eight dimensions of reflective questioning.

**What Provokes Questioning**

Our data analysis suggests that challenges in thesis circles occur at different levels. At the individual level, a student encountering a major challenge (e.g., in writing up a literature review) may start contemplating privately about his own work (e.g., “what if I try . . .”) or the work of others (e.g., “how did Sharon produce her review chapter so quickly?”). At the group level, students may face particular problems and challenges that may provoke them to raise reflective questions about their own work or the work of others in a meeting. Most importantly, tasks and experiences perceived as rather challenging were likely to create doubt as an important source of questioning. For example, one student reported, “When starting to work on the thesis, questions such as “what do I want exactly?” came to my mind. Because you read and hear a lot, and you actually would like your thesis to contribute something . . . And besides thinking about what you
want, you get confronted with questions such as “what can be realized given constraints of time and effort?,” “what do I really like to do?” and of course “what has already been studied?”

As such, challenging experiences, problems, or doubts appear to provoke questioning in the context of inquiry (Miller, 2004; K. Y. Ng et al., 2009; Reynolds, 1999b). The literature suggests that problems, for example in the form of knowledge gaps, indeed provoke cognitive processing (Klahr & Simon, 1999; K. Y. Ng et al., 2009) and possibly also cognitive change (VanLehn, 1996). In this respect, challenging tasks or experiences may thus provoke questioning activity (Chronicle, Ormerod, & MacGregor, 2004; Churchman, 1971). In other words, events or experiences in which one becomes aware of a knowledge deficit tend to provoke questioning activity.

Who Questions

Human beings differ in their inclination to engage in reflection, particularly when confronted with unexpected events and puzzling experiences. Our data show that students display highly different levels of effort in cognitive processing. In the context of thesis supervision, in which BSc and MSc degrees are at stake, almost all students were uncertain and puzzled about thesis-related issues and tried to make sense of them. However, students making a large effort in cognitive processing engaged much more in actively searching for information, questioning ideas, and scrutinizing their thinking than those displaying small efforts. For example, “[Small efforts] In my perception working on this thesis . . . writing on this thesis occurred in a fast pace. It had to be done in a fast way . . . so I did not feel the need to question many things.” “[Large efforts] You are eager to search . . . I mean, you are permanently thinking, but I am also continuously exploring new information to see whether my thought process is valid, or whether there might be other things providing a new direction.”

Our empirical data suggest that the willingness to engage in effortful thinking is an important condition for reflective questioning. In this respect, people frequently engaging in reflective questioning appear to have a high need for cognition (Van Seggelen-Damen, 2013). In cognitive and personality psychology, need for cognition has been defined as “a stable individual tendency to (not) engage in and enjoy effortful cognitive activity” (Cacioppo, Petty, Feinstein, & Jarvis, 1996, p. 198). This need to understand the world begins with wonder, questioning, and curiosity (Feist, 2012). Individuals with a strong need for cognition tend to seek, acquire, think about, and reflect back on information to make sense of the world (Cacioppo et al., 1996). Previous studies of this “hunger for information” (e.g., Feist, 2012; Sadowski & Cogburn, 1997) found strong associations between need for cognition, critical thinking, and openness to experience.

Why Questions Are Raised
We asked students why they (believed they) raise reflective questions. Some students referred to sources of critique and expressions of a critical attitude. For example, one student explained, “We were stimulated to explain the choices we made. For example, when defining variables you notice “this author says this, another one says that, this one that . . . .” Eventually, you pick a definition. “Why did you choose that particular one, why is it appropriate in your thesis?” It actually is about justifying choices. That is what is meant by a critical attitude. Also, the design of your theoretical framework, for example, whether you use more theoretical perspectives, not relying solely on one author . . . that kind of stuff.”

Many students emphasized that writing a thesis significantly differs from previous tasks in their study. In this respect, they recalled a variety of sources of critique and reflection such as personal beliefs, institutionalized criteria (e.g., the school’s thesis requirements), and previous experiences. For example, “I believe every question I asked myself was necessary to come up with subsequent questions. I may have concentrated longer on some parts of the thesis, . . . though these issues certainly contributed to other parts of the thesis as well, which is why the process went on like it did, and produced this result [thesis]. And for me, each particular question . . . if one question would have been dropped, other results would have been produced. Hmm . . . whether these results would have been better or worse, I don’t know.”

When someone questions matters previously taken for granted, (s)he is exploring the nature and boundaries of knowledge and the act of knowing, that is, epistemology (Hofer, 2001). The basic skill to address the validity of knowledge claims is developed primarily in childhood (Kuhn, Cheney, & Weinstock, 2000; Watson, Gelman, & Wellman, 1998), but is also contingent on educational background and professional experience (Etkina et al., 2010; Hofer, 2001; Schmidt-Wilk, 2009). In this respect, questioning the act of knowing, by creating doubt, is what turns critical into reflective thinking (King & Kitchener, 1994; Kitchener, 1983). The role of doubt and the questions it brings forth appear to be crucial. The more an individual develops as a professional, the better (s)he is able to assess the validity of his or her own knowledge claims (King & Kitchener, 1994).

Target of Questions

In thesis circle meetings, students obtain new input and feedback regarding their ongoing thesis project. Furthermore, when raising a question in a group setting, students hold assumptions and expectations about who or what may provide answers. A student can raise questions in an internal conversation with himself, or raise questions to other students, the supervisor, or an external source (e.g., the literature). They can do so by exclusively addressing a particular person (another student or the supervisor) or by targeting a broader group (e.g., all participants in the meeting). The following example involves multiple participants:
[SU = supervisor, ST = student discussing his or her own thesis, SC = student commenting on this thesis]

ST: But . . . but I would really like to know, well in using those mechanisms, but why and . . . (silence) and all, and indeed, which is success, what is the strength of those mechanisms?

SU: So write that down, in your main question: What defines successful . . . knowledge . . . transfer.

SC: Well, across the parent firm.

SU: And then you still have a descriptive study, and you can use the literature to find out which criteria to use, and they are in the Prencipe & Tell paper actually, hmm . . . and they are all filling the table you present . . . But you . . . you just put it in there, but you didn’t really use it . . . So you can find out whether or not these mechanisms are successfully applied. Because that is what you want to know, if the application of this, of these mechanisms is a success.

As the example illustrates, the act of reflective questioning is not only an individual matter. In the personality literature, "locus of control" refers to the extent to which a person seeks inward or outward explanations for what is happening (Kesici, Sahin, & Oguz Akturk, 2009). Similarly, locus of cognition refers to the expectation that answers and solutions are more likely found internally or externally. In the latter case, people consult others when they are facing a problem they cannot solve alone or feel insecure about. Vygotsky’s (1978) work suggests that social interaction strongly influences higher cognitive functions. Moreover, social interaction is likely to enhance the engagement in cognitive processing (Kuhn, Shaw, & Felton, 1997; Vince, 2002).

The Kind of Questions Raised

When we invited students to recall and comment on their questioning, they referred to different types of questions raised. We identified a variety of questions in our data: “Example 1: Many things have been written, and one author claims “this works well” [student points at dense network] because it creates trust. And another author argues “this is good” [student points at dispersed network], because it stimulates innovation and creativity. So these are real opposites. The thing is, there is a lot of theory about this. But how does a network look like in terms of nodes?” “Example 2: I made this subdivision myself, although I derived it from theory on the
creation of social capital. Both theoretical forms have never been translated into networks before, so the question is “What does a network look like?” “Example 3: These nodes and ties indicate cohesion, whereas those refer to structural holes. Both need to be each other’s opposites, so my hypotheses are that this network [pointing at a picture of the cohesion network] serves management, and this [pointing at the structural holes network] stimulates innovation.” “Example 4: If one person gets ill, is fired, or drops out, then this part of the network is lost. To what extent can this type of network dynamics be managed?” “Example 5: The ideal situation may be somewhere in between, because both situations are not perfect. How can you test this empirically?”

These examples demonstrate differences in the “underlying logic” of questioning. As such, reflective questions include options (example 1), inferences (example 2), hypotheses (example 3), premises (example 4), or experiments (example 5). The individual capability to draw on underlying logic thus appears to determine the level of sophistication and depth of questions raised.

Students in our empirical study were aware of a certain level of sophistication in the act of reflective questioning. The capability of a person to employ logic influences the depth of questions (s)he raises. Dewey (1933) suggested that logic points to inferences following from premises that are definite in meaning, which are either self-evidently true or have been previously proved to be true. He identified a process of logic including suggesting, intellectualizing, hypothesizing, reasoning, and testing. “Suggesting” here means introducing new ideas or options based on previous observations. “Intellectualizing” involves making inferences by combining inductive premises. “Hypothesizing” refers to proposing possible relationships. “Reasoning” includes deducing premises from theory. Finally, “testing” is about controlling theoretical insights by way of practical observations. As such, the variety of questioning we observed in our data largely fits Dewey’s (1933) classification of logic: suggesting (cf. Example 1), intellectualizing (Example 2), hypothesizing (Example 3), reasoning (Example 4), and testing (Example 5).

How Questioning Works

Many students argued that management problems tend to be very complex, implying an integrated approach to problem identification. For example, one interviewee talked about her attempt to define the notion of shared norms and values for a professional services firm: “Involvement may result from employees sharing values with the board of directors, which is considered to be a kind of social control. When interviewing employees about “norms” and “values” they came up with issues I didn’t intend to address. People referred to norms and values in society, and these norms and values also hold for the organization. It was difficult to explain what I exactly meant with the concept, since it was rather vague. Moreover, it still is an
accountancy and law firm. And I noticed that these people are number crunchers, who do not think about this kind of things, or about the firm’s image. They are not into this, which made it difficult for them to answer certain questions.”

Students in thesis circles also often tackled problems by decomposing them into smaller problems: "[On network theory] So, I just had all sort of, not really sub-questions described for my research question. But just, I had taken everything from “what do I need to know to answer my research question?” Not so much questions, but underlying . . . no, well, content matter so to say. So, I wondered “what is a network?”, “what is a knowledge network?”, and “what does it mean for this case in particular?” Hmm, “what does effectiveness mean?” Well, I split up these issues and explored them in the literature.”

The examples above demonstrate that questioning in an educational setting draws on (some awareness of) problem-solving heuristics (cf. Smith, 1988; Tversky & Kahneman, 1982; Wetzstein & Hacker, 2004). In particular, Churchman (1971) refers to problem-solving heuristics, involving three subroutines. First, problem identification heuristics serve to establish problem scope and assumptions, and draw on for example the notion of representativeness (Churchman, 1971; Miller, 2004; Tversky & Kahneman, 1982). Second, heuristics for decomposing problems serve to structure the initial problem into smaller problems (Churchman, 1971; Miller, 2004). Third, heuristics for problem (re)modeling are about creating a pathway for goal-attainment (Churchman, 1971). In sum, heuristics appear to drive questioning activity, in implicit or more deliberate ways.

The Extent to Which Questions Disclose Paradox

Our observations in thesis circles suggest that students routinely refer to and draw on facts and opinions, whereas they were much less proficient in defining and uncovering assumptions. In particular, many students appeared to be hardly aware of the distinction between an opinion and an assumption. One interviewee illustrated this as follows: “But if you have this [interviewee draws two triads; networks consisting of three nodes connected by two ties], that is two of these taken together. Taken apart I would not have counted them as being beneficial for creating trust. But if you combine them, and you put them together like this [diamond-shaped], then this could also be appropriate for creating trust. So, they gave me this example of “suppose you have this [two combined triads]. This situation is likely to happen in a network. Following your logic this wouldn’t be beneficial for creating trust, would it?” Then, I thought “this could be true indeed.” So, this was a very welcome suggestion: That, taken apart, a triad would be less effective for creating trust, whereas when being combined, . . . this means one has thought about involving the complete network, and in this case a combination of triads can also provide an explanation.”
The literature suggests that reflective questioning involves the ability to understand and handle different levels of abstraction in making inferences (cf. Carson & Fisher, 2006; Coutinho, Wiemer-Hastings, Skowronski, & Britt, 2005; El-Dib, 2007). The act of abstracting involves separating particular from general qualities (Markman & Gentner, 2001) and exploring other contexts for the latter, thus possibly inferring new relationships. Argyris et al. (1985) describe the “ladder of inference” as a tool to disentangle different levels of abstraction in making inferences. These levels include the following: (a) directly observable data, (b) the cultural meaning of data, (c) interpretations drawn from cultural meanings, and (d) interpretations of interpretations (Argyris et al., 1985). According to Schön (1983, 1987), the ladder of inference is instrumental in questioning the tacit understandings underlying everyday thinking, and as such provides for renewed sense making of unfamiliar situations. As such, understanding different levels (cf. ladder) of abstraction is essential for critical reflection.

**The Outcome of Questioning**

Our data suggest that students who repeatedly engage in questioning develop a deeper understanding (e.g., of their thesis topic), that is, their cognitive frameworks become more complex. Most students we interviewed observed that frequent questioning served to identify and explore multiple frames of reference. For example, “Discussions which really made me think concern the use of theory. At first I assumed the theoretical background to be written and finished at the start of the project. But gradually I learnt it to be the product of an iterative process. Discussions about epistemology, that kind of stuff, those were really difficult. I guess everyone thought this to be a difficult topic: “what approach do you choose?”, “for what reason?”, and “how do you include this in your research?””

In this respect, reflective questioning tends to start from a personal frame of reference, involving a related set of meanings that serves to define and construe a situation or a problem (Walsh, 1995; Weick, 1995). By making this frame of reference explicit, reflective questioning can help to uncover implicit standards and assumptions and question their validity (Lyles & Mitroff, 1980; Tsang & Zahra, 2008). Such “unsettling” questions may serve to identify distinctions and comparisons as well as dynamic relationships and complex connections (Wetzstein & Hacker, 2004; Wolke & Aronoff, 1992). As such, the main outcome of reflective questioning is that students’ thinking becomes more cognitively complex, which means that they identify and integrate multiple frames of reference (Curşeu & Rus, 2005; Walsh & Charalambides, 1990).

**INSTRUCTION VERSUS COACHING-ORIENTED GROUP SETTINGS**
As explained earlier, we observed two types of thesis circles in our empirical study: circles frequently engaging in authority-led, instructive conversations and those frequently engaging in coaching-oriented conversations. The *instruction-oriented* circles were characterized by frequent interventions by the academic supervisor and relatively short meetings (an average of 2 hr). Knowledge exchange in these meetings centered on the academic supervisor (even though a student was in charge of chairing the meeting), who frequently "explained" theories, methods, standards, and so forth. For example,

(SU = supervisor, ST = student discussing his or her own thesis)

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ST: Before I talk about the data collection and all that, it was all about the empirical network. And now, because I just use it as an example, what do I do with it then? Data collection, I talked about . . . the network and the triads, they use it as a data analysis network, do I leave that in . . . or not?
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SU: I would downplay. I would say the concept developed will be applied to the following case, and then write a little bit about the case, where the data comes from.
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Other thesis circles were more *coaching-oriented*. These circles held meetings in many instances taking more than 3 hr, and students did most of the talking in these meetings. Moreover, questioning activity by both students and supervisors was much more pronounced and frequent in these circles than in the other ones. For example,

(ST = student discussing his or her own thesis, SC = student commenting on this thesis)

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ST: I really find it very difficult because I thought I provided some structure by saying that it was hmm, I want to make a framework, but at first I want to make classes, so which triads will I look at, because there are, there are a couple of them. And I will choose one, I think, or, at least make classes of it. And then the class will say something about it. And then, to add a distribution about it to that same framework. And then say what it means, or whether it is effective or not. But how I’m going to do that? . . . I think I really have to read a theory to find it out, so I really have no . . . Maybe, do you perhaps have an idea? How I could do that? Because I really cannot visualize the thing I can do.
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SC: Describe how you are going to do it, like you now described it, maybe you should put that down.
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The instruction-oriented circles mainly engaged in questioning characterized by provocations, heuristics, logic, and epistemology (see Figure 1). Here, the more dominant role of and frequent interventions by the academic supervisor apparently imply a higher risk for students to speak up about their doubt and raise questions (i.e., lower psychological safety; Edmondson, 1999). By contrast, questioning in the coaching-oriented circles to a large extent involved need for cognition and levels of abstraction in addition to logic and epistemology. Here, the supervisors adopted a more coaching-oriented intervention style, thereby reducing the perceived risk to speak up (Fenwick, 2008; James, 1996; Kearins & Springett, 2003; Reynolds, 1999a) and raising psychological safety (Edmondson, 1999; Elder Hinshaw & Sakalli Gumus, 2013).

The above suggests that the extent to which thesis circles are characterized by critical reflection varies between thesis circles. Although most facets of critical reflection show up in thesis circles, some are absent in instruction-oriented circles and others in coaching-oriented ones. In the instruction-oriented circles, the facets of need for cognition, level of abstraction, and cognitive complexity tend to be absent. This implies that in this type of thesis circle, a “curious” personality is not likely to satisfy his or her cognitive needs because of the instructive style of teaching. Similarly, because of the instructive style there is hardly any opportunity to identify blind spots in one’s thinking. Furthermore, problem solutions raised in circle meetings may suffer from not being extensively discussed.

Critical reflection in coaching-oriented thesis circles, on the other hand, tends to lack task or event-driven provocations, heuristics, and cognitive complexity. Here, comments raised by the coach-facilitator or other students, rather than tasks or events, challenge and provoke a student’s self-oriented critical thinking. In this type of circle, discussions evolve and do not follow blueprint heuristics. Also, problem solutions raised may not be as complex or integrated as they possibly could be because of students’ self-focus. Although students can benefit from other students’ views by identifying blind spots in their thinking, dealing with the latter requires a level of self-consciousness that essentially is a personal matter rather than a shared act.

Coaching-oriented circles are characterized by a stronger culture of critical reflection. In this type of thesis circle, students are more likely to satisfy their need for cognition by raising their doubts and questions, and share these with peers and supervisor(s). This tends to make meetings longer and is also likely to raise the extent of self-oriented reflective questioning. Students may ask peers and supervisor(s) to help them identify blind spots in their thinking. A blind spot is essentially a “reflective paradox,” that is, by looking at ourselves as objects, we tend to overlook that this act of objectification is subjective in itself (Cunliffe & Jun, 2002). A student’s intention to detect a blind spot typically involves that (s)he thinks out loud and talks in the first person (“I”). In
doing so, the student is likely to draw on multiple *levels of abstraction* in which (s)he addresses his or her:

1. observation(s) (e.g., in *previous quote*: I provided structure . . . ),

2. cultural meaning(s) (e.g., From this structure I choose . . . ),

3. interpretations of cultural meaning(s) (e.g., I infer from my choice that . . . ), and

4. interpretation of interpretations (e.g., I say whether it is effective or not . . . but really have no idea how I’m going to do that—Do you perhaps have an idea?).

**DISCUSSION AND IMPLICATIONS**

In this study of reflective questioning in (supervised) student groups working on final MSc projects, we identified a number of key dimensions of reflective questioning. Rather than trying to establish the extent to which students in these group settings engage in critical reflection and reflective questioning, our findings point at important indicators of the kind of preparatory training that would be needed for (an educational culture of) critical reflection.

First, reflective questioning apparently differs from other types of questioning as it is triggered by events, experiences, or interactions with other people provoking non-rhetorical questions. Truly reflective questions address taken-for-granted assumptions, and as such serve to explore and extend the boundaries of knowledge. Moreover, the inquisitive nature of human beings appears to drive reflective questioning: Students with a high need for cognition will actively engage in inquiry and non-rhetorical questioning, whereas those with a low need for cognition do not. Reflective questioning also draws on the capability to employ logical thinking, problem-solving heuristics, and the ability to understand and handle different levels of abstraction. Finally, reflective questioning appears to enhance cognitive complexity: the awareness and use of multiple frames of reference.

Previous studies have described a variety of reflective practices among teachers or students, which are mostly confined to probing techniques and their effectiveness ([Barbrec & Buckner, 2013; Hatton & Smith, 1995; Jay & Johnson, 2002]) and relate to only one dimension of reflective questioning. For instance, reflective metaphors, storytelling, Kelly’s repertory grid, concept mapping, seminars, diaries, journals, and portfolios (e.g., El-Dib, 2007; Gray, 2007; Litvin & Betters-Reed, 2005; Scot, 2009) are well-known techniques that focus on *provoking* reflection. In addition, many other tools such as authentic business projects and traineeships ([Van Noort & Romme, 2005]), critical incident analysis ([Vachon & LeBlanc, 2011]), photographs ([Korthagen, 1993]), and mirroring ([Hofmann & Heinrichs, 2002]) serve to introduce provocative
experiences or challenges. In this way, students may learn to cope with uncertainty as well as make sense of challenges by seeing parallels with earlier experiences. To guide this process of provocation and prevent it from becoming a meaningless (but mandatory) exercise, its purpose needs to be clearly communicated. In other words, management educators should provide students with challenging, responsible, and meaningful tasks (e.g., running a start-up business or mentoring an underperforming peer) and explain their cause.

Although few scholars have addressed the *locus of cognition* dimension of reflective questioning, some previous work on reflective conversations and dialogue in the workplace emphasized the role of peers and the importance of feeling empowered in reflective questioning (e.g., Edmondson, 1999; Fenwick, 2008; Gray, 2007; James, 1996; Reynolds, 1999a). Tucker, Nembhard, and Edmondson (2007), for instance, found that psychological safety in teams—that is, a perception of low risk when speaking up in public—is crucial for team effectiveness. Another study by Edmondson (2002) observed that perceived interpersonal safety affects whether teams are able to benefit from individual team member contributions or not. Accordingly, management educators should (more often) address and actively develop the peer-review skills of their students. By practicing the role of a “critical though righteous” reviewer—mentor, students will raise the bar and learn to provide constructive comments themselves. A safe atmosphere serves to avoid defensive behavior and motivates participants to speak up and brainstorm without loss of face.

In addition, our findings draw attention to the dimension of *epistemology*. Extensive exploration of the epistemic boundaries of our knowledge is a key purpose of reflection in educational contexts (e.g., Hofer, 2001; Rogers, 2001; Schmidt-Wilk, 2009). As such, reflective questioning serves to confront students as well as educators with their own limited knowledge, which may make them aware of the complex nature of knowledge and the act of knowing. This confrontation with things previously taken-for-granted demands time, space, and exemplification. People need time and space to identify their own position, take distance, and develop new perspectives. If assumption testing is too risky or expensive, “serious” management games and other simulation tools can be helpful. Furthermore, educators may lead by example, by sharing and discussing their own assumptions, pitfalls, doubts, and “truths” (Romme & Putzel, 2003).

Management education practices hardly ever address the other five dimensions of reflective questioning identified in our study. The notion of a reflective personality, for instance, is mainly a by-product of psychological studies focusing on self-reference or self-consciousness (e.g., Cheek & Briggs, 1982; Trapnell & Campbell, 1999). We introduced *need for cognition* to identify possible intrinsic (cognitive) motivators for questioning behavior. This also implies that student teams working on cases and projects are best composed around students with a high need for
cognition (cf. Edmondson, Dillon, & Roloff, 2007; Van Seggelen-Damen, 2013; Vygotsky, 1978). Thus, team members with an inquisitive nature can motivate, and act as role models to, other participants.

As the cognitive content of reflection has been largely overlooked in the literature, there is hardly any knowledge on the key role of logic in reflective practices in management education. It is logic that distinguishes reflective from rhetorical questioning. In this respect, logical thinking serves to make both the premises and the inferences from the premises explicit, and to craft conclusions in ways that can be tested independently from the actor (Argyris, 1999). To learn and exercise reflective questioning, students will benefit from thinking out aloud, both literally by sharing thoughts in public, as well as by keeping a diary, journal, blog, or logbook (Gray, 2007). This type of exercise raises the student’s attention toward assumptions and mental leaps, which very likely stay unnoticed otherwise.

Another dimension often overlooked in reflective learning is heuristics. Although the explicit use of heuristics appears to contradict the "spontaneous" and "groundbreaking" nature of reflection, questioning things previously taken for granted does require profound cognitive efforts (Raber Hedberg, 2009; Reynolds, 1999a). In this sense, heuristics refer to the cognitive routines by which humans process doubt. These doubt-processing routines imply that there is something about reflection which can be considered a (more or less) universal practice. And this cognitive practice can be advanced and taught, for instance, by means of exemplification and experiential learning (cf. Kolb, 1984; K. Y. Ng et al., 2009; Schön, 1983, 1987). In the context of management education, these doubt-processing heuristics can be taught to future leaders of business and other organizations (cf. Gray, 2007; Nesbit, 2012) by immersing them in communities, thesis circles, and similar feedback practices, preferably also at earlier stages of undergraduate and graduate programs (Kearins & Springett, 2003).

Most management education programs at the undergraduate as well as postgraduate level include team work on projects and cases (e.g., Gosling & Mintzberg, 2006). Team discussions can stimulate deeper questions about solutions, methods, and so forth. As team work often provokes discussions to level with one another or to manage conflicts, participants need to learn how to distinguish between practical (concrete) and conceptual (abstract) issues (cf. Argyris et al., 1985; Schön, 1983, 1987). Awareness of different levels of abstraction serves to stimulate deep questioning. Educational practitioners can raise awareness about concrete and abstract issues by speaking in terms of directly observable data, cultural meanings of these data, interpretations hereof, and interpretations of interpretations. Disentangling key arguments in terms of this so-called “ladder of inference” helps to thoroughly question matters in a constructive rather than destructive and emotional way (Argyris et al., 1985; Schön, 1983, 1987).
Finally, our results suggest reflective questioning increases cognitive complexity in both individual and team outcomes (cf. Walsh & Charalambides, 1990). Edmondson et al. (2007) predict that reflective questioning in a team setting produces valuable team behaviors by discussing different frames of reference. When students reflect individually as well as in team settings, they share and develop their ideas. In this respect, individual reflection serves to take distance, whereas collective reflection provides a tool for discussion and consensus building. Teams systematically engaging in reflection are likely to openly discuss frames of reference and may construct new or more complex frames (cf. Tsang & Zahra, 2008) without falling prey to group think or defensive behavior.

At a more general level, our findings suggest that a supervisor adopting the role of coach/facilitator is likely to create a safe environment, which motivates students to share their ideas and doubts and "test" their assumptions without denial or loss of face. In such a setting, students are more comfortable to speak up and be critical in a constructive way, and students can benefit from multiple views and collectively construct meanings and interpretations. Furthermore, by acting as a role model, the coach/facilitator can demonstrate to students how one identifies different levels of abstraction in discussions and how one signals and deals with socio-political issues and behavior.

Furthermore, students alternating between individual and collective reflection are likely to leverage their learning processes and outcomes. In this respect, reflective questioning helps make sense of, challenge and test premises and arguments, which in turn is likely to enhance individual learning and transformation. To exploit the synergy between individual and collective reflection, management educators can integrate tools and practices such as peer review, mentorship, case studies, and "serious" management games in separate courses, or alternatively, these can be offered sequentially across a program. Important is that management students experience a safe "lab" environment to stepwise build their reflective questioning skills. As reflection is all about deep questioning, strong links with management content are needed. For instance, an organizational behavior course can be combined with a training in research methods or professional skills, in such a way that students analyze cases but, in parallel, blog-wise and in team meetings reflect on these cases.

Taken together, these implications suggest an integrated and critical approach toward reflective questioning practices in management education. This type of approach serves to stimulate particular dimensions of reflective questioning, for example, encouraging students with a high need for cognition to publicly share their thoughts; in addition, it also yields synergetic effects in other dimensions, for instance by exploring epistemic boundaries using doubt-processing heuristics. Thus, this approach to reflective questioning can turn instruction-based into
experience-based learning, and thus help students prepare for and make sense of (future) managerial practices.

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Author Biographies

Inge C. M. van Seggelen-Damen is an assistant professor of work and organizational psychology at the Open University of the Netherlands. She obtained a MSc degree in organization studies and a doctoral degree from Tilburg University.

A. Georges L. Romme is a professor of entrepreneurship & innovation at Eindhoven University of Technology. He obtained a MSc degree in economics from Tilburg University and a doctoral degree from Maastricht University. He previously was a professor at Tilburg University.

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