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How clinical problem-based medical education sets the scene for social identity formation in medical students

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Abstract

This article examines how clinical problem-based medical education (PBL) shapes medical students' social identity formation and influences how they learn in clinical practice. Drawing on an ethnographic study comprising 240 hours of observations and eight hours of individual interviews with seven medical students, the analysis identifies three prominent and dynamically shifting identity positions: *medical student*, *nearly physician* and *colleague*. These identities structure how students participate in clinical work, the degree of autonomy they assume and how they interpret their professional responsibilities. Through the lens of social identity theory, the study shows that high-quality learning arises not from a single identity position but from the dynamic balance between them. The findings highlight how identity salience affects deep learning, reflective practice and patient safety, and point to the need for curriculum designs that scaffold progressive autonomy, strengthen inclusive clinical cultures, and integrate structured reflection to prepare students for clinical practice.

Introduction

This article examines how clinical problem-based learning (PBL) supports the social identity formation of medical students and shapes their professional behaviour, thinking and approach to learning. Social identity formation influences how students participate in and make sense of clinical learning activities, and how they position themselves within the professional community (Wenger-Trayner et al. 2015; Wenger-Trayner & Wenger-Trayner 2020). Understanding which social identities emerge in clinical PBL, and how curriculum structures support these identity processes, is therefore essential for designing high-quality medical education.

Since its emergence in the late 1960s, PBL has served as a pedagogical approach intended to prepare medical students for clinical practice through collaborative problem-solving, self-directed learning and engagement with authentic patient cases (Dolmans et al. 2005; McNeill et al. 2014; Schmidt et al. 2019). Through these activities, students are encouraged to integrate prior knowledge, reflect on their learning and participate actively in professional communities (Barnett 2009; Hmelo-Silver 2004; Johansson et al. 2022; Schmidt et al. 2019). Contemporary PBL models emphasise not only problem-solving and knowledge application but also participation in social and professional practices. These practices inevitably influence the identities students develop as they navigate clinical settings (Wenger-Trayner et al. 2015).

Social identity formation is an integral part of becoming a physician. Curriculum structures, clinical contexts and professional interactions shape how students understand what it means to belong to the medical profession

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(Tan, Van der Molen & Schmidt 2016). In clinical PBL, medical students are immersed in authentic patient care, collaboration with healthcare professionals and multidisciplinary teamwork, providing rich opportunities for identity formation. Research in higher education and medical education has shown that students' identity formation is closely linked to their learning approaches and future professional practice (Cruess et al. 2014; Sharpless et al. 2015).

Despite increasing interest in identity formation in medical education, there remains limited empirical knowledge about how social identities evolve specifically within clinical PBL settings (Johansson, Nøhr & Stentoft 2020). Previous research points to PBL as a pedagogical approach that may enhance students' identity formation, yet the empirical basis for this assumption remains underexplored (Johansson, Nøhr & Stentoft 2020). Addressing this gap is important for understanding how curriculum design influences learning processes and for informing future educational development (Cruess et al. 2014; Johansson et al. 2022; Passi et al. 2010).

Using a social identity theory lens, this study examines how clinical PBL creates opportunities for medical students to assume or be assigned particular social identities. The study explores which social identities become salient in clinical PBL, how they are shaped through social interaction and participation in professional communities, and what characterises these identities.

This leads to the research question: *Which prominent social identities does clinical problem-based medical education assign to medical students, and what characterises them?*

The social identity approach

The social identity approach provides a theoretical lens for understanding how medical students come to see themselves, and are seen by others, within the clinical learning environment. Central to this perspective is the notion that identity is not a fixed attribute, but a dynamic and socially constructed process shaped through interaction, participation and affiliation with particular groups (Burford 2012; Haslam 2017; Jenkins 2008). Social identity theory posits that individuals define themselves partly through their membership in social in-groups, and that these group-based identities influence how they think, act and behave in professional contexts (Crossley & Vivekananda-Schmidt 2009; Monrouxe 2009; Johansson et al. 2022). The concept, *in-groups*, is understood as locally enacted professional collectives within clinical practice, most prominently the group of physicians working at a specific ward. These in-groups are characterised by shared norms and values regarding how clinical work is carried out, including expectations of autonomy, responsibility for patient care, initiative in diagnostic processes and accountability for clinical decisions. When such a group membership becomes salient, individuals tend to align their behaviour with what is locally recognised as prototypical for that group (Haslam 2017; Turner 1987).

Accordingly, shifts in identity salience among medical students can be observed when clinical arrangements afford participation rights typically associated with physician membership. Situations that allow students to examine patients independently, initiate clinical assessments or assume responsibility under indirect supervision activate identification with the physician in-group. In these moments, students enact behaviour congruent with the norms and values of that group, illustrating how social identity processes are embedded in everyday clinical practice.

Within clinical PBL, medical students become embedded in professional communities where norms, expectations and practice structure not only learning opportunities but also identity formation (Wenger-Trayner et al. 2015). As students participate in authentic clinical activities, they negotiate their position relative to physicians, peers, nurses and patients. This negotiation shapes which identities become salient in different

situations and how these identities guide behaviour. When a social identity is salient such as identifying as a *medical student*, *nearly physician*, or *colleague*, students tend to adopt the norms, values and behaviours associated with that identity (Burford 2012; Haslam 2017; Turner 1987). *Salience* refers to the context-dependent activation of a particular social category, such that it becomes the basis for self-categorisation and guides perception and behaviour (Turner 1987). When a social identity becomes salient, individuals are more likely to perceive themselves and others in terms of group membership rather than personal characteristics, and to act in accordance with group-related norms and values.

A central contribution of the social identity approach is the distinction between personal identity (who one is as an individual) and social identity (who one is as a member of a group) (Haslam 2017; Turner & Onorato 1999). In clinical PBL, this distinction becomes crucial: students may shift between seeing themselves primarily as learners, emerging professionals or collaborators depending on the affordances of the clinical environment. These shifts influence not only how they behave but also what they prioritise during learning.

The social identity approach also emphasises that identity formation is shaped through interaction and positioning. Identities are assigned by others in how physicians address, include or exclude students and assumed by students in response to these cues. For example, being invited to examine patients independently may assign a nearly physician identity, while being instructed to observe may reinforce a more peripheral medical student identity. These situated interactions contribute to how students understand their place within the clinical hierarchy and how they approach learning tasks (Crossley & Vivekananda-Schmidt 2009; Monrouxe 2009).

Applying the social identity approach to clinical PBL illuminates the multiple ways in which educational practices shape identity formation. Clinical PBL affords opportunities for students to move between different identity positions, each with distinct implications for learning. Understanding these dynamics is essential for designing curricula that support positive identity formation, foster professional growth and enhance the quality of learning in clinical settings.

Method

Ethnography as methodological approach and social identity theory both emphasises the mutual influence of the natural environment on the participant's behaviour, thinking, acting, norms and values and vice versa (Hammersley & Atkinson 2007; Leung 2002). Given these theoretical principles, it is quite logical, then, that ethnography is considered the methodology of choice to explore medical students' everyday lives (Leung 2002) and their social identity formation during the final three years of clinical PBL medical education.

The study relied on participant observations, informal conversations, field notes, and individual in-depth interviews to explore how medical students behave, act and think during clinical practice and go beyond what they say to what they do (Hammersley & Atkinson 2007). Furthermore, participation in the daily clinical routines enabled the researcher to gain insight into the students' clinical culture and learning context, while also experiencing the conditions of being a medical student in practice. This immersive engagement strengthened the researcher's ability to develop contextually grounded interpretations of students' thoughts, actions and behaviours. The ethnographic approach gives the opportunity explore how medical students experience their identity formation retrospectively (interviews) and include information on their practices and surroundings (observations).

Setting of problem-based clinical education

PBL medical education at Aalborg University is organised around cases and project work based on authentic

clinical problems, self-governed group work, collaboration with relevant stakeholders and extended periods of clinical practice. For example, students work in small groups with patient cases drawn from their clinical placements, where they are expected to identify learning objectives, seek relevant knowledge and relate theoretical understanding to ongoing clinical work. These cases are subsequently discussed in structured group sessions, often involving feedback from supervisors trained in local PBL principles.

This pedagogical approach is intended to support the development of key professional capacities, including independent action, clinical problem-solving, reflective practice, giving and receiving feedback, critical thinking and self-directed learning (Savery 2006; Stentoft 2019). During the final three years of the six-year clinical PBL medical education programme, students spent most of their time in clinical practice, where they provided supervised patient care and work with real patient cases alongside physicians. Clinical supervision is aligned with PBL principles, emphasising graded responsibility, dialogue and reflection rather than directive instruction.

Participants

The fieldwork took place during the final three years of the medical programme at Aalborg University Hospital, where clinical PBL constitutes the primary pedagogical framework. Seven medical students were involved across multiple wards. 240 hours of participant observation of clinical practice and 8 hours of individual semi-structured interviews were conducted during the period from December 2017 to June 2019 (Figure 1). Observations encompassed clinical casework, ward rounds, supervised patient consultations, clinical lectures and group-based case discussions. Informal conversations in situ were documented in field notes to contextualise actions, participation and behaviour.

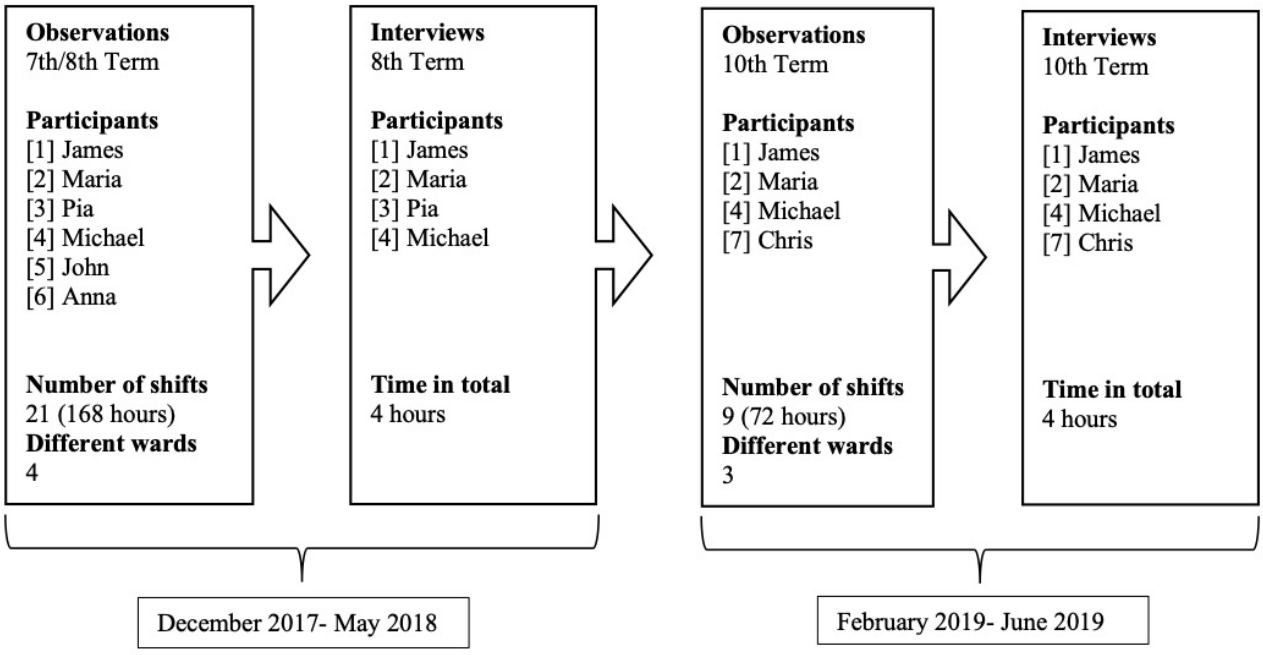

Figure 1: Overview of participant involvement and their pseudonym.

Before the ethnographic research started, the participants were randomly selected from a complete list of all 7th and 8th term medical students, thereby ensuring a representative sample of participants through the method of *simple random sampling* (Moore & McCabe 2006). And all participants were anonymised using pseudonyms. The breadth (observations, interviews, informal conversations) and depth (longitudinal

engagement) of the dataset provided strong information power to address the research question and increases the potential transferability of the findings to other medical educations (Malterud et al. 2016). Furthermore, this ethnographic study's longitudinal nature also allowed to explore the participants' unique experiences and identity formation over a period of one and a half year. The inclusion of in-depth interviews gave the opportunity to return to the informal conversations and observations with students, enabling them to clarify and expand on their experience.

The social identity theory informed ethnographer

The study was conducted by a single researcher (first author), whose positioning within social identity theory shaped both access to the field and the analytical interpretation of the data. Ethnographic approaches acknowledge that a researcher's preconceptions affect their interpretation, description, and analysis (Klein & Myers 1999). Furthermore, ethnographers balance between roles as participant and observer, insider and outsider with the purpose to explore an empirical set of social and cultural practices. Nonetheless, the researcher will to some degree influence the practice being studied (Clifford & Marcus 2005; Gadamer et al. 2013). In this current study the focus is on how medical students assume and assign social identities while engaging in professional communities in clinical PBL practice and the researcher primarily adopted an observational role and did not participate in clinical decision-making or educational activities. On this basis, any influence on students' behaviour, actions and thinking is assessed as limited and arises from the structural conditions of observations, interviews and informal conversations rather than from intentional intervention by the researcher.

Researcher positioning and data quality

The study was conducted by a single researcher with a background in medical education research and familiarity with problem-based learning, but without a clinical teaching role or responsibility for patient care. This positioning enabled sustained access to clinical settings while limiting direct influence on students' clinical or educational activities. As in all ethnographic research, the researcher's theoretical commitments and prior experience informed attention and interpretation. To support data quality, interpretations were grounded in prolonged field engagement, triangulation of observations, interviews and informal conversations as well as close alignment between empirical excerpts and analytical claims. The use of a first-person voice reflects ethnographic convention and serves to make the researcher's presence and analytical positioning transparent rather than implicit.

Data collection and analysis

The approach to analysis can be described as a thematic analysis utilising an abductive framework with inspiration from Braun and Clarke (2006) and Kiger and Varpio's (2020) analytical guidelines: (1) familiarising yourself with your data; (2) generating initial codes; (3) searching for themes; (4) reviewing themes; (5) defining and naming themes; and (6) producing the report. The abductive approach followed a process in which several codes and themes emerged from an iterative process alternating between the ethnographic data and social identity theory perspectives and preconceptions. Transcripts and field notes were read iteratively to establish familiarity, after which initial inductive codes were generated to capture recurrent patterns in behaviour, interaction and identity positioning. These codes were then refined through iterative comparison with concepts from social identity theory (e.g. salience, self-categorisation, in-/out-group positioning). Through this process, three prominent social identities as *medical student, nearly physician* and *colleague* were confirmed as organising themes for subsequent analysis and reporting.

Data collection was guided by the premise that social identity is enacted through practice. Observations focused on how students entered clinical situations; how physicians and other professionals positioned them (e.g.

invitations to examine patients vs instructions to observe); and how students interacted with peers, staff and patients. Interviews elicited participants' retrospective accounts of learning and identity experiences and were used to probe and clarify episodes observed in the field.

Results and analysis

The analysis demonstrates that clinical problem-based medical education affords three prominent social identities that medical students assume or are assigned as: *medical student, nearly physician* and *colleague*. These identities become salient in different clinical situations and shape how students think, act and behave in clinical PBL. Anchored in social identity theory, the findings show how social identity salience is continuously negotiated through interactions, positioning and the pedagogical affordances of PBL. These identities were shaped through interactions with physicians, nurses, peers and patients, as well as through the pedagogical structures and expectations embedded in clinical PBL. Figure 2 gives a brief overview of the analytical structure and shows the dynamic of social identity positioning. Social identity as a medical student is at the core of the assumed and assigned social identities, therefore it is placed in the centre. The arrows indicate how medical students in clinical PBL constantly move back and forth between the assumed and assigned social identities, because this identification process draws on both their personal characteristics as well as the clinical context they are situated in (Haslam 2017; Jenkins 2008).

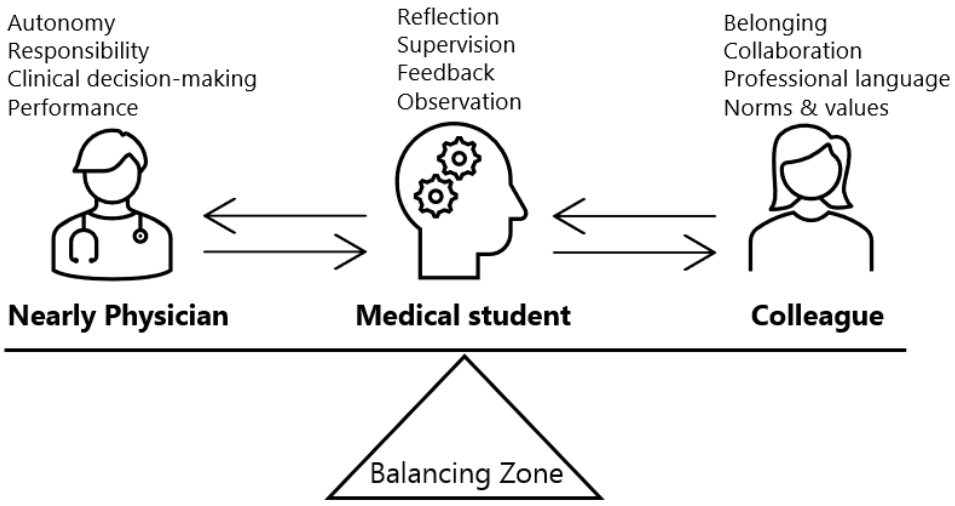

Figure 2: The assumed and assigned prominent social identities.

The results below are organised around the three prominent social identity positions. Each identity is presented as an analytical subsection. Within each subsection, the identity is first characterised analytically, followed by illustrative empirical excerpts from observations and interviews that demonstrate how the social identity is enacted in practice. Each subsection concludes with a short synthesising paragraph that summarises the defining features of the social identity and its implications. Together, the three analyses illustrate how social identity salience structures students' participation, responsibility and learning in clinical PBL.

Identity as medical student

Within the medical student identity, learning activities are characterised by explicit explanation, reflective dialogue and guided integration of theory and practice. These practices align with established characteristics of deep learning, including sense-making, feedback and critical engagement under supervision. The following interaction assigns a salient learner identity to the student through close supervision and explicit scaffolding.

From a social identity perspective, the physician's guidance defines the local prototype of 'what a medical student does, inviting James to self-categorise as a peripheral member who learns via observation and explanation. Within PBL, this mirrors guided participation and role-modelling, connecting theory to situated practice while preserving appropriate boundaries of responsibility.

> The physician explains to James that focus is important in this kind of physical examination and what to pay attention to. The physician has a very pedagogical approach and explains all that she does and why she does so. (James, observation)

By choosing to handle the complex case herself, the supervisor limits Michael's responsibility in a way that safeguards patient safety and deliberately stages learning by keeping him at the periphery until appropriate competence is established. In PBL terms, this preserves the sequencing of difficulty and maintains a scaffolded progression from observing to doing under supervision. The physician said to Michael, "*I will handle the next patient, it is a very complex case, which involves some psychosocial problems.*" (Michael, observation).

Here the identity is self-assumed. By explicitly marking his group membership (as 'medical student') and deferring decisions to a physician, James positions himself as a learner. This aligns with social identity theory's account of identity-consistent behaviour and with PBL's emphasis on reflective practice, feedback and patient-centred communication under supervision.

> As we enter the patient ward, James presents himself by name and as a medical student. He informs the parents that he will consult the results of the physical examination with a physician. After the examination, James asks the physician to examine the patient too. He said to the physician that it is important that the parents feel comfortable (James, observation).

Spatial organisation materialises in-/out-group boundaries and sustains the salience of a student identity through peripheral seating. Self-categorisation processes are cued by environmental affordances that signal limited participation rights. Within PBL, such structuring can both orient learners to observe expert reasoning and inadvertently restrict their opportunity for collaborative problem-solving.

> The morning conference is about to start, and the physicians are busy preparing their presentation of the ward cases. I am seated with the medical students, along the wall as we are told. Even though there are several empty seats around the table in the conference room, not one of us (medical students and I) is invited to sit at the table and join the discussions. As an observer, I got this strange feeling of "us and them" because of how the room is furnished and the missing interaction between the physicians and the medical students (Maria, observations).

As described above, the social identity as *medical student* is characterised by close supervision, guided participation and limited autonomy. Students are positioned as legitimate peripheral participants who learn primarily through observation, feedback and structured interaction with supervisors. This identity is reinforced through both explicit pedagogical actions such as physicians explaining procedures step-by-step and implicit contextual cues, including spatial arrangements that separate students from physicians during clinical conferences. Students also actively self-categorise into this identity by introducing themselves as medical students and deferring clinical authority to supervising physicians. Through the lens of social identity theory, these practices underscore how group boundaries are maintained and how learners adopt behaviour consistent with the student prototype. Within the PBL framework, this identity aligns with fundamental principles of guided participation, role-modelling and reflective learning.

Identity as nearly physician

While identification as a nearly physician intensifies engagement and responsibility, the data also reveal a recurrent tension between performance and learning. Autonomy and responsibility trigger a shift in salient identity from medical student to nearly physician. In contrast, when the nearly physician identity becomes salient, learning shifts towards task completion and performance. Opportunities for immediate feedback and reflective dialogue are reduced, indicating a move away from learning practices associated with deep learning. In this context, the relevant in-group is the ward's physicians, whose local norms emphasise independent patient assessment, task ownership and personal accountability for clinical decisions. By self-stereotyping towards this physician prototype, James adopts these norms in practice: he examines patients independently, initiates diagnostic work, and consults supervisors only briefly to confirm his assessments. In this way, his behaviour becomes congruent with the expectations and values associated with physician membership.

> My presence here at this ward has allowed me to examine patients on my own […] I already now feel that I am prepared to the life after the study and take the responsibility as a physician; certainly, I do (James, observation).

This sequence exemplifies indirect supervision as a structural affordance that supports identity transition. Brief consultation maintains safety while allowing identity-consistent action aligned with nearly physician norms (initiative, diagnostic workflow).

> When the patients arrive at the emergency room, James acts very independently. He goes through the patient's journals and briefly consults the physician on duty, and then he carries out the physical examination on his own with supervision afterward (James, observation).

Peer discourse normalises an identity of task-owner rather than learner, privileging performance and efficiency over observation and reflection. When James and Chris describe supervision as time-consuming in relation to "the real work", reflective learning activities central to PBL are explicitly devalued. Social identity theory predicts that once an in-group identity is salient, members pursue prototypical behaviour; here, 'real work' signals adhesion to physician norms, which may displace time for reflection emphasised in PBL.

> At the morning conference, I heard James and Chris agree that doing the (physician's) work on their own without a physician by their site is much easier. Following the physician around only consume time from the real work (Michael, observation).

Strong positive valence attached to responsibility reinforces identification with the physician in-group, consolidating identity salience. Within a PBL frame, such motivation can deepen engagement but also risks crowding out explicit supervision and feedback if not balanced.

> Sometimes you are the one with the responsibility, with the patient right in front of you. I do not think that much about it, so I am excited about it. I really like the responsibility. I do not construe it as negative, rather as positive to act and think as a physician (Michael, interview).

'Freelancer' captures the identity drift towards autonomous practitioner. By assuming responsibility and examining patients independently, Chris self-categorises as a nearly physician. Empirically, this is evident in his account of working alone and consulting physicians only after completing the examination. From a social identity perspective, such post hoc consultation can be interpreted as identity-consistent behaviour, aligning with physician norms of autonomy and task ownership. Across observations and interviews, this identity shift is repeatedly accompanied by reduced engagement in immediate supervision and reflective dialogue. While

students report increased confidence and skill acquisition, the prioritisation of independent performance limits opportunities for feedback and guided reflection, indicating a potential inhibitory effect on deeper learning processes.

> I think that I have taken more responsibility than intended […] I have been more like a freelancer and examined patients on my own. Of course, I have consulted the physicians on duty according to the physical examinations I have done. In this case, I have learned more to do so on my own and assumed a high degree of responsibility (Chris, interview).

External assignments (being named 'the physician') can prompt identity uptake, but personal efficacy boundaries regulate salience. This illustrates the negotiated nature of identity: assignment by others interacts with self-assessment to determine whether the nearly physician identity becomes operative.

> […] if it is only a physical examination and they (nurses) introduce me to the patients as 'now the physician has arrived to examine you' it is ok, because that I feel competent to do so. However, if the examination involves decision making about medication or something else, then I do not see myself as a physician (Maria, interview).

Here, assigned responsibility triggers an identity transition accompanied by emotional arousal typical of boundary-crossing experiences, understood as situations where learners move beyond established participation boundaries and temporarily assume roles associated with more central group membership. The episode demonstrates how clinical affordances (solo consultation) precipitate performance consistent with nearly physician norms while simultaneously exposing the need for supportive feedback structures in PBL.

> Her supervisor asked her if she is ready to carry out the consultation on her own, which she accepts. Shortly after, we leave the office and walk down the aisle toward the patient waiting for a cancer treatment consultation. She is nervous; she blushes and speaks in a faltering voice to the patient. […] on her own in the examining room, responsible for asking the right questions, acting as a physician (Maria, observation).

The identity as *nearly physician* emerges when students are granted autonomy, responsibility and opportunities for independent clinical work. In these situations, students demonstrate behaviour aligned with the physician prototype, including initiative, diagnostic reasoning and clinical decision-making. They express motivation and excitement when performing clinical duties independently, which reflects strong identification with the physician in-group. This identity is shaped by both assigned and assumed elements: students may be introduced by staff as physicians or may themselves step into roles that carry physician-like responsibility. However, students' internal competency evaluations also regulate identity uptake, especially when tasks involve complex decision-making. In social identity terms, this identity shift represents a move toward a more central group membership, guided by perceived readiness and contextual affordances. From a PBL perspective, this identity reflects the intended progression toward supervised independence, enabling students to embody clinical practice while navigating the balance between autonomy and the need for feedback.

Identity as a colleague

Recognition and naming are classic inclusion cues that strengthen in-group identification and belonging. Social identity theory links such cues to increased adherence to group norms, values and motivation. In PBL, belonging expands learning opportunities through legitimate participation in shared clinical tasks.

> I have felt like a part of the gang in all the medical wards I have worked in. That feeling is confirmed when the physicians still say hello to you and mention your name after the time on the wards. The colleagues say hello and good morning to me because they recognise me and not just someone, they have seen before,

> but someone they have had some good experiences together with (James, interview).

Acquisition of professional language and discourse practices marks internalisation of group prototypes. This linguistic alignment facilitates participation and signals readiness for deeper collaborative problem-solving central to PBL's cooperative knowledge building. "Yes, of course, it is essential, when interacting with your colleagues. First of all, to understand what is said, but also to appear professional and knowledgeable somehow" (Chris, interview).

Contribution to shared goals functions as identity capital; responsibility and visible impact signal membership of the professional collective. This aligns with social identity accounts of collective efficacy and with PBL's participation-centred view of learning.

> Author: "Do you feel like a colleague if you assume responsibility on your own?" Respondent: "Certainly, I do, that is for sure. Furthermore, I feel that it is more exciting to work at the ward if the physicians can see that I contribute to the assignments in a positive way" (Michael, interview).

Inclusion practices modulate identity opportunities; where inclusion is weak, students revert to peripheral identities with reduced engagement. Maria's account highlights how inclusion is enacted through concrete practices: being invited to examine patients independently, being perceived as a legitimate learner rather than a burden and working in a ward culture oriented toward education. These locally enacted affordances – invitation, trust and supervision – condition whether PBL enable students to assume a colleague identity while maintaining learning quality and patient safety.

> Some physicians are better to include us as colleagues and let us examine patients on our own […]. It is also more exciting to work on a ward where the physicians want to educate us. Physicians who see us as a burden affect the learning output, and you do not dare to try on your own (Maria, observation).

The identity as *colleague* becomes salient when students experience inclusion, recognition and reciprocal interaction within the professional community. Students describe feeling part of the team when physicians address them by name, acknowledge their contributions or involve them in professional discussions. Such cues function as markers of in-group membership, facilitating internalisation of professional norms, values and language. When workplace cultures are inclusive, students take initiative, collaborate actively and experience increased motivation. Conversely, when staff signal that students are a burden, the colleague identity collapses, reducing engagement and learning opportunities. Social identity theory explains these dynamics as shifts in perceived group belonging, where inclusion enhances identification and exclusion reinforces peripheral status. Within the PBL framework, this identity supports collaborative problem-solving and active participation core elements of learning through practice and shared inquiry.

Summary of social identity dynamics

Together, these three social identity positions respond directly to the article's research question by illustrating which social identities clinical PBL assigns to medical students and what characterises them. Clinical PBL creates a fluid identity landscape where students move between learner, novice practitioner and colleague roles depending on supervision, task structure and social inclusion. Each identity invites distinct learning behaviours: reflective observation as medical students, autonomous performance as nearly physicians and collaborative engagement as colleagues (Figure 2). These identity dynamics highlight how clinical PBL not only facilitates knowledge acquisition but also shapes the social processes through which students come to understand themselves as learners, emerging professionals and members of a clinical community. This social identity

formation is central to how, what and why students learn in clinical PBL and underscores the pedagogical significance of designing environments that balance responsibility, support and inclusion.

Discussion

A recurring question raised by this study is whether the observed learning experiences are specific to clinical PBL or reflect more general features of clinical clerkship. Many of the activities described – such as examining patients, working under supervision and participating in ward routines – are indeed common across clinical medical education. The contribution of this study does not lie in claiming that such activities are unique to PBL, but rather in showing how PBL principles shape the *conditions under which these experiences are afforded, interpreted and learned from*.

In the Aalborg context, clinical work is explicitly framed as a learning responsibility for students, with institutionalised expectations of self-directed inquiry, reflective dialogue and graduated autonomy. Through a social identity lens, the analysis demonstrates how these pedagogical structures make identity positions salient and legitimate for example, by licensing supervised independence or encouraging reflective learner positioning. In this sense, PBL operates not as a distinct set of activities, but as a pedagogical logic that configures identity affordances within otherwise familiar clinical practices.

A key finding is that high-quality learning does not reside in any single social identity position but rather in the dynamic balance between them. Each identity affords particular learning opportunities and carries inherent risks if it becomes overly dominant. Thus, learning quality emerges not from any single identity, but from movement and regulation between identities.

Rather than operating in isolation, the three social identities identified in this study function as an interdependent learning ecology. High-quality learning in clinical PBL emerges through regulated movement between the identities of *medical student*, *nearly physician* and *colleague*. Each identity affords distinct forms of participation and learning, but it is the dynamic balance between them that supports both professional development and patient safety.

When the medical student identity is salient, learning is characterised by observation, explanation, feedback and reflective dialogue. This identity creates conditions for integrating theory and practice and aligns closely with established characteristics of deep learning. However, prolonged confinement to this identity risks passivity and limited experiential engagement. Conversely, the nearly physician identity affords autonomy, responsibility and confidence, but if insufficiently scaffolded, it may prioritise performance over reflection and displace feedback-rich learning processes. McNeill et al. (2014) argue that doing and feeling like a physician has some positive implications for wellbeing and revealed that identity and wellbeing are related, with a strong identity providing a buffer of resilience. The colleague identity expands participation through inclusion and shared responsibility, yet without protected reflective spaces, social belonging may overshadow explicit learning goals (Wenger-Trainer et al. 2015; Wenger-Trainer & Wenger-Trainer 2020).

These findings suggest that learning quality in clinical PBL depends less on progression through identities and more on supervisors' and organisational practices' capacity to modulate identity salience in response to task complexity, competence, and context. Recognising these fluid identity dynamics is central to understanding how clinical PBL structures learning and how educational practices can ensure both safety and development (Maudsley & Strivens 2000).

Implications for patient safety

Identity transitions have direct implications for patient safety. When students identify strongly as nearly physicians, they may take on responsibilities that stretch beyond their competence, particularly in fast-paced environments such as emergency departments (Gillespie et al. 2021). While such participation can be highly educational, it requires careful scaffolding to ensure that enthusiasm does not overshadow clinical judgment or lead to overconfidence. Assigning students too much autonomy without real-time supervision can compromise safety not only for patients but also for the students themselves, who may experience anxiety or uncertainty when confronted with tasks they are not fully prepared for (Øhrstrøm et al. 2026). Conversely, restricting students too heavily to the medical student identity can inhibit the development of the clinical reasoning skills necessary for safe independent practice after graduation (Klitgaard et al. 2022). Thus, ensuring patient safety requires intentional structuring of identity affordances: students must be granted autonomy that is proportionate to their demonstrated competence while receiving feedback and supervision that guide them toward responsible participation.

Deep learning and reflective practice

Across the three identity positions, the findings indicate that deep learning practices associated with reflection, feedback and integration of theory and practice vary systematically with identity salience. When the medical student identity is salient, learners are more likely to reflect on their observations, seek feedback and connect clinical experiences to prior knowledge. These practices align strongly with deep learning principles (Dolmans et al. 2016; Moradimohkles et el. 2024). However, when the nearly physician identity dominates, students may prioritise efficient task completion and clinical performance. While this can strengthen procedural fluency and decision-making, it risks shifting learning toward a more surface-oriented, task-driven approach. Similarly, when the colleague identity becomes salient, the social demands of belonging may overshadow reflective space unless explicitly supported through structured debriefing and supervision. Meaningful deep learning in clinical PBL therefore hinges on ensuring that students are not only participating actively but also guided to make sense of their actions through ongoing reflection (Johansson et al. 2022). Identity-sensitive supervision and structured opportunities for critical dialogue can create this balance.

Clinical PBL and experience-based learning

The findings also resonate with principles from experience-based learning (ExBL), which emphasises learning through authentic participation in clinical practice, supervision and reflection (Dornan et al. 2019). Like ExBL, clinical PBL affords learning through engagement in real patient care, responsibility and interaction with professional communities.

However, while ExBL foregrounds participation and experience as primary learning drivers, this study adds an explicit social identity perspective, demonstrating how the *meaning* and *learning potential* of experience depend on which identity becomes salient in a given situation. The analysis shows that the same clinical activity can support deep reflective learning, performance-oriented task completion or collaborative sense-making depending on whether students identify as medical students, nearly physicians or colleagues.

From this perspective, clinical PBL can be seen as a pedagogical framework that not only facilitates experience-based learning but also structures identity affordances that regulate how experience is interpreted and transformed into learning. This contributes to ExBL by highlighting identity salience as a key mechanism through which experience becomes educationally productive.

Conclusion

This study demonstrates that clinical problem-based medical education shapes medical students' learning in powerful ways by affording three prominent and interrelated social identities: *medical student*, *nearly physician* and *colleague*. These social identities do not operate in isolation; rather, students move fluidly between them depending on clinical context, task demands, supervisory practices and inclusion within the professional community. The findings show that each identity position invites distinct modes of learning: reflective observation and feedback when identifying as a medical student; autonomous engagement and clinical responsibility when identifying as a nearly physician; and collaborative participation, communication and belonging when identifying as a colleague. These identity dynamics illuminate how social positioning influences not only what students learn, but also how and why they engage with clinical practice. Importantly, the study highlights that the educational value of clinical PBL lies in maintaining a *balanced interplay* between these identities (figure 2). Overemphasis on any single identity can hinder learning: an excessively peripheral medical student identity may restrict active participation, while an overly dominant nearly physician identity may push students beyond their competence and limit reflective learning. Similarly, inconsistent access to a colleague identity can shape students' willingness to engage and their sense of belonging. Understanding these identity processes is therefore essential for designing clinical learning environments that promote deep learning, foster professional growth, and prepare students for safe and effective practice as future physicians.

Future perspectives – curriculum implications

Building on these insights, several directions emerge for strengthening curriculum development and the preparation of new doctors:

1. Identity-sensitive curriculum design

Future curricula should explicitly recognise that professional identity formation is intertwined with learning. Educational structures must be designed to support balanced movements between observer, practitioner and collaborator roles, ensuring that students have opportunities to engage meaningfully while remaining within safe supervisory boundaries.

2. Structured progression toward responsibility

As medical programmes increasingly emphasise workplace-based learning, there is a need for more intentional scaffolding of autonomy. Clear pathways from observation to guided participation, to supervised independence can ensure that responsibility aligns with competence and supports both learning and patient safety.

3. Strengthening inclusive clinical cultures

Future work should explore how clinical workplaces can cultivate more consistent inclusion practices. Normalising small but powerful acts of recognition – such as naming, inviting participation and involving students in team dialogue – can expand students' access to learning opportunities and reinforce their sense of belonging.

4. Embedding reflective practice into clinical routines

To guard against surface learning in high-pressure environments, curricula should integrate protected spaces for reflection, feedback and sense-making. Embedding structured debriefings into daily clinical routines can help students connect experience with theory and maintain reflective depth even when operating with increased independence.

5. Preparing educators for identity-aware supervision

Finally, supervisors play a pivotal role in shaping students perceived identities. Faculty development initiatives

should equip clinicians to recognise when students are over- or under-identifying with specific roles and to guide them toward balanced, developmentally appropriate participation.

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