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Abstract: This research was conducted within the context of the University of Sydney Medical Program (USydMP), a four year problem based graduate entry course established in 1997. Students have three 90 minute PBL tutorials each week in the first two years and this is reduced to twice a week in the final two years. Students spend one day per week in the hospital setting to supplement learning of PBL case material in Years 1 and 2. During this clinical day they attend practically oriented tutorials focused on communication skills and examining a patient. In Years 3 of the program students permanently move out to the clinical sites where they complete a series of four week integrated clinical attachments (ICAs) on a hospital ward (e.g. cardiology, respiratory). Within each attachment, students are expected to become a member of the hospital team, comprising a consultant, a registrar, resident, intern, and another student. As well as being attached to the team and therefore completing ward rounds, attending team meetings, and participating in patient care, students are expected to attend lectures, PBL sessions and other structured tutorials. AimsIn consideration of the theoretical framework and the research context, the aims of this investigation were to explore how medical students self-regulate their learning in PBL tutorials and how this changed between Years 2 and 3 of the program. I was also interested in how students self-regulate their learning in each context over the two years and how self-regulation transferred between the PBL and clinical settings, as well as what the affording and constraining factors were which mediated transfer and self-regulation in each context. MethodThis was a longitudinal study and exploratory in

nature. As such, mostly qualitative methods were used. Video recorded non-participant observation and individual interviews with second and third year medical students were used to assess self-regulation and transfer over a two year period. This in

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Self-regulation and transfer in a problem based learning medical program

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Full paper

Introduction and aims

This research has as its premise the idea that all learning is social in nature and that individual processes originate in social practices (John-Steiner and Mahn 1996). Such ideas, whose major proponent was Vygotsky, have become increasingly more common in the literature, but to date, this socio-cultural approach has been neglected in studies which investigate self-regulation and transfer across contexts in a graduate student population. Socio-cultural research studies the way in which the co-construction of knowledge is internalized and transformed in formal (e.g. Problem-Based Learning tutorials) and informal (e.g. clinical) settings. Investigating transfer of self-regulation is one way of exploring this dynamic relationship between external and internal aspects of development. This introduction will briefly outline some of the key concepts and themes associated with a socio-cultural approach and which have particular relevance for this study.

First, is the notion of *interdependence between social and individual processes* (John-Steiner and Mahn 1996; Hickey 2003; Daniels 2007a) in the co-construction of knowledge. Second is the notion of *engaged participation* (Hickey and McCaslin 2001; Hickey and Granade 2004) as indicative of learning, where learning means co-participating, becoming an active participant in various Communities of Practice (CoP) and being engaged in activities that are meaningful to that community, rather than simply knowledge acquisition. Third, *enculturation* into CoP (McCaslin and Hickey 2001; Walker, Pressick-Kilborn et al. 2004) through active involvement by individuals participating in practical activities. Enculturation is the process by which individuals transform their skills and understanding through their participation and this often leads to a change in identity. This process was observed to occur in Year 3 when students were in the clinical setting full time. Fourth is learning and *identity* (Holland and Valsiner 1988) and the idea that self develops in response to different social contexts. Fifth, the *Zone of Proximal Development* (ZPD) (McCaslin and Hickey 2001) and the extension of this into *Communities of Practice* (CoP) and *Communities of Learners* (CoL) with an emphasis on collaboration, co-regulation, and co-participation (Walker, Pressick-Kilborn et al. 2004). Finally, being attuned to *affordances and constraints* (McCaslin and Hickey 2001; Hickey 2003) which scaffold and maximize successful participation to become enculturated into the CoP.

A socio-cultural perspective explains self-regulation as arising through interaction with others and transformation of ones participation through joint activity. Transfer is also dependent upon participation in activities and activity structures. A socio-cultural approach conceives transfer as the changing relations between persons and context, with the socio-cultural activity mediating that change and development (Beach 1999). This changing relation results in a different sense of self and social positioning, depending upon an individuals desired or actual role within a specific context. A person can establish similar meaningful relationships with two different contexts, depending on goals and identity, thus facilitating transfer (Beach, 1999). If a meaningful relationship fails to develop, or there is a mismatch between desired and actual role however, resistance to regulation and transfer may occur, as will be illustrated.

This paper advances the idea that depending on an individuals' identity, they will either accept or reject a role, and therefore actively *choose* to self-regulate their learning or not.

Background

This research was conducted within the context of the University of Sydney Medical Program (USydMP), a four year problem based graduate entry course established in 1997. Students have three 90 minute PBL tutorials each week in the first two years and this is reduced to twice a week in the final two years. Students spend one day per week in the hospital setting to supplement learning of PBL case material in Years 1 and 2. During this clinical day they attend practically oriented tutorials focused on communication skills and examining a patient. In Years 3 of the program students permanently move out to the clinical sites where they complete a series of four week integrated clinical attachments (ICAs) on a hospital ward (e.g. cardiology, respiratory). Within each attachment, students are expected to become a member of the hospital team, comprising a consultant, a registrar, resident, intern, and another student. As well as being attached to the team and therefore completing ward rounds, attending team meetings, and participating in patient care, students are expected to attend lectures, PBL sessions and other structured tutorials.

Aims

In consideration of the theoretical framework and the research context, the aims of this investigation were to explore how medical students self-regulate their learning in PBL tutorials and how this changed between Years 2 and 3 of the program. I was also interested in how students self-regulate their learning in each context over the two years and how self-regulation transferred between the PBL and clinical settings, as well as what the affording and constraining factors were which mediated transfer and self-regulation in each context.

Method

This was a longitudinal study and exploratory in nature. As such, mostly qualitative methods were used. Video recorded non-participant observation and individual interviews with second and third year medical students were used to assess self-regulation and transfer over a two year period. This information was triangulated with student journals, reflective portfolios, and survey data.

Purposive sampling was used to select participants (two PBL tutorial groups) on the basis of their characteristics and goals of the study. Two PBL tutors who had self-reported having successful PBL groups were invited to participate. This was the only criteria used for selection. The groups had to be working relatively well together to volunteer to participate as I did not want to have too many variables constraining my observation of student self-regulation. Students from each group participated in the study and were followed through to the end of their third year.

There were 10 students in one group and nine in the other. Each group was observed by the first author. All observations in second year were both video and audio-recorded, for five consecutive weeks. In third year, individual students within each group were dispersed among eight clinical school sites and joined different PBL groups. As such, 11 PBL groups were observed in third year on average for a block of three consecutive weeks. Field notes were written in real time on a laptop throughout these observations. Each of the 19 students was interviewed on two separate occasions in second year, one of which

included using stimulated recall. The video footage was used to stimulate recall of participation patterns and modes of participation on the clinical day. One interview was conducted with each participant in third year after each block of observations to investigate students' experiences of learning when they were in the clinical context full time and if the way they self-regulated their learning had changed between contexts and between the second and third years of the medical program. All interviews were transcribed verbatim, imported into a qualitative software package, NVivo[1], and coded to generate themes.

Results

One key theme emerged from the interviews – perceived role. This theme is central and related to the major coding categories of the learning task, learning needs and modes of self-regulation in each context. How students perceived their role was also reflected in their interaction in each context. The results will be divided into two parts – PBL and Clinical for each context of study. For this paper, most discussion will concentrate on the clinical context as this is where transformations were seen to take place and where perceived role and identity had the most effect on participation.

PBL

The PBL environment offered many different opportunities for students to engage in co-regulation of learning, especially when their tutor was not a clinician and was new to the PBL process. Students participated in PBL through asking questions, suggesting causes of the patients' complaint, explaining disease mechanisms, referring to texts and the internet, and evaluating the groups' progress at regular intervals. Neither group observed struggled with this, and these patterns of participation were accepted by all students. The additional benefit of PBL for the students in this un-graded course is that it facilitated their self-evaluation of their own knowledge and ability as they were able to constantly compare their own knowledge with others in their group. This constant interaction, three times a week, meant that students were able to monitor their learning by comparing themselves with their peers. If they felt that they understood most of the discussion then they were on track, if they felt lost in discussion, they would ask questions but also realized that they needed to do more study and preparation before the next tutorial in order to come up to speed. Opportunities for self-regulation and extension of learning were therefore only as good as the other members in the group. For this reason, if students felt lost and weren't able to catch up because everyone was too high above their level or vice versa than students' questioned their role in the group and what they contributed. In one instance, Brittany admitted that she felt she couldn't come up to everyone else's level despite her study efforts, and so she compensated for this by taking on the role of 'class clown' and providing 'comic relief'. She was always encouraging of her classmates however, participated by asking questions and commenting on possible causes of the patients' complaint and was always vocal when she did not understand something. In another instance, Patrick was frustrated by his group who *got off track all the time* and he wasn't getting much out of the PBL group in the time I observed him because his group did not do much preparation and study before class, he felt that he was contributing more than he was getting out of it and for him, it was not operating as a ZPD. For this reason, he said that he did not ask a lot of questions in this group compared with his previous PBL groups.

[1] Qualitative Solutions and Research (QSR) NUD*IST VIVO, QSR International Pty. Ltd. Victoria, Australia

The observation of PBL groups across two years of study revealed that students fell into set patterns of interaction within their group. For example, some were always quiet, some were always the ones who referred to the textbooks in the room, some fell into the role of explaining things to others and drawing on the board, others took on the role of facilitating group discussion and bringing the group back on track, some were the ones who always ask the most questions etc. For most students, these patterns of participation persisted into the third year, when they were all in different groups. However, some students who had been very quiet and interacted very little in Year 2 transformed their participation in third year as a result of having more knowledge and clinical experience. As a result of this experience, they felt that they had more to offer to the group. Other students said that their participation had changed because they felt more comfortable with their PBL group and knew everyone better, having remained in the one group for a longer period of time than in Year 2. Interestingly, all four students whose modes of participation changed to become more active were international students from Singapore.

Clinical

Students participated and regulated their learning differently in the clinical context in both years of study, and this will be the focus of the remainder of the paper. In this context, role and identity in relation to participating in this context were key themes. In Years 1 and 2 students only attended this setting one day per week, in small groups. Learning in this context in the junior years comprised three structured tutorials where practical skills were learnt. The remainder of the time that students spent in this setting was completely self-directed. All students were identified as medical students in this context and had a clinical skills tutor, but were not attached to anyone in particular in terms of supervision. Outside of the set tutorials, students were encouraged to approach the nurse unit manager to identify patients they could speak with and practice their skills on. Students were also encouraged to practice skills with a peer. The focus of learning in this context was therefore different from the PBL context, the focus was more on clinical skills rather than clinical knowledge, although over time, students were expected to integrate the two. Many students were unfamiliar with this context and needed to adapt to new ways of learning and to develop the skill to seek out the learning opportunities available. In Year 3, such skills involved impression management, ‘being seen to be keen’ and being proactive. No one instructed the students how to do this or told students what was expected of them, it was assumed that all students would immerse themselves in this setting and that the clinicians involved in patient care would become involved in teaching them. In Years 1 and 2, the students could not engage as an active participant in this clinical community because they had no assigned role, being a medical student was perceived as something external to the hospital system, and although students were encouraged to speak to patients and attend tutorials put on for junior doctors, no one actively involved them, they had to become attuned to these opportunities and seek them out.

For students in the clinical environment, success was not measured by marks or exam performance but by being willing to learn and express their desire and motivation to learn from the doctors who teach them, this enables them to be exposed to a broader range of learning opportunities. This knowledge is implicit. Students developed these strategies through talking with senior students, or simply learning that being proactive about learning ‘pays off’ in this context if they want to be exposed to the learning opportunities available. The students who did not develop these skills to self-direct and regulate their learning often struggled and floundered, remaining confused about what they were expected to learn and may as a result withdraw from the context, as indeed, three students in this study did.

Students participated in the clinical environment in Year 2 by using their peers as a resource to practice clinical skills on and get feedback, using resources such as clinical texts and patient charts, seeking help by asking questions of their clinical tutors, taking advantage of the learning opportunities available,

preparing for learning, and engaging with the clinical tasks. Patrick for example, regulated his leaning by teaming up with four other students who he felt could act as a ZPD and spent his free time with them outside of the group. Patrick was quite strategic about his use of peers on the clinical day and was not satisfied with the peers he had in his allocated clinical day group and so managed to find three to four other students with similarities to his own interest, attunement to learning opportunities available, and proactive learning style to spend his self-directed learning time with:

> *…the four of us, we pass ideas to one another, we try and find out what sessions are going on at the hospital, you know, the radiology tutes and stuff like that… I have my clinical group, but I think that they're separate to this group that I, I rely on to get my knowledge and, and my confidence… We try and see patients. I usually do it with like those sort of 3-4 guys outside of my normal group or one of my people from my group we'll just try and see someone…I'd observe her and she'd observe me and we'd come back and say 'yep, you did this, you did this, you probably should have asked about this and you probably shouldn't have done this' and that, that was helpful at the time. You've got to find people keen enough to do it* (Patrick, interview 1, pp.1-8)

One way of taking advantage of the learning opportunities available is to be immersed in the culture of the hospital, attending the various meetings and tutorials put on for junior doctors

> *…purely to get experience at hearing these cases and these words and these terms...so it's like, so when you hear it again you're not hearing it for the first time and you've got maybe some vague recollection and you just build on it...* (Andrew, interview 1, pp.15).

Similarly, for Patrick, it was *like a mass absorption thing for me. Like, I go to things that are completely over the top for me in that way it's more like when I was learning a language* (Patrick, interview 1, pp.5). These quotes from Patrick and Andrew illustrate the process of enculturation and their active role in such a process.

One important skill students needed to develop in order to succeed in learning in the clinical setting is to be aware of what their learning needs are and how they can be met, whilst also meeting the needs of course requirements. There was a struggle within some students who were trying to decide what they think they should know and what they should be learning about for their own interest and balancing these competing demands in the absence of clear guidance from the faculty. There was also the conflict which arises when students did not have enough time to learn all that they think they should and were faced with competing demands on their time, the outcome of which was that some decided not to attend lectures in favour of self-study. Students also needed to balance their perceptions of the context (real or artificial) with own philosophy and understanding of the task demands and prior experiences and expectations.

In third year, as well as coping with the transition to the clinical environment full time, students had to adapt to different ward teams every four weeks. The response from many students suggested that there had been a subtle shift in identity as a result of increased time spent in the clinical setting of the hospital ward, the freedom and flexibility to learn new skills and pursue their interests, and a re-affirmation that they had chosen the right career path. One student described their new role as being like an apprentice or like a traveller and that the learning in this setting occurred by osmosis:

> *It's like passing through a country and living there for 6 months, that's the difference* (Andrew, interview 2, pp.12)

Whilst students developed new practical skills that allowed them to become useful members of the ward team, this was a source of tension as it was not a course requirement and they would not be assessed on it. Students were therefore caught between their desire to practice skills they would need for internship, after graduation, and which make them a useful member of the ward team and spending time focusing on their own learning outcomes and knowledge needed to pass the exams. Conflict existed between what students needed to know for the exams and what felt they needed to know to eventually practice competently as a professional. In learning to be proactive, and in the absence of any faculty guidelines, students developed the capacity to self-regulate their learning in ways they didn't have the opportunity to do in the first two years. They strategically chose what they did and did not need to learn and focus upon.

This lack of guidance promoted the type of experience that students have mentioned – being like an apprentice. By purposefully not being proscriptive about what students are meant to learn in third year, the faculty is giving flexibility to each individual clinical school to tailor the student experience to the particular strengths of each site. In the absence of any structure however, students need to develop self-regulation skills and do indeed learn that they need to become proactive about seeking out available learning opportunities to meet their learning needs.

Students were cognizant of the fact that the more useful they were to the team, the less they were seen as someone who had to be taught all of the time and the greater the opportunity for learning and performing procedural skills would be. Students made a deliberate trade off between being useful, focusing on their own learning needs and meeting course requirements, although some were able to cope quite well, others existed at either extreme. For example, Andrew described his role as "just being a junior medical officer" whereas Brittany and Andrea said that they didn't have a role, they were "supernumerary" and not useful to the team.

Students' identities of being useful members of the ward team and assuming the role of a junior doctor instead of a medical student, were reinforced by patients, especially in more regional settings where there was a shortage of doctors. As Patrick explained:

> *I used to fly on planes with the nurses out to communities and I'd be treated like a doctor out there. It'd be like 'you go see Patrick' and sit in a little room with, usually the men, they'd tell me what their problems were and I'd do like check ups on them and take their blood and do all that kind of stuff and give out antibiotics just cause there wasn't that many people there.* (Patrick, interview 2, pp.3)

Although there are many positive processes associated with becoming enculturated into the CoP in third year, there are also many negative processes that students needed to learn to cope with. Part of the enculturation process involved becoming attuned to both the strengths and weaknesses of a particular profession, its affordances and constraints. As a result of these negative experiences, some students actively rejected the role of being an active team member on the hospital ward. By actively rejecting and avoiding such participation students are also regulating their learning – not towards becoming a more legitimate member of the community, but in order to maintain their status of being a medical students and the luxury that entails in terms of choosing how to spend available time. Brittany for example, tried out the role of being an active and useful team member but found it did not meet her learning needs and preference for spending time with patients, and she disliked the responsibility associated with it at this stage of her learning:

> … *I didn't get a chance to go and talk to patients properly,… I try to steer away from actually doing their [intern] work for them. when the consultant says 'I'm, going off to do this' I want to be able to follow him rather then be stuck with the intern, helping with paperwork, and so I don't want to offer to do paperwork* (Brittany, interview 2, pp.6)

Brittany attributed her lack of participation with the ward team to the misguided expectation of others around her and her dissatisfaction with performing particular tasks which she would have to do after graduation. Whilst some students tried to help out the intern as much as they could, Brittany actively avoided it and did not see it as a learning opportunity. Her lack of participation in this way did not affect her performance in exams or her progression to the final year of the medical program. It is unknown however if it affected her performance as a recent graduate. Part of Brittany's avoidance stemmed from her low levels of self-efficacy to perform clinical tasks.

Other strategies associated with being proactive about obtaining the best learning opportunities possible is to 'manage up'. As Andrew very quickly discovered, "if you're confident, they'll keep using you" (p.??). Andrew was focused not only on obtaining learning opportunities in Year 3 but was aware that his interactions with people in this environment may have an effect on opportunities in the future. He strategically engaged in impression management to ensure a positive learning outcome:

> …*I guess I'm trying to create a favourable impression… It's just a matter of being pleasant and competent I guess and it's easy enough to appear to be both of those, and that gets remembered because it greases the wheels a lot more…you've just got to find ways of managing the people* (Andrew, interview 2, pp.7-8)

Andrew engaged in this activity of impression management because he was aware that it would result in more learning opportunities and greater participation. He had internalised the strategies needed to maximise successful participation in this setting, maybe through his previous work experience, and externalised this in the way he interacted with people to maximise learning opportunities.

The hospital ward is both a work and a learning environment, although most staff are expected to engage in teaching as part of their duties, the students realise that this does not always happen naturally, hence the need to be proactive and 'manage up'. The students also perceived that it was a two-way street and they needed to give something back in order to receive more teaching. In this way, it was an unspoken reciprocal agreement, the more useful a student is, the greater the opportunity to participate and be involved and the more useful they will become still as an intern. Despite the challenges of third year and the various conflicts and negotiations of role, for most students, it was the epitome of their training so far and confirmed their career choice:

> *Year 3 has been good, it's been by far the best year for me… I love it. It seems like this is what I was always waiting for, when I started…* (Patrick, interview 2, pp.1)

<u>Relationship between contexts: Impact of role development</u>

For most students, there was a mismatch and lack of alignment between the PBL and clinical contexts. Depending on the students' identity, one of two contexts did not always meet their learning needs. For Andrew for example, the PBL context was "very artificial…and it's not the way it happens" (p.??). Once students had adopted the role of active team member in third year on the wards, the PBL tutorials

ceased to be relevant and were described as “less alluring”. There was also a different focus of learning in each context, the PBL context was focused more on theoretical content whereas the clinical context afforded the opportunity to learn practical skills. Student enthusiasm for PBL in Year 2 had been replaced by the clinical experience where they felt that they were doing something useful - it no longer took first place or was given priority in their study time. This perception of the lack of relevance of PBL may have negatively impacted on student self-regulation in this context due to lack of interest and desire to focus on more meaningful learning activities such as ward experience. In third year, because of students’ active role on the wards with the ward team, there was a general sense of apathy towards PBL and the PBL process which was not perceived to be relevant for their learning, but was necessary for them to participate in to progress in the course. The role of medical student seemed to conflict with their role in being useful to the ward team, and students resented being pulled away from the wards to attend the PBL tutorial. As a result of this apathy towards PBL the students skimmed through the tutorial, did not go into any depth with most of the cases, did not use resources such as texts to look up information when their knowledge was lacking and did not prepare or consolidate their learning from the PBL tutorials.

Whilst students were taking on new roles and becoming active members of the ward team, they were neglecting their study of PBL case material because it no longer seemed relevant to many of them and because the patient management practices advocated by the CRG did not match the practices used on the ward.

The third year of the USydMP marked a significant transition for students as they were past the half-way point in the course and on the final learning trajectory for this first stage of their medical training. Year 3 students felt that they were progressing more towards this goal and felt more a part of the community of practice associated with medicine.

Through being involved in patient care, being seen to be useful, and being treated like a staff member, students perception of the tasks associated with being a third year medical student changed. The ward attachments were no longer seen as one more phase to pass through in the medical program, nor a place to learn and practice clinical skills and to prepare for assessment but instead were perceived as “exposure”, “learning how to work with different people”, “to see what the role of a doctor is, or a junior doctor”. What is of concern is that students saw the two contexts – university/PBL and hospital ward, as increasingly separate entities rather than as a continuum of training and an opportunity to integrate knowledge. Some also commented that the first two years did not prepare them for third year. It is primarily for this reason that there was a lack of transfer of self-regulation between the two contexts.

Discussion

The results of this study show that student self-regulation in each context was influenced by perceived role within the context and perceived usefulness of the learning task to achieve goals, meet learning needs, and reinforce ones preferred identity, either as a medical student or as a trainee doctor. This paper described the various aspects of socio-cultural theory of most relevance to this study. These included the notion of engaged participation, enculturation into CoP and the interdependence between social and individual processes. These issues were highlighted with an overview of how the medical students participated in each context based on the relevance of the learning task to meeting their idealized identity and their perceptions of their potential and actual role in each context. Self-regulation was seen to arise through interactions with others and transformation of participation in different contexts through joint activity with peers or those in the CoP they aspire to belong to. Whilst transfer was also investigated, the results suggest that the learners perceived the two contexts, PBL and Clinical

as insufficiently related, especially in third year. The skills required to regulate learning in each context were also different and so transfer of self-regulation skills between contexts was not seen to occur or indeed to be appropriate. Students recognized that methods of engaged participation in one context were not be acceptable in another and that their role and responsibilities differed between the various CoP in which they were a member across the two different years of study.

The results show how students participated in different contexts and the effect that participation had on self-regulation. Students did engage in self-regulation in each context but in different ways. Having a non-clinical tutor afforded student self and co-regulation in PBL in Year 2, and peers in PBL and having no grades enhanced students' capacity for monitoring and self-evaluation. Peers also facilitated learning in both settings and across both years of study. The PBL group and peers could also be limiting and constraining factors however when their knowledge and abilities were low, as was the case for Patrick who did not ask questions in his group. These issues highlight the interaction between social and individual processes and shows the impact such interaction had on students' participation – the outcome of which for Patrick was not to ask questions, and for Brittany was to provide 'comic relief' in an effort to contribute something, even if it was not directly related to the case discussion. On the whole, participation in PBL did not change across the two years of the study, despite the different groups students were in and that the task had less relevance for them.

The second issue arising from the results is the way in which student participation was transformed in the PBL context in third year as a result of their clinical experiences and spending more time with their PBL group, leading to feeling more comfortable to participate on different levels and having a more active role.

In the clinical context, students' participation varied between the two years of study as a result of their role in the context. In Year 2 for example, students visited the clinical setting once a week and learning was quite structured, whilst in Year 3, students were based in the clinical setting full time and attached to a variety of ward teams. They were therefore perceived as more legitimate members of the CoP in Year 3 compared with Year 2. The main way in which students learned and participated was through being attuned to and proactive about seeking out the various learning opportunities available. To obtain these opportunities, students had to take on a more active role in the clinical setting and make an impression that they were keen to learn by assisting with the duties of the intern.

Compared to the PBL context, there was a lack of scaffolds such as goals, tasks, peer learning and supervision to facilitate engaged participation in the clinical context. This was a problem for several students in the study who could not immerse themselves in the context, refused to participate in the activities meaningful to the hospital community, and as a result felt that they had no role, were not proactive and did not become involved in patient care. Students who succeeded in seeking out learning opportunities and became useful members of the ward team had transformed their participation through becoming enculturated into the CoP via successful participation and as a result, were exposed to more learning opportunities. Students' identity transformed through taking on a more active role and identifying with the junior members of the ward team, performing the duties expected of them after graduation and being immersed in the culture of the hospital. Sometimes however, students transformed their participation at the expense of neglecting course requirements associated with PBL, and many students found it difficult to balance the competing demands of their own learning needs with the expectation of their clinical supervisor, ward team, and PBL tutor.

Whilst the absence of scaffolds such as faculty guidelines about what students should be doing on their ICAs prompted students to actively regulate learning, students with poor self-efficacy and who did not identify strongly with the role of junior doctor in this stage of their learning suffered and there was little

support in place to recognize these students and help them to develop coping skills. These students deliberately chose not to actively participate as a member of the ward team, choosing to regulate their learning in a way more commensurate with their identity as a medical student rather than as a junior doctor.

In conclusion, this study highlights the various socio-cultural factors at play across two different learning contexts and two different stages of learning in a medical program. It shows the importance of considering role and identity and the effect a variety of factors had in affording and constraining learning in each setting. The results also highlight the findings from a similar study of self-regulation in medical students that was confined to the PBL context only and which found that different forms of self-regulation emerge as learners negotiate their role and participation in different learning environments (Evensen, Salisbury-Glennon et al. 2001)

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