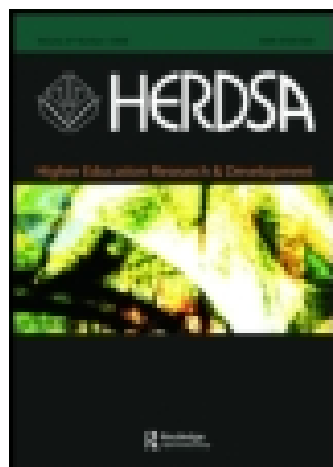


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Adaptive research supervision: exploring expert thesis supervisors' practical knowledge

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Adaptive research supervision: exploring expert thesis supervisors' practical knowledge

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Several researchers have suggested the importance of being responsive to students' needs in research supervision. Adapting support strategies to students' needs in light of the goals of a task is referred to as *adaptivity*. In the present study, the practice of adaptivity is explored by interviewing expert thesis supervisors about diagnosing student characteristics in order to determine students' needs and concurrent adaptive support strategies. The findings suggest that next to competence, supervisors also diagnose elements of students' determination and context. With respect to support strategies, it is suggested that supervisors adapt to student needs in terms of explicating standards, quality or consequences, division of responsibilities, providing more/less critical feedback and sympathising. The complexity of the relationship between diagnosing student characteristics and adapting support strategies is illustrated and needs further study.

Keywords: adaptivity; master's thesis; postgraduate education; practical knowledge; research supervision; student support; supervisors

Introduction

In most higher education institutions in Europe, a master's thesis is the final element of a master's programme. In most cases, a master's thesis project can be characterised as having a substantial research component of which the direction is determined by the learner, with prolonged engagement, and with the support of an individual supervisor (Todd, Bannister, & Clegg, 2004). The quality of the supervision process is deemed one of the most important factors contributing to a successful research project (Drennan & Clarke, 2009; Heath, 2002). Over the years, several scholars in the field of research supervision have suggested or concluded that an important aspect of effective supervision is that it is adjusted to an individual student's needs (Anderson, Day, & McLaughlin, 2006; Derounian, 2011; Deuchar, 2008; Gurr, 2001; Halse & Malfroy, 2010; Kam, 1997; de Kleijn, Bronkhorst, Meijer, Brekelmans, & Pilot, *in press*; Lee, 2008; Maxwell & Smyth, 2011; McClure, 2005; Pearson & Brew, 2002; Todd, Smith, & Bannister, 2006; Wass, Harland, & Mercer, 2011).

From a supervisor perspective, Wass and colleagues (2011) found that supervisors needed different and more varying support strategies compared to a situation with a highly structured and pre-determined curriculum. Also, Anderson and colleagues (2006), based on 13 interviews with master's thesis supervisors, found that these supervisors described themselves 'as adjusting their approach to the needs of individual students' (p. 166). They concluded that the supervisors participating in their study were

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responsive to the students' person and their circumstances. In line with this, Todd and colleagues (2006) found that, even though there are some general patterns in the supervision, supervisors' level and type of support differed from student to student. In addition, Halse and Malfroy (2010) interviewed 26 supervisors, and following the work of Aristotle, they indicated habits of mind as one of the five facets of doctoral supervision as professional work. Habits of mind implies supervisors:

being interested in students and their work; responsive to students' needs; able to make balanced judgements about the quality of students' work; able to provide critical yet constructive feedback and advice; and able to learn from these experiences and apply this learning in different situations with different students. (p. 85)

From a student perspective, McClure (2005) investigated a group of Chinese laboratory-based research students in an overseas environment during the first 6–18 months of their candidature. She concluded that even within such a homogeneous group, students required different supervisory relationships with their supervisor, ranging from highly dependent to highly autonomous. Also, Deuchar's (2008) study, based on the use of student vignettes, found that tensions could arise when supervision does not meet the students' needs; for instance, when supervisors offered pastoral support and the student was looking for support with project management. He concluded that the best working relationship emerges when a supervisor is flexible, responsive to the student's needs in a person-centred way, with open communication and a frank exchange of views. In addition, students themselves also indicate the value of this practice as Derounian (2011) found that responsiveness was the topmost of the three most important characteristics of a research supervisor in the eyes of 14 students. With responsiveness they meant a supervisor being receptive in providing feedback and willing to negotiate.

Thus, the idea that research supervision should be responsive to the students' needs seems to be widely acknowledged. Related to this, in an earlier study we found that good supervisors shared the practice of adapting to students' needs (de Kleijn et al., *in press*). Interestingly, these supervisors did not just adapt to the general wishes of the students, but to their needs in light of reaching the goal(s) of a certain task such as a master's thesis project. We named this shared practice 'adaptivity'. Next to the fact that most supervisors indicated that they adapted their supervision strategies to different students' needs in terms of reaching the goals, they also experienced tensions with regard to providing critical comments without diminishing motivation and regulating students who might not be able to finish successfully their master's thesis project as independently as would be intended. The present study aims to further explore the practice of adaptivity in research supervision and to support supervisors in providing adaptive supervision (Pearson & Brew, 2002), by addressing *how* supervisors actually adapt their supervision to the specific needs of specific students in light of the goals of a task. Therefore, this study explores the practical knowledge of five expert thesis supervisors concerning adaptivity.

Conceptualising supervisors' practical knowledge

Following Verloop, Van Driel, and Meijer (2001), we use the term 'practical knowledge' to indicate 'an overarching, inclusive concept, summarizing a large variety of cognitions, from conscious and well-balanced opinions to unconscious and unreflected

intuitions' (p. 446). Teachers' practical knowledge is often distinguished from formal propositional knowledge that is mainly learned in teacher education institutes. As the focus is on the practice of providing adaptive supervision, we use the lens of supervisors' own practical knowledge rather than formal propositional knowledge. The term 'practical' also emphasises the practical nature of the knowledge that is mainly acquired from the activity of supervising students. As argued by Verloop and colleagues (2001), even though teachers' practical knowledge is strongly related to someone's individual experiences and context, there are elements that are shared by all or large groups of teachers. It is suggested that in order to do justice to the complex and specific nature of practical knowledge, it is important to explore both these shared and individual elements. Therefore, in the present study we aim to explore supervisors' practical knowledge with respect to adaptive research supervision and the extent to which these elements are shared.

Conceptualising adaptivity

Building on the findings of de Kleijn and colleagues (*in press*), we conceptualise adaptivity as adapting support strategies to students' needs in order for them to reach the goals. This conceptualisation contains three concepts that need further elaboration: supervision strategies, students' needs and goals. In the context of research supervision, the term *goals* refers to curricular goals and/or personal goals of the supervisor and/or the student (de Kleijn, Meijer, Brekelmans, & Pilot, 2013). In addition, in a literature review concerning scaffolding, van de Pol, Volman, and Beishuizen (2010) found that adapting support to individual students can aim to support students' metacognitive activities, cognitive activities or affect. The concepts *adaptive support strategies* and *students' needs* are based on Wood's (1991) notion of contingency, which comprises the elements of diagnosing students' understanding and adapting support to that understanding. Hence, adaptivity requires two supervisor activities: diagnosing needs and intervening with adaptive support strategies (see also van de Pol, Volman, & Beishuizen, 2011). In this explorative study, we focus on these two activities and, based on the above, we address the following research question: What is the practical knowledge of five expert thesis supervisors concerning providing adaptive supervision?

Methods

Design

The present study is explorative in nature and does not aim to test but rather to develop hypotheses and directions for future more large-scale studies. Two group interviews or group discussion meetings (GDMs) were organised and individual interviews were held with five expert thesis supervisors. Between the two GDMs the supervisors filled out a short log-file about a supervision meeting with a student. Interviews were chosen as this is a common means of measuring teachers' practical knowledge and beliefs (Meijer, Verloop, & Beijaard, 2002). We included expert supervisors as an earlier study indicated that they shared the practice of providing adaptive supervision (de Kleijn et al., *in press*). Following Bogner and Menz (2009), we defined experts as having 'technical, process and interpretative knowledge that refers to a specific field of action, by virtue of the fact that the expert acts in a relevant way' (p. 54). In addition, the first two interviews were in a group, because we were also interested in shared practical knowledge

(Verloop et al., 2001), and more than one interview was held in order to integrate the findings from the interviews and the log-files by using both as input for subsequent interviews. Following Meuser and Nagel (2009), the data were collected using open discussions and interviews based on general topics. As de Kleijn and colleagues (*in press*) found that supervisors can provide both more general and specific information about adaptivity, the GDMs and interviews focused more on adaptivity on a general level and the log-file aimed to provide data about specific students and instances. Although the log-files were not extensive enough to see them as separate data sources, they were an indispensable part of the on-going collaborative conversation between the five supervisors and the researcher.

Participants

As we sought to include expert supervisors, we followed Bogner and Menz (2009) who argue that experts act in a relevant way and, based on that, have technical, process and interpretative knowledge. We asked the deans of three faculties to name supervisors with a local reputation of being good, and thus we let these deans judge which supervisors in their faculties stood out by acting in a relevant way. In addition, we used students' judgements of the relevance of their teachers' acts, by including supervisors who had been nominated for the 'best teacher of the year' award in the past five years. These supervisors were invited to take part in the study, and five agreed to participate. The supervisors came from four different departments: humanities, economics, pharmacy and social sciences. During the data collection we focused on situations in which the students work independently and have supervision meetings with their supervisors once every two to four weeks. Two supervisors were female and three were male. Two supervisors were teaching staff, two were assistant professors and one was an associate professor.

Procedure

During the first GDM, the expert thesis supervisors and the researcher got acquainted and discussed what they saw as the main goals for master's thesis projects and how they supervise students to reach these goals. During the GDM, it appeared that all five supervisors applied adaptivity in their supervision. The outcome of this GDM was that it became clear that adaptive supervision was a shared practice among these supervisors. Building on this first GDM, in order to explore two activities of adaptivity, diagnosing student needs and providing adaptive support strategies, the supervisors were asked to fill out the log-file based on a supervision meeting with a student. Four supervisors completed the log-file.

During the second GDM, the researcher's summary of the first GDM was discussed and the supervisors spoke about differences between students by describing different student types. They focused mainly on problematic student types. The outcome of this second GDM was data concerning the diagnosis of student needs: a list of student types with corresponding descriptions in terms of student characteristics.

Consequently, a list of the student types and accompanying student characteristics discussed in GDM 2 was used as input for the individual interviews for two reasons: (a) as a member check so that they could indicate whether their views were correctly reflected (Krefting, 1991) and (b) as a means to refresh their memory and to invite them to further elaborate on these student types. In the interviews, some successful

student types were also added. The outcome of the interviews was an extended overview of student types and corresponding student characteristics, as well as adaptive support strategies.

Instruments

The topics discussed during the first GDM were goals of the master's thesis and providing feedback (Table 1). During the second GDM, to elicit student characteristics that supervisors adapt to, the guiding question was: what types of students do you supervise? For subsequent individual interviews, an interview scheme was developed in which the student types and descriptions were further elaborated (Table 1). The log-file was initially designed by the researcher, but adjusted in consultation with the supervisors during the GDM to make sure that the questions fitted the supervisors' practice. The student types that were mentioned were used to elicit student characteristics and types of adaptive support strategies. Some examples of student types that were mentioned by the supervisors are the Helper, the Nobel prize winner, the Unguided missile, the Storyteller, the Compliant student and the Ideal student.

Data analyses

First, fragments concerning student characteristics or adaptive support strategies were selected from the GDM and interview transcripts. As the data concerning student characteristics and adaptive support strategies were collected in relation to the student types that had emerged, these data fragments were then organised in a table with the rows representing the student types that were mentioned by the supervisors in GDM 2 and the individual interviews, and the columns representing student characteristics and adaptive support strategies. Second, from the student characteristics column, the researcher selected the phrases that described one characteristic of a student type and these were put in a separate document thereby disconnecting them from the student types and according support strategies ($N = 116$). For the adaptive

Table 1. Overview of instruments.

Topic list GDM 1
Introduction and getting to know each other
What are the goals of a thesis project?
How do you provide supervision in order to reach these goals?
Log-file
Based on what student signs did you decide on what strategy to use in the supervision meeting?
To what extent are you satisfied with your role in the supervision meeting?
About what specific aspects of the meeting are you satisfied and/or dissatisfied?
Topic list GDM 2
Introduction and summary of GDM 1
What different kinds of students do you supervise?
Interview scheme individual interviews
Which of these student types do you come across and what kind of students are they?
What student types do you come across that are not yet described in this overview?
What is a typical example of feedback you provide to these different student types?

support strategies column the same procedure was applied ($N = 68$). Third, to develop a theory about what student characteristics supervisors adapt to, a grounded theory approach was used when analysing these two lists (Glaser & Strauss, 1967). A grounded theory approach usually involves three steps: open coding, axial coding and selective coding (Corbin & Strauss, 1990). During open coding data fragments are conceptually coded, during axial coding the relation between codes is explored and during selective coding the main overarching theme is established (Corbin & Strauss, 1990). The main theme was already established in the GDMs together with the supervisors (i.e., adaptivity in terms of student characteristics and adaptive support strategies). With respect to the open coding, a code was only maintained when at least two supervisors had mentioned it. During the axial coding, the codes of the open coding were grouped in several main categories. This step was also performed by a second and independent educational researcher (also experienced as a thesis supervisor) and differences in their findings with respect to the main categories were discussed until agreement was reached. Fourth, in order to investigate the relation between diagnosis of student characteristics and adaptive support strategies, for each student type the accompanying categories of student characteristics and adaptive support strategies were indicated. Therefore, the initial relation between diagnosis and intervention was re-established. The analyses were performed by the first author. For the data collection, data analyses and conclusions an audit procedure was successfully completed (Akkerman, Admiraal, Brekelmans, & Oost, 2008), indicating that a third and independent researcher reviewed all steps taken, decisions and interpretations, so as to establish visible, comprehensible and acceptable results and conclusions. Poria, Reichel, and Brandt (2010) argue for making the audit documents available to the reader. In order to increase transparency as part of validity, we explicitly follow their suggestion by making the auditor report available on request.

Results

Diagnosis of student characteristics

Based on 116 student characteristics distilled from the data and the open codes given to the fragments, three main categories were developed together with an independent researcher (Table 2). Three fragments could not be labelled as they were too general (e.g., ‘Someone who doesn’t reflect anything’) and seven labels occurred only once. The three main categories were Competence, Determination and Context. The category Competence included general competence, writing competence, abstract and critical thinking and the student’s perception of his/her own competence. The category Determination comprised enthusiasm about a topic, motivation, ownership and self-regulation, dealing with deadlines, attitude towards supervisor, effort and commitment and focus and consistency. Finally, the category Context included orientation to profession, social environment and distraction from personal situation. For Competence and Determination the characteristics could be identified as positive or negative, which is indicated with (+) and (–) in Table 2.

Adaptive support strategies

With respect to the 68 forms of adaptive support strategies that supervisors described in relation to the different student types, four main categories were developed

Table 2. Main categories for diagnosed student characteristics and example fragments.

Student characteristic	Example fragments
Competence level	<p>(+) ‘That student, she was very good, she just wrote very good pieces.’ (<i>Supervisor O, individual interview</i>)</p> <p>(–) ‘Not being able to distinguish opinions from facts, for instance very politically engaged. They have opinions by selectively perceiving and only hearing that which matches their ideas. Not a critical mind.’ (<i>Supervisor H, individual interview</i>)</p> <p>(–) ‘But they just don’t see where something should be going. It sounds a bit awful but some people just don’t have it.’ (<i>Supervisor K, individual interview</i>)</p>
Determination	<p>(–) ‘Ehm, or well they sometimes do not stick to their agreements, or postpone them again.’ (<i>Supervisor T, individual interview</i>)</p> <p>(+) ‘Being able to work, think and act independently. It is not about assertiveness I think, but taking responsibility for your own thesis.’ (<i>Supervisor E, individual interview</i>)</p> <p>(–) ‘Who go from here to everywhere. I recognise that as well. At one point they say: I will do this. And then the next time they say: I will do that. They keep going in different directions rather than one consistent direction, so to speak.’ (<i>Supervisor H, individual interview</i>)</p> <p>(–) ‘Often boys who seem to reach puberty very late and then, well just don’t accept me as an authority and make a fuss.’ (<i>Supervisor K, GDM2</i>)</p>
Context	<p>‘A concrete orientation to the field only, not the reflection, or rethinking of what we know and do not know.’ (<i>Supervisor H, individual interview</i>)</p> <p>‘Some others would love to work at a ministry and find it more important to write policy documents and almost find that as more important than a thesis that is publishable.’ (<i>Supervisor K, individual interview</i>)</p> <p>‘They won’t do something scientific or immunology-related, but they go straight to McKinsey, or to a friend of their father.’ (<i>Supervisor T, GDM2</i>)</p>

together with the independent researcher (Table 3). Six codes appeared only once, and were, therefore, not included. The four main categories were explicating standards, quality or consequences, Division of responsibilities, Providing more/less critical feedback and Sympathising with the student. Explicating standards or consequences included giving an indication of the grade or quality of student work, emphasising the standards and criteria, explicating supervisor satisfaction or dissatisfaction, indicating consequences of certain student behaviour or explicating why the supervisor chooses a certain supervision strategy. Division of responsibilities included the supervisor assuming a more/less proactive attitude towards the student, the supervisor taking over issues related to planning and deadlines, providing a structuring assignment to the student, giving the student the suggestion to quit or postpone the master’s thesis project or the supervisor transferring the responsibility to the student. Providing more/less critical feedback concerned strategies in which supervisors choose to be more or less critical towards the student. Finally, Sympathising with the student includes, for instance, listening to students’ personal problems and suggesting where they can turn to for help concerning non-thesis-related issues.

Table 3. Main categories of adaptive support strategies and example fragments.

Adaptive support strategy	Example fragment
Explicating standards, quality or consequences	<p>‘And then you come to a point where you say: this bears down to a four [an F]. So, if you want to pass this, and it would be wise to try and do so, you will have to do something with my commentaries.’ (<i>Supervisor H, individual interview</i>)</p> <p>‘Well, I put into words: I have the idea that I say things that somehow (points at forehead) don’t end up here. Is that correct? Am I completely off? Is my communication wrong? Is it my style of personality, or ... I just don’t see that you understand it, do you think you do?’ (<i>Supervisor H, individual interview</i>)</p> <p>‘And then made it very explicit in the supervision: listen up, I try to get you as far as possible so we’ll go to the last. And that means that you face this. And someone else, for whom the standards is less high, that person would not experience this.’ (<i>Supervisor O, individual interview</i>)</p>
Division of responsibilities	<p>‘So whereas for some students I email them with: hey I haven’t heard from you in a while, how are you? For such a student I think, well ok you come and just show me some work.’ (<i>Supervisor T, individual interview</i>)</p> <p>‘That means that they would have to start producing texts: I want to see your first chapter next week, your second chapter in two weeks. Then I focus on time management a lot.’ (<i>Supervisor E, individual interview</i>)</p> <p>‘And no, then I work harder myself too. Then, I don’t just look at what you have written, but I also see it bigger in terms of what can you add and what can you do extra. Did you think of that or have you tried this?’ (<i>Supervisor T, individual interview</i>)</p>
Providing more/less critical feedback	<p>‘Also, in terms of content, because in that case I won’t put the standard too high for them. How bad that might be. Then, we just go for a six [a C], then we don’t go for fantastic scientific research, but just make sure that it is satisfactory. That leads to a different way of providing feedback.’ (<i>Supervisor K, individual interview</i>)</p> <p>‘Students that say, I aim for a nine (an A+), well they get hell. And if they manage to handle that ... So try to stimulate their ability resolve issues themselves and their self-analysing ability.’ (<i>Supervisor H, individual interview</i>)</p> <p>‘And then I am very hard. Then I say: just go home and come back when you have something that is (1) feasible, (2) what you can do and (3) that is related to something that gives you a basis and not this kind of stupidity. Because you just do not know what you are talking about. Being critical at something that you don’t know is very easy, but here you are seen through. So he got hell. Such a boy, I put him back on the ground with both feet.’ (<i>Supervisor H, individual interview</i>)</p>
Sympathising with student	<p>‘So, eh well, becoming a bit personal like: I understand that your mother is very ill and that that costs a lot of time and that you can’t always concentrate on your thesis.’ (<i>Supervisor E, individual interview</i>)</p>

(Continued)

Table 3. (Continued).

Adaptive support strategy	Example fragment
	<p>'By showing one's hand in terms of your own research experiences, like guys the first time that I write a paper that is just perfect in once, still has to be born. It is very hard and I myself run into these kinds of problems. That way, your students when they themselves haven't reached their result with their determination you show them like, take this from me, if you do this now it will pay off.'</p> <p>(Supervisor O, individual interview)</p>

Relation between diagnosed student characteristics and adaptive support strategies

After the individual analysis of diagnosis characteristics and adaptive support strategies, these two sets of categories were re-integrated to examine possible relationships. We saw that this relation is not just straightforward, indicating that a single characteristic cannot be linked to a single support strategy. This is illustrated in a fragment from the first GDM:

<i>Supervisor O:</i>	Because, based on that, that mix of interventions, that is that sign with an exclamation mark behind it, if there is seven [strategies], there are 7×6×5×4×3×2 combinations of interventions and that's what we do in practice. So you always mix a critical remark with a directive remark.
<i>Supervisor T:</i>	And that can differ per meeting, I think.
<i>Supervisor O:</i>	And then you have to double it because for some strategies you deliberately do not use them. So because, just like weak students, this student needs that you explain how you can make proper footnotes, but there's so much more to it, we'll see that later.
<i>Supervisor K:</i>	Then your intervention is doing nothing.

This fragment suggests a rather complex relation between sets of student characteristics and sets of adaptive support strategies. In order to explain this finding in more detail, Table 4 presents five examples of student types in terms of their characteristics and the accompanying adaptive support strategies. We deliberately chose to report on student types that show that overlapping student characteristics can lead to different forms of adaptive support strategies. Also they illustrate that certain adaptive support strategies can be related to different sets of student characteristics. As can be seen in Table 4, for the Ideal student, the Do-gooder, the Musty student and the Wrongly selected student the support strategy 'providing more critical feedback' is mentioned by one or more supervisors, whereas for the C-student providing less critical feedback is mentioned. This strategy is not exclusively related to any of the student characteristics, as some student types have high or low determination, or high or low competence. We thus found that different sets of diagnosed characteristics can lead to supervisors providing either more or less critical feedback, in combination with one or more other support strategies. This is also evident in the following fragment of the individual interview with Supervisor K:

The undisciplined mind. Eh that is more or less like the do-gooder. The fact that you believe something or think it is true, doesn't mean that it is true. So you have to go to

Table 4. Examples of student types with diagnosed student characteristics and adaptive support strategies.

Example student type	Diagnosed student characteristics	Adaptive support strategies
The ideal student	<i>Competence</i> : general competence (+) <i>Determination</i> : motivation (+), commitment (+), self-regulation (+), dealing with deadlines (+), dealing with supervisor (+)	Assuming a more proactive attitude Providing more critical feedback
The do-gooder	<i>Determination</i> : motivation (+), enthusiasm about content (+) <i>Context</i> : orientation to practise	Providing more critical feedback Explicating quality
The wrongly selected student	<i>Competence</i> : general competence (–), abstract thinking (–) <i>Determination</i> : commitment (+), self-regulation (–) <i>Context</i> : distraction from personal life (+)	Providing more critical feedback Division of responsibilities
The musty	<i>Competence</i> : general competence (–) <i>Determination</i> : motivation (–)	Providing more critical feedback Explicating quality Explicating standards
The C-student	<i>Determination</i> : motivation (–)	Providing less critical feedback Explicating quality

Note: (+) and (–) indicate whether the diagnosis of these characteristics is high (+) or low (–).

those arguments and to work towards depth. And the fact that you go to university is not enough. You have to work for it. You have to go for it and get inspired. And if that doesn't happen it doesn't work. But what might be the difference is that the undisciplined mind, in my opinion, is also lazy. So finds a six (C-) enough. While the other is not lazy, the do-gooder, who wants to make things work. So you stimulate them in another way. Because if someone is also lazy, you just sometimes have to use your whip, be clear about boundaries like: now you start working. While the do-gooder, well you have to canalise them, and make sure he ends up in the right place, rather than having too little motivation.

Supervisor K here indicates that in her supervision, having strong beliefs without arguments to underpin these beliefs can lead to different support strategies depending on whether a student's motivation is high or low. It seems, therefore, that there are no one-to-one relations between student characteristics and supervision strategies. In other words, adaptivity support cannot be described in terms of simple 'equations'.

Discussion

The present study aimed to explore five expert thesis supervisors' practical knowledge about providing adaptive supervision. Based on the work of van de Pol and colleagues (2010), we focused on diagnosing student characteristics and providing adaptive support. We explored the student characteristics that supervisors diagnose, the support strategies that they consequently use and the relationship between these characteristics and support strategies. Several authors have argued that there is no supervision strategy that can be favoured over the others, as different students might need different supervision styles or strategies (Hemer, 2012). Our findings with respect to *diagnosing*

provide a more specific hypothesis with respect to what student characteristics seem to matter: supervisors diagnose several elements of students' competence, determination and context in order to determine students' needs. Related to this, in a discussion about the increased diversity in the university classroom, Buckridge and Guest (2007) mention several differences between Biggs' (2003) hypothetical students 'academic Susan' and 'non-academic Robert': attitude and approaches to learning, motivation, consciousness and engagement. These characteristics would all fall into our determination category. Our findings thus suggest that we should add student competence and context to the discussion about differences between higher education students that matter for designing learning environments.

In relation to the *adaptive support strategies*, other authors mainly indicated that some students might need more guidance than others (McClure, 2005). Our findings further elaborate the hypothesis on this issue by giving a more specific overview of adaptive support strategies that supervisors employ. The category division of responsibilities is probably closest to the already mentioned more, or less, guidance. Additionally, being more explicit to students about standards, the quality of their work or the consequences of their behaviour, providing more or less critical feedback and sympathising with them were found to be strategies that supervisors adapted to different diagnoses of students' characteristics and needs.

Concerning the *relation* between diagnosing student characteristics and adapting support, the findings suggest that this is a rather complex set of interactions between different diagnoses and support strategies. This might just be the essence of adaptivity and the reason why it is not as straightforward as it might appear at first glance. Furthermore, in line with this hypothesis, Overall, Deane, and Peterson (2011) found that students' research self-efficacy could be explained by a combination of high levels of autonomy support and personal support. This would suggest that the effect of a certain support strategy is best judged in relation to the other support strategies. As such, it is concluded that even though diagnosis of student characteristics and adaptive support strategies can be described with several main categories, the relation between both elements of supervisors' practical knowledge is more complex.

Limitations and directions for future research

Despite the contribution of our study to understanding the practice of adaptive supervision in master's thesis projects, it is important to bear in mind that this was only a small-scale exploratory study that generated hypotheses rather than tested them. Second, the supervisors who participated in this study shared a local reputation of being good supervisors in the eyes of their dean or their students. However, we do not know how the deans and students developed these views on the supervisors' reputations. This implies that these five supervisors cannot be seen as a fully homogeneous group. Therefore, for future research it is suggested to use more transparent criteria for selecting expert supervisors. In addition, we note that in this study we focused on the *what* of diagnosing, rather than the *how*. Future research might take up these issues and elaborate on these findings by addressing a validation of the categories, differences between supervisors, the *how* of diagnosing adaptivity and a distinction between adapting to differences between students from adapting to an individual student from meeting to meeting. Another limitation is that it remains unclear to what extent diagnosing and providing adaptive support strategies are conscious activities, or whether their articulation was due to the research design.

Concerning the particularities of the supervision processes investigated in this study, the thesis projects these supervisors supervised generally lasted six months. Other projects such as PhD projects might take three to four years and it would be interesting to also further investigate the issue of adaptivity within PhD supervision to gain more insight into how it develops over time. With respect to supervision in different disciplines, even though supervisors from four departments (humanities, economics, pharmacy and social sciences) participated in this study, our findings did not indicate clear differences between disciplines concerning adaptivity. However, given the small sample, this is not to conclude there are no differences between these disciplines or that our findings can be generalised to other disciplines. We do note that our findings are specific for situations in which students work independently and once every two to four weeks meet their supervisor.

Finally, future research might also address the role of students in the practice of adaptive supervision. After all, adaptivity would require the student to share some of his/her characteristics, thus providing the supervisor with the opportunity to adapt to specific situations and needs. It would be interesting to investigate to what extent students are willing to do this, and how they could be supported in sharing useful information about their situation.

Implications

In line with the findings of de Kleijn and colleagues ([in press](#)), these findings suggest that adaptivity is a way of increasing the goal-relatedness of supervision and, therefore, the effectiveness of supervision. After all, it is not farfetched to think that adapting the supervision strategies to a specific student's situation and needs might lead to a more constructive supervision process in which the student actually uses the provided advice and feedback. However, adaptive supervision still has to be empirically related to increasing student learning and performance. Still, at this point, we deem the research findings convincing enough to say that it would be worthwhile for supervisors to know what adaptivity looks like in terms of providing adaptive support and diagnosing what students might need to reach the goals of the master's thesis project.

This study has also two methodological implications. First, the open way of data collection and intermediate data analysis allowed new insights to arise and to be developed in the interviews with the expert thesis supervisors. Moreover, Bronkhorst, Meijer, Koster, Akkerman and Vermunt ([in press](#)) suggested that collaboration between educational researchers and educators can trigger enthusiasm, involvement and participation, which, in turn, can benefit the truth value, neutrality and, to some extent, the applicability of the research. Therefore, when interviewing experts in the study of practical knowledge, it is advisable to apply an open way of data collection and to give the experts a say in what topics are worth exploring in depth. This is in line with the argument of Bogner and Menz (2009). Second, we found that keeping small log-files increases supervisors' consciousness concerning their own supervision practices, as is illustrated by supervisors' comments in GDM 2:

Supervisor O:

The result of last week is that, this is the work of the student about whom I filled out the log-file and this afternoon we have another meeting. And I just nicely wrote up front what I want to do with this meeting. [...] And I think that is already something that takes little time for supervisors and can lead to better supervision results.

Supervisor K: But also because you know: I have to fill out the form, so I'm not just gonna mess around. But I will closely observe myself in terms of what am I doing? So my behaviour changes due to the fact that I'm involved in your study.

Therefore, we suggest that keeping short log-files such as the one used in this study, and discussing them, could be an effective way of supporting a supervisor.

Conclusion

In sum, the findings of this study give insight into how five expert supervisors provide adaptive supervision. We conclude that these supervisors carefully observe students in terms of competence, determination and context and, based on the diagnosis of these characteristics, decide on what supervision strategies would benefit the students most, in terms of division of responsibilities, being more explicit to students about standards, quality and consequences, providing more, or less, critical feedback and sympathising with their situation. Nevertheless, this is only a first attempt to explore adaptivity and, therefore, we suggest that this issue is considered in future research studies concerning research supervision.

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