Medical students' self-regulated learning in clinical contexts

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Chapter 2

Routines of clinical departments that influence students’ self-regulated learning

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Under review
Abstract

Objectives
In the clinical phase of undergraduate medical education, students are expected to self-regulate their learning. It is largely unknown how students’ self-regulated learning (SRL) is affected by the standard practices of clinical departments. Understanding this is important because contextual influences may have a profound influence on students’ engagement in SRL. Standard practices of clinical departments involve collective, recurring patterns in behavior, also known as routines. This study addresses how routines of a clinical department influence medical students’ SRL.

Methods
We used focus groups to study how routines of clinical departments influenced medical students’ SRL from a constructivist paradigm, using grounded theory methodology. Six focus groups, including 39 purposively sampled participants from one Dutch university were organized. The focus groups were audio recorded, transcribed verbatim and were analyzed iteratively using constant comparison and open, axial and interpretive coding.

Results
Students described how both routines and characteristics of a clinical department influenced their SRL. Routines could enable or hinder the relationships students engaged in. Enabling relationships affected students’ SRL by increasing motivation, decreasing barriers to ask questions, and by making learning experiences and feedback more meaningful. Routines could also make students feel that a department invested effort in them. A perceived effort investment aided students’ goal setting, learning opportunities, monitoring of one’s own progress and receiving valuable feedback. Typical features characteristic for a department, such as patient mix, also influenced SRL opportunities that students perceived.

Discussion
Our study gives a practical insight in routines of clinical departments that influence students’ SRL. Routines predominantly influence relationships between students and staff. These routines are vital for students’ SRL because they can support many different aspects of SRL and make learning more meaningful. Departmental characteristics also need to be taken into account, because some departments were perceived to lack opportunities to engage in SRL.
Introduction

Students face heavy expectations to seize appropriate learning opportunities in the clinical workplace and to learn autonomously.¹ To do so, medical students need to take control of their own learning and engage in self-regulated learning (SRL).²⁻⁵ Students are known to struggle with SRL when transitioning to a new context, because they require support to become aware of effective learning strategies in a context.⁵ SRL results from a complex process that happens in the interaction between individual and context in a dynamic fashion.⁶ Therefore, both individual and context have a profound influence on students’ SRL and a context should foster an individuals’ SRL.⁵ A broad variety of contextual factors have been described that influence SRL in structured environments designed for learning, such as curriculum pedagogy, possibilities for guided and independent practice, and social factors.²,⁷,⁸ However, less is known about the different contextual factors influencing students’ SRL in more complex environments, such as a clinical workplace.⁵,⁶ This knowledge is vital for clinical teachers to better understand and support medical students’ SRL in clinical contexts.⁹

Students learn in clerkships, ergo these clerkships constitute their learning contexts. Clerkships take place in hospital departments and community health settings. In clerkships, students learn from participating in clinical practice and from teaching sessions.¹⁰⁻¹³ To understand the influence hospital departments have on SRL, we need to know more about their teaching sessions and the standard clinical practices students are supposed to participate in and learn from. Standard clinical practice of a department involves recurring patterns in behavior to achieve a certain goal, otherwise known as routines.¹⁴ Routines are context-dependent, recurrent patterns of behavior, which are collective in nature, and shaped by history.¹⁴ This may for instance involve supervision strategies in a clinical department or a well-established feedback culture. It is largely unknown how students’ SRL is affected by routines of clinical departments. Thus, to address this gap in literature we performed a focus group study to answer the research question: How do undergraduate medical students perceive routines of clinical departments to influence their self-regulated learning in clerkships?
Method

Design
We used focus group sessions to study how routines of clinical departments influenced medical students’ SRL from a constructivist paradigm, using grounded theory methodology. We assumed students would become more aware of the routines and their effects on learning when discussing experiences with peers. We organized focus groups sessions to engage students in a lively discussion about their self-regulated learning in clinical environments. The multidisciplinary nature of our research team provided a variety of perspectives to approach our research question. The first author (JB) is a recently graduated MD and a PhD-student in health professions education. All other authors have PhD's in health professions education and offered insight from both under- and postgraduate medical education and in cognitive as well as socio-cultural perspectives on learning.

Setting
We selected students from a Dutch medical school with entering cohorts of 350 students per year. The medical curriculum includes a preclinical phase (year 1-3) and a clinical phase (year 4-6). The clinical phase consists of rotational clerkships ranging from 3 to 16 weeks in academic and teaching hospitals, as well as community settings. Throughout the clinical curriculum, independence and responsibilities gradually increase until students are able to function as residents after graduation.

Participants
Between December 2015 and June 2016, the first author (JB) purposively approached students based on experience and current clerkship during educational meetings, asking for participation in focus group sessions. Focus groups consisted of 4-9 participants. We initially organized both homogeneous and heterogeneous focus groups, but we found that students were better able to discuss their experiences with others who had similar experiences. Otherwise, students were mainly sharing experiences with each other and not discussing the impact of these experiences on their learning. Therefore, after one heterogeneous focus group we decided that the remainder of the focus groups would be homogenously sampled based on current clerkship location.

Data collection
Focus groups were subsequently scheduled, whilst iteratively collecting and analyzing data. All but one focus group were moderated by the second author (IS)
who has ample experience in moderating focus group sessions for medical education research. The first author (JB) observed all focus groups, and moderated the last one for practical reasons.

All participants received an email explaining SRL before joining the focus groups and were asked to think about departmental routines influencing their SRL. We obtained informed consent and some background information regarding the demographics of the participants at the start of the focus groups. Next, the moderator briefly explained the goal and rules of a focus group session. We then facilitated the discussion by asking: 1) what were routines of the department influencing SRL, 2) how do these routines influence SRL, and 3) under what circumstances do these routines support or hinder SRL? At the end of each focus group we asked participants what routines needed most urgent attention from the clerkship course director as per having the biggest effect on their SRL. Each focus group session lasted for approximately one hour. The focus groups were audio-recorded and transcribed verbatim. We anonymized all transcripts.

Data analysis
After each focus group session, the moderator and observer shared their initial responses. The first author (JB) transcribed and open coded the transcript, and performed a preliminary analysis to guide future sessions. Next, the first and second author (JB and IS) started with open coding of the transcripts, followed by axial coding and interpretive analysis. Analysis was done iteratively, constantly collecting, coding, comparing, and interpreting data until no new concepts emerged. We organized one final focus group to confirm theoretical saturation. Data analysis was supported by the use of MaxQDA V11 (Verbi GmbH, Berlin Germany).

We discussed the emerging ideas and interesting findings within the entire research group in four meetings. To keep track of our reflections, thoughts and interpretations, the first author kept memos and a log to record all emerging ideas and concepts.

Ethical approval
Participants were not compensated for participating in this study. The Ethical Review Board of the Netherlands Association for Medical Education (NVMO) approved the study under file number 613.
Results

We organized 6 focus group sessions, including 39 participants. Extensive in-depth discussions took place about routines influencing students’ SRL. Details regarding the focus group sessions and its participants are given in table 1.

<table>
<thead>
<tr>
<th>Session number</th>
<th>Number of participants</th>
<th>Type of focus group session</th>
<th>Enrolled in what clerkship(s)</th>
<th>Participants gender (male/female)</th>
<th>Participants age in years (mean, range)</th>
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<td>2/7</td>
<td>24.9, 24-28</td>
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<td>5</td>
<td>Heterogeneous</td>
<td>1: Pediatrics in peripheral hospital, 1: Ear-Nose-Throat disease in academic hospital, 1: Obstetrics and Gynecology in peripheral hospital, 2: Surgery outpatient clinic in peripheral hospital</td>
<td>2/3</td>
<td>23.8, 21-28</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
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<td>Internal medicine, academic hospital</td>
<td>5/1</td>
<td>23.7, 22-25</td>
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<td>2/3</td>
<td>25.0, 23-27</td>
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<td>Surgery, academic hospital</td>
<td>5/2</td>
<td>22.9, 22-25</td>
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<td>Homogeneous</td>
<td>Psychiatry, academic hospital</td>
<td>3/4</td>
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</table>

Table 1. Focus group session characteristics
Students described both routines and typical features of a clinical department to influence their SRL. Students also described clinical department characteristics that didn’t fit our working definition of routines, but because of their significance to our research aim they were included in the analysis as well. We will first discuss the routines that influenced students’ SRL, followed by a discussion of how characteristics of departments influenced students’ SRL.

**Routines in a clinical department**

Two themes emerged from the focus group discussions about routines students perceived to influence their SRL. 1) Routines could influence students’ SRL through enabling or hindering the formation of relationships, and 2) routines could make students feel a department invested effort in their learning. We will explain the themes in more detail in the coming sections in which we include exemplary quotes. The letters and digits preceding these quotes are unique identifiers of participants.

**Theme 1: Enabling or hindering the formation of relationships**

Routines could support the formation and maintenance of professional relationships between students and members of clinical teams by facilitating personal attention, informal contact, continued collaboration in clinical activities, and participation as part of the team. By supporting relationships, these routines supported students’ SRL through enabling them to engage others in their SRL, increasing their motivation, decreasing barriers to ask questions, and by making learning experiences and feedback more meaningful to them.

**Personal attention**

Routines that facilitated personal attention included limiting the number of students in a department and offering longer clerkships. Both helped staff members recognizing new students, know students’ names and to get to know each student individually. Knowing one another lowered barriers for students to ask for help, made feedback from supervisors more meaningful and credible to them, and made a clerkship less stressful.

\[F5R1\]: “I had to introduce myself in my final assessment. I think that is strange […] if you have the assessment with someone who has monitored your progress than, eh, that person can do the assessment much better. Yes, that decreased my motivation a little.”
Informal contact
Routines that enabled students to have informal contact with other team members involved regularly having lunch together, instead of eating in separate groups, and ending a day informally with drinks. Having informal contact enabled the students to ask questions, increasing the opportunity to involve others in their SRL strategies.

F5R7: “There [a department in another hospital] the consultants, residents, students, and even administrative staff had lunch together […] here there are separate groups and there it was really one team. […] There you feel much more at ease to ask questions.”

Continued collaboration in clinical activities
Routines that enabled students to collaborate with others in clinical activities pertained to the amount of time students and supervisors worked together. Students explained how working with the same person for two or three weeks, instead of having different supervisors frequently, was greatly beneficial to their SRL, because both students and supervisors knew what they could expect from each other. With continued collaboration students were able to show their capabilities and were motivated to study a case in-depth, because they knew whether their supervisor might ask questions. It also decreased students’ stress because they knew what to expect, and increased self-efficacy to engage in SRL. Supervisors on the other hand were able to determine what students could do independently and increase students’ responsibilities in clinical tasks, thereby increasing students’ autonomy and possibilities to engage in SRL.

F4R2: “You are assigned to a different supervisor every day, which results in you needing to prove what you are capable of doing independently every day, which result in the feeling that you start from scratch every morning, you know, before you can continue making progress.”

Participation as part of the team
Routines that made students feel like a true team member included being invited to participate in clinical activities, being asked questions during clinical activities, being asked for their opinion during meetings, and getting responsibilities when seeing patients rather than just observing. These routines made clinical participation more meaningful to students. This increased the effort students invested in their SRL and lowered barriers to make alterations to their learning environment, such as asking for more responsibilities, or to ask questions. Additionally, it increased
student motivation for actively participating in clinical activities because they felt welcome, appreciated, and valued as an individual. Participating in clinical activities was explained to occur more frequently when students and residents shared a room or had adjacent ones.

F2R2: “There is much more attention for your position, just, I don’t know. For instance you start the day together, prior to a day discussing: what are we going to do today, what will we do, and you end the day together. There is room to discuss with all others: how was your day, do you have any comments? Any suggestions? That was fan-tas-tic”

Theme 2: Investing effort in student learning
Routines could support students’ perception that effort was invested in their learning, by having high quality teaching sessions, high quality assessment, a supportive learning environment, and asking thought provoking questionings. By supporting students’ perception that effort was invested in their learning, students’ SRL was supported through aiding goal setting, increasing learning opportunities catered to the needs of a specific student, enabling monitoring of a student’s own progress, and high quality feedback.

High quality teaching sessions
Routines that made students feel that a department invested effort in students through having high-quality teaching sessions included: frequent and structural educational sessions, student presentations, and allowing students to participate in all of the educational sessions for doctors. These routines helped students with their SRL through goal setting by identifying gaps in their current knowledge. Because of high quality teaching sessions, students could set SRL goals for themselves that involved competencies, diagnoses and treatments options they had not encountered during clinical activities. Additionally, routines regarding teaching sessions helped students in planning their SRL by presenting less-evident learning opportunities to them.

F3R6: “Patients...like in nephrology, they have a routine program after they had a transplantation [...] that means there is relatively little to do for us [...] they try to tackle that by scheduling extra educational sessions where, ehm, a patient is presented and the differential diagnosis is discussed.”
High quality assessment
Routines that invested effort in the quality of assessment included the routine of having a weekly staff meeting where each student’s progress was discussed and assessed by all staff members. It also included the routine of appointing a staff member to monitor performance and the progress of a small number of students during their clerkship. These routines were often regarded by students as highly valuable because it led to personalized feedback and an objective assessment of performance. These are both important for self-assessing the attainment of learning goals and monitoring progress in SRL.

F6R2: “I had not seen the consultant a lot during the clerkship, but I know we were evaluated by everyone on a weekly basis. That included consultants, residents, and some nurses. So than you know that the consultant assessing you at least got some information about you from all others. […] That gives you the idea more thought has been put into the assessment, and then the feedback is more grounded and more useful.”

Supportive learning environment
Routines that catered to a supportive learning environment involved discussions about learning goals, observations of students during clinical activities, responsibilities tailored to students’ personal needs, high expectations of students, structured learning activities, autonomy to manage one’s own time, and adequate resources. For instance, discussions about learning goals aided students’ SRL, specifically regarding goal setting and increasing learning opportunities, because goals were shared with supervisors. Observing students during clinical activities improved feedback quality which is imperative for accurate self-reflection. Responsibilities tailored to personal needs enabled students to work on their personal SRL goals on an adequate level. If supervisors articulated high expectations of students, this led to students setting ambitious goal in their SRL. High expectations also led to an increase in self-efficacy when students managed to successfully fulfill a high-expectation task. Students needed to be able to allocate time to engage in SRL activities and work on their personal goals. Additionally, students explained valuing mandatory activities, such as having to attend teaching sessions. These activities enabled students to identify learning opportunities they would not have identified on their own if they had opted for not attending a voluntary teaching session. Lastly, students’ motivation for SRL increased by having adequate resources. For instance, having an own room or being supported by a clinical librarian when making a scientific presentation, made students put more effort into SRL, increasing the effectiveness of SRL.
F4R5: “Wat I especially like is if there is the possibility to find your own learning goals and to do many things by yourself. But also, when it is unclear what you can and may do, that you are given clues, or support, so you can still have that opportunity.”

Thought provoking questions
The routine of asking questions to students was probably one of the most widespread and important ones. Questions were valued in all situations, no matter whether it was during morning rounds, handovers, presentations, consultations, or other clinical activities, because it made students feel their learning mattered. Questions triggered students to study and helped them identify gaps in their knowledge and set subsequent learning goals. It also made students aware of the need for practicing clinical reasoning and presentation skills, and lowered the barrier to ask questions themselves. Additionally, it made students feel like their progress was not only monitored by themselves but also objectified and assessed by others.

F6R3: “What stimulates me a lot to study, or learn things, or actively look for learning opportunities is what [name F6R2] also said: when people, residents or consultants, ask you questions. They try to motivate you and, ehm, by doing that make you realize: oh, I hadn’t thought of that, or: I think I don’t know that yet.”

Characteristics of a department
Although we did not ask this in the focus groups, students spontaneously mentioned typical features that were characteristic of a department to severely influence their SRL. These characteristics pertained to: the number and diversity of patients, patients’ average length of stay in hospital, and the degree of specialization of care delivered by a department. Many students perceived these characteristics to influence the learning opportunities available for them to engage in SRL, because many of their learning goals involved diagnosing patients and making a treatment plan. This resulted in students perceiving to be limited in their SRL if there were not enough patients. A similar perception existed when there was a high percentage of follow-up patients in outpatient clinics because they already had a diagnosis and a treatment plan, making working on many of students’ SRL goals difficult. Highly specialized departments, such as a ward dedicated to renal transplantation, also limited perceived possibilities to work on many of students’ SRL goals because these patients also had a diagnosis and treatment plan, and additionally discussions regarding patients were too specialized for students to make a valuable contribution.
Some students perceived departments with a short average length of stay of patients in hospital to limit their SRL opportunities because it hindered studying patient cases in depth. Along these lines, some others students also perceived long-stay departments, such as psychiatry, to limit their possibilities to engage in SRL because it hindered their opportunity to see a wide variety of patients and fulfill their learning goals.

Discussion

Medical students described a variety of routines and characteristics of clinical departments that influenced their self-regulated learning. Routines of clinical departments supported students’ SRL by facilitating professional relationships, and by showing that effort was invested in students’ learning. Routines that facilitated professional relationships most notably affected students’ SRL by enabling others to be engaged in students’ SRL, increasing students’ motivation, decreasing barriers to ask questions, and by making learning experiences and feedback more meaningful. Routines that made students feel effort was invested in their learning most notably supported their SRL through aiding goal setting, increasing learning opportunities catered to the needs of a specific student, enabling monitoring of one’s own progress, and receiving valuable and personalized feedback. Certain characteristics, such as highly specialized care, a relative homogeneous patient mix, very short or very long stay departments, and departments with heavy time constraints, made students perceive these clinical departments as less suitable for their SRL because these characteristics limited the variety of SRL goals they could work on.

The two themes we found in the routines of clinical departments that influence students’ SRL both pertain to relations between students and staff members. Firstly, it is of great importance for students’ SRL to be enabled by routines that form relationships with staff members. It is known that relationships between staff and students are important for learning, but has been getting little explicit attention. Our results demonstrate the importance of enabling students that form relationships, because this influences their use of SRL. It was striking to find that a basic psychological need for a feeling of relatedness, and a need for legitimate peripheral participation, played such an important role in the formation of relationships and thereby stimulates SRL. This implies that satisfying these needs is catered to in varying degrees by clinical departments. Satisfying these needs is predominantly hindered by high numbers of students simultaneously learning in a clinical department, and frequent rotations in both staff members and students.
Therefore, from an SRL and motivational point of view, smaller numbers of students learning in a clinical department, and allowing for longer lasting clerkships with collaboration between student and supervisor are very important to better support students’ SRL in a clinical context.

Secondly, students also need to sense some form of reciprocity in their relationship with staff members. Students get motivated by motivated, engaged teachers, which are required to maximize students’ engagement in SRL and to help create the best context for students to learn in. Likewise, teachers get motivated by engaged students who invest effort into their learning. Besides motivation, this reciprocity in effort may also facilitate teacher work engagement, which in turn is likely to improve teacher performance and result in an upwards spiral.\textsuperscript{21} Other research already showed how student and teacher motivation, engagement and effort are interrelated.\textsuperscript{22-24} Our findings add to the understanding how routines of clinical departments facilitate this process, and how educators might address certain routines to achieve such an upwards spiral, resulting in high teacher work engagement and students engaging in SRL.

Our findings align well with the developmental space students require for learning, as described by Van der Zwet et al.\textsuperscript{25} Developmental space also originates from an interaction between student and context, similar to self-regulated learning,\textsuperscript{6} and consists of contextual space and socio-emotional space. Contextual space is determined by supervision, observation, feedback and patient mix, as well as other material, organizational, and educational elements.\textsuperscript{25} Our findings illuminate how routines of departments can provide students with the contextual space required for SRL. Contextual space for SRL is most likely to be created by having students feel effort is invested in their learning. Socio-emotional space originates from interactions with a social environment, consisting of supervisors, other team members and patients.\textsuperscript{25} Our findings illustrate how socio-emotional space is mainly influenced by the opportunity to form relationships between students and staff members, which requires time, effort and legitimacy.

\textit{Strengths and limitations}

Our findings result from focus groups with students from a single institution, which included multiple teaching hospitals. Therefore, care should be taken when generalizing these results to other settings, especially if these settings have naturally different relationships between students and staff. Using focus groups limited us to only include participants from clerkships in which many students were simultaneously enrolled: internal medicine, obstetrics/gynecology, surgery, and psychiatry. In these
clinical departments the effect routines had on the possibility to form relationships with others may have been different from other clerkships. One can imagine that professional relationships are easier to be formed and maintained in a department with only a handful of staff members and a small number of students enrolled in a clerkship.

By not using a very strict definition of routines, students were allowed to talk about all things they regarded to be routines that influenced their SRL. Students did not only discuss behavioral routines of members of a clinical department, but also took departmental characteristics such as patient mix into consideration. This provided us with some extra insight in how students perceived patient characteristics to influence their SRL. However, it also provided us with the insight that students mostly talked about their SRL thinking about goals regarding diagnosing and treating a patient. Little students mentioned goals other than those in the domain of medical expert. We are unsure whether SRL aiming for goals in other domains is influenced similarly.

At some moments, students had difficulty explaining how and when routines affected their SRL and why they believed some routines happened the way they did. We believe this is caused by students’ relatively short stay on single departments. A similar study with students enrolled in longitudinal integrated clerkships might have provided more in-depth details regarding department routines and how it affects SRL.

**Implications for practice and future research**

Our findings give us some leads as to what routines of clinical departments support medical students’ SRL. First of all, it is important that routines support professional relationships between students and staff members. This is facilitated when staff members know which students are enrolled in their clerkship, involve students in informal activities, actively involve students in daily clinical practice, and have frequent interactions with students. This can be encouraged using many different routines, for instance by having lunch with students, actively asking for student opinions during meetings, pairing students and a supervisor for a longer period of time, and by having frequent talks with students about their clerkship learning goals and progress.

Secondly, students need to perceive that effort is invested in their learning. Clinical departments can facilitate this feeling through catering for learning experiences that meet an individual student’s objective and by appropriately questioning students in a safe environment. This can also be encouraged using many different routines,
Routines of clinical departments that influence students' self-regulated learning

for instance by providing students with their own workplace close to a resident, adjusting assessment procedures to include feedback from multiple staff members, and by scheduling observation sessions.

The routines discussed in this paper involve routines that supported medical students’ SRL in clinical departments. However, many routines were also mentioned that hindered students’ SRL. Most of these originated from a similar problem: having too many students in a department for a short period of time. This made it difficult to cater to students’ individual needs as is required to engage in SRL. Therefore, it would be beneficial for students’ SRL to limit the number of students in a clinical department and to have longer clinical placements such as in longitudinal integrated clerkships.

Our findings give an insight in how routines of clinical departments influence students’ SRL, but many questions remain. We suggest future research should use a legitimate peripheral participation or developmental space perspective to focus on how knowledge, skills, and attitudes that are learned by students, are affected by routines and characteristics of clinical departments. Some students in our study regarded certain clinical contexts as totally unfit for their SRL, and in fact learning in general. It would be interesting to see how students (try to) self-regulate their learning in such contexts, and whether their perception is coloured by only thinking about learning goals regarding diagnosing and treating patients which may be a mismatch with the restricted opportunities offered in these more limited contexts. In this same light, it would also be interesting to study how routines and characteristics of clinical departments affect the SRL of others than medical students. For instance, residents might be better able to understand routines of a department and set SRL goals that pertain to other competency domains when they are unable to work on their medical expertise goals. Lastly, we suggest future research on routines in clinical settings to focus on how consultants experience characteristics and routines of their department to influence their self-regulated, lifelong learning.
Conclusion

Our study gives insight in what practical routines of clinical departments influence students’ SRL in clinical contexts. Firstly, there were routines that enabled or hindered the formation of relationships between students and other members of a clinical team, enacted through informal contact, continued collaboration in clinical activities, and participation as part of the team. Secondly, a broad variety of routines could make students feel a department invested effort in them. This involved routines regarding the implementation of teaching sessions, implementation of assessment, questioning students and creating a supportive learning environment. Routines most notably affected students’ SRL through increasing their motivation, decreasing barriers to ask questions, making learning experiences more meaningful, aiding goal setting, increased (self-regulated) learning opportunities, aiding monitoring of one’s own progress and increasing personalized feedback. Students also perceived certain characteristics of clinical departments to influence their opportunities to engage in SRL. This included the patient mix treated by a departments and the degree of specialization of care delivered.
References


