

Revitalizing Pedagogy in a Medical Problem-Based Learning (PBL) Curriculum

Findings, Methodology, and Recommendations from a Systematic Self-Assessment

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Abstract

The Medical Programme at Linköping University, committed to Problem-Based Learning (PBL) and interprofessional education, confronted the necessity for pedagogical revitalization due to an upsurge in student numbers, alterations in national physician licensing criteria, and an organizational framework shift. In response to these challenges, stakeholders conducted a comprehensive systematic self-assessment to navigate a course toward a sustainable and contemporary pedagogical transformation.

The methodology employed in this assessment involved a systematic examination of scientific pedagogical literature, policy documents, educational materials, and schedules. Additionally, valuable insights were gathered through teacher and student surveys. Key findings underscore the importance of a balanced approach that grants students more time for self-study and reflection. Enhancing tools and methodologies for constructive alignment is

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crucial to achieve equilibrium in both theoretical and practical training settings. Moreover, establishing seamless collaborations between the university and teaching hospitals is deemed essential for faculty development and the long-term competence within both organizations.

The self-assessment underscored the critical importance of continuous evaluation in medical educational settings. The approach not only ensures the ongoing relevance of the curricula but also cultivates an environment conducive to student-centred teaching and learning. This, in turn, prepares students for lifelong learning and the diverse challenges in their future medical profession.

Keywords: Medical Education, Curriculum Development, Lifelong learning, Sustainable pedagogy

Pedagogical framework

History

Linköping University (LiU) was established in 1975, and its dynamic current vision is “LiU - with the courage to think freely and innovate” (<https://liu.se/en/about-liu/vision-and-strategy>). Since its foundation in 1986, the Medical Programme at LiU has consistently been at the forefront of adopting and promoting Problem-Based Learning (PBL) (Barrows, 1980; Boud, 1998) as a student-centred pedagogy in Sweden (Dahlberg et al., 2020). LiU was also the first medical faculty in Europe to implement student-led interprofessional training wards for undergraduate students (Wahlstrom et al., 1997). Interprofessional approaches are now deemed fundamental in international modern medical education ((WHO), 2010). As time progresses, it is imperative to continually adapt pedagogical methods to align with the evolving needs and values of the surrounding society.

Local Pedagogy

The pre-clinical semesters of the current PBL curriculum in the Medical Programme are organised around recurrent scenario-based tutorial group sessions. The tutorials serve as the nave of the learning process. Lectures, seminars, and other scheduled learning modalities are aligned, intended to support students' learning. Locally, the tutorials are referred to as *base groups*, signalling the importance of the groups as the homebase and backbone of students' learning. Tutorial groups meet twice a week, to support students' self-directed study towards intended learning objectives. Students become well-versed in PBL, and the Base group format transitions into weekly illustrative patient cases, during clinical placements. Examinations occur most often at the

end of the semesters and include formats that enable assessment of both basic medical knowledge and the ability for applied reasoning and problem-solving, which aligns well with the fundamental principles of the pedagogy (van der Vleuten & Schuwirth, 2019).

| Medical Programme, Linköping University |
|--|
| <ul style="list-style-type: none"> • Founded: 1986 • Student capacity: 1200 (1300 in 2027) • University employed teachers: 95 • Affiliated teachers: 80 • Number of clinical study sites: 4 campuses, 9 hospitals, 107 primary care units |

Figure 1. Programme Specifications.

Current challenges

Currently, the Medical Programme is facing the impact of external frame factors that influence the curriculum and delivery of the programme. 1) European Union strategies to enhance student and academic mobility have led to a new licencing procedure in Sweden, adding an extra semester as well as the necessity for a comprehensive restructuring of the curriculum. 2) the student enrolment has quadrupled, while the number of teachers has not increased proportionally. These new requirements were the incentives for a restructuring of the organizational and pedagogical framework of the programme. The Medical Programme became subject to a process of regionalization 2017-2021, and three new campuses were established within the Swedish south-eastern healthcare region, aiming to provide the required number of high-quality clinical placements. Specifications of the medical programme are illustrated in Figure 1. These multifaceted challenges also called for a self-critical examination of the programme's educational design and delivery in a problem-based environment, to a) identify the impact of the current challenges on the conditions for learning, and b) suggest strategies for development and improvement. The structure of the process of the self-assessment, our findings and insights are discussed in this article.

Context and implementation

Theoretical framework

In this paper, the educational planning and professional learning in medical education involve several stakeholders. Faculty leaders and programme directors, students, teachers, researchers, and clinicians are deeply involved in the planning and delivery of the programme and are also immersed in the prevailing approach to teaching and learning. The theoretical framework for this self-evaluation of the educational arrangements in use in the medical programme can be described as combining two fundamental features. The first feature is the *problem-based teaching and learning approach* applied in all programmes of the Faculty of Medicine and Health Sciences. A problem-based approach has been in place since 1986, building on a social constructivist perspective on learning and educational reform, where knowledge is created in interaction between the learner and the social and cultural environment, including other learners (Doolittle 2014; Walker & Shore 2015).

The second feature is the one of *stakeholder engagement*, which is a construct stemming from business and society research (Kujala et al., 2022). Stakeholders are in this field of research widely understood as individuals, groups or organizations that affect or are affected by organizational activities. Kujala et al show that organizational activities can comprise many aspects, of which some examples are value creation, strategic planning and decision-making, innovation, learning and knowledge creation (2022). The forming of task forces and collaborative workshops during the process can be seen as a way of materializing our theoretical framework in practice.

Implementation

The leadership and key personnel of the Medical Programme initiated a structured and collaborative bottom-up approach to the self-assessment. The starting point for the collective examination of areas in need of improvement was a workshop, designed to ensure diverse and comprehensive representation and involving more than 50 participants within the faculty. Attendees included the Dean, programme and deputy programme directors, student representatives, teachers, course coordinators, and representatives of the medical subjects for the programme. A systematic approach was adopted starting with brainstorming sessions, problem identification, followed by subsequent prioritization. Through a structured process, a SWOT (Strength-Weakness-Opportunities-Threats) analysis was conducted, leading to the crystallization of the three prioritized areas of *Attractivity*, *Teacher perspective*, and *Content and Quality*. Under each of these prioritized areas several task forces with specified assignments were established and were collaborating within the

specific prioritized area. An executive board was assigned to design and oversee the self-assessment and define assignments for the task forces (Figure 2).

Faculty members and student representatives, with relevant expertise to each theme, were enlisted to the ten task forces involving 42 participants in total. The assignment was to conduct in-depth analyses of the three main prioritized areas and, based on available scientific evidence, suggest development strategies. Regular written reports were submitted to the executive board to facilitate transparent communication and decision-making. Feedback loops were established to ensure information dissemination to both faculty members and students. Each task force utilized a systematic approach where educational research, together with local policy documents, educational materials, schedules, and feedback from teachers and students in directed surveys and discussions were assessed. The methodology aimed to create a clear, academically solid strategy to sustainably develop the programme within the current context and the surrounding society. The bottom-up approach of the ten task forces, for instance, multiple instances of questionnaires and discussion to enhance the validity of the data, resulted in an average working time of 12 to 24 months extending from 2021 to 2023.

During the end of the working period, the task forces produced final reports of their findings including recommendations within their specific assignments. These recommendations were determined within the task forces based on consensus and thematic analyses (Braun & Clarke, 2006). The final reports were presented to the executive board. Due to the collaborative nature within the specific prioritized areas, several recommendations in the final reports were similar between the task forces. Accordingly, the executive board thematically grouped the task force results into recommendations within each specific prioritized area (Figure 3).

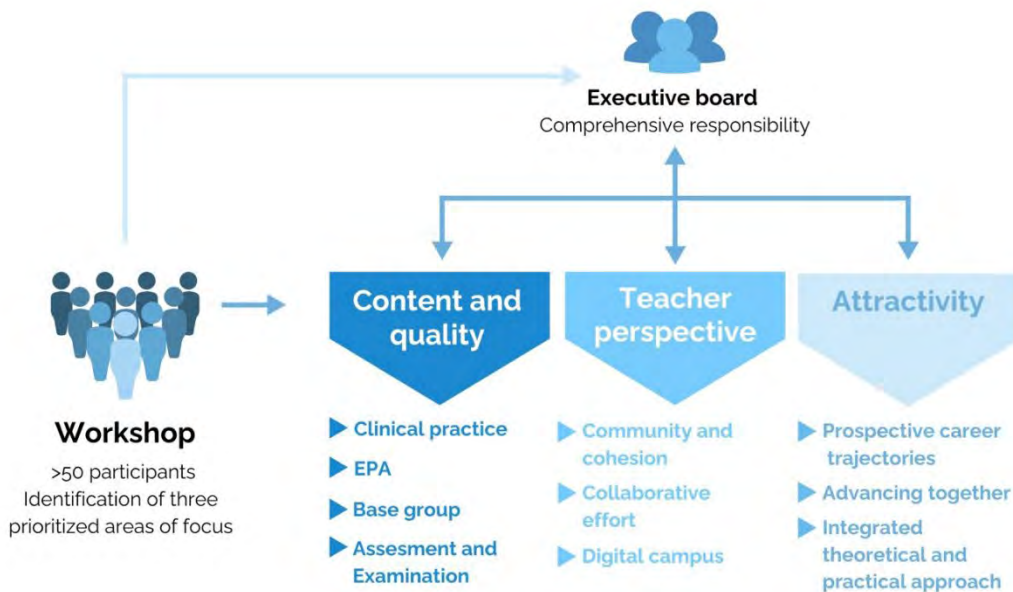


Figure 2. Structure of the systematic self-assessment. Under each of the three identified and prioritized areas, several important task forces were established and were collaborating within the specific prioritized area.

Evaluation and analysis

Key outcomes and recommendations from the systematic self-assessment within the task forces are summarized in Figure 3, areas according to the three main themes. In the following, the outcomes from the work with the three prioritized themes are exemplified.

Within the theme of *Content and quality*, an analysis of the scheduled time for complement learning modalities, especially in pre-clinical semesters revealed that students' time for independent study and reflection was delimited. A need of reducing teacher-lead modalities, such as lectures, within several subject-integrated themes of the pre-clinical semesters was identified. The need for a revised and clearly identifiable constructive alignment (Biggs, 1996; Biggs & Tang, 2011) between learning objectives, the problem-based learning activities and the assessments applied was also identified. This alignment would involve meticulously embedding objectives within the mandatory assessment components, ensuring that evaluations were both equitable and in tune with the educational content. An improved blueprint for learning objectives, enabling clarity and structure to facilitate alignment in the assessment process, was underscored. Furthermore, a broader spectrum of assessment formats, incorporating open-book tests, collaborative tasks, and realistic medical

scenario simulations, which would challenge students to apply their knowledge in diverse situations. In the context of clinical progression to national licensure level implementation of Entrustable Professional Activity (EPA) was due according to a national consensus (Gummesson et al., 2023). However, EPA have ((AAMC), 2014; Frank, 2015) to be thoroughly aligned with overarching learning objectives and integrated in the PBL framework. A steadfast communication strategy was suggested to disseminate assessment procedures and digital system guidelines, ensuring all parties are well-versed in the operational framework of the EPA system prior to and during implementation. To facilitate continuous pedagogical refinement, a dedicated faculty was proposed to oversee the implementation and evaluation of educational strategies, especially those pertaining to the clinical skills assessments. To compile these aspects, a new tangible model for formal assessment encompassing EPA, professional development, and clinical reasoning was proposed (Kogan et al., 2017). A new clinical mentorship program was also suggested to support students in learning to build a sustainable work-life balance.

Within the theme of *Teacher perspective*, the essentialness of the collaboration between LiU and the south-eastern healthcare regions was highlighted. The need for a joint process in recruitments and competence development to ensure that both the healthcare sector and the university benefit from recruitments was pronouncedly delineated, including clear career paths and career support regardless of employment. Furthermore, the importance of teaching experience being as meritorious as research was also distinctly highlighted. Enhanced support for key faculty members within the programme's pedagogical framework, such as improved training and assistance for base group facilitators, and the establishment of a more robust network and discussion forums for examiners, was also clearly emphasized. Additionally, digital competency and enhanced digital infrastructure harmonized with the programme's scaffolding and pedagogy were prominently highlighted.

In the theme of *Attractivity*, efforts within the program itself, including the creation of dedicated meeting spaces between teachers, students, and staff, were highlighted as essential to develop together and strengthen each other. In terms of the pedagogical principles, there was a clear indication that neither websites nor other sources of information sufficiently showcases the educational core values of the programme, both within the programme and to external parties and prospective students. The proposition that students should also wield greater influence and engage in discussion forums with the teaching hospitals, reminiscent of student participation in universities, was underscored as a distinct avenue for improvement. Similarly, the continual advancement of an integrated theoretical and practical approach was accentuated, serving as an

appealing aspect for the program per se and for the employability and self-reliance of the programme's graduating students.

| Content and quality | Teacher perspective | Attractivity |
|--|--|---|
| Decrease lecture dominance | Strive towards seamless regional collaboration | Align clinical skill training |
| Diversify examinations | Improve career paths | Improve meeting arenas |
| Align learning objectives | Integrate digital systems | Increase student regional influence |
| Implement blueprint of learning objectives | Increase base group facilitator support | Improve external and internal pedagogical communication |
| Implement EPA | Form an examiner group | Define program identity and strengths |
| Launch EPA communication platform | Ensure competence development | |

Figure 3. Resulting summarized key recommendations from the systematic self-assessment aligned with prioritized areas.

The undertaken self-assessment yielded significant insights into the programmes' pedagogical context and approaches and structural challenges.

One noteworthy finding pertains to the prevailing dominance of teacher-led learning activities within the programme's curriculum. An overloaded curriculum inevitably raises concerns regarding issues like restriction of self-reflection in a problem-based approach. However, while contributing to the overloaded curriculum, lectures and other teacher-led activities also offer crucial structured learning opportunities that facilitate understanding of essential complex subjects. The heart of the matter lies in striking a delicate balance between maintaining the flexibility of the curriculum and integrating lectures that reinforce rather than deteriorate PBL. An influential factor contributing to an imbalance could indeed be the strong influence of students within the university. The self-assessment revealed that an increasing number of lectures on specific subjects are frequently requested by students and their representatives. One plausible reason is when constructive alignment of the components of the programme is opaque, students might seek support for their learning merely within lectures, rather than relying on the intended problem-based learning design of the programme.

Lectures in a PBL programme should be a complement to the work in base groups, providing students the possibility to acquire knowledge presented by experts leading students to deeper discussions and problematization (Azer, 2009). Teachers' inclination to lecture intersects often with their own passion for the subject and with the student demands, potentially skewing the program towards a more teacher-focused layout. Acknowledging this paradox is critical

to be able to navigate towards a curriculum that benefits from both the educators' expertise and a genuine student-centred approach, without compromising the integrity of the intended PBL model. It is therefore essential to improve understanding of PBL and its effect on sustainability as a learner and as a future physician among both teachers and students.

To foster coherence and transparency in the curriculum for both students and teachers the knowledge and engagement in constructive alignment should be increased. The diversification of written assessments by incorporating open-book assessments, intricate group assignments, and simulated real-world scenarios demonstrates a commitment to evaluating students' capacity to apply their knowledge across varied contexts. In accordance, the problem-based approach becomes increasingly aligned all the way from Base group to assessments and examinations (van der Vleuten & Schuwirth, 2019). In clinical progression, the implementation of EPA, which is indicative of the competency-based medical education (CBME) model, harmonizes with the same principles in the realm of clinical skills assessment and progression toward licensure (Gummesson et al., 2023). However, the necessity of a robust communication strategy to effectively convey assessment protocols and digital guidelines highlights the complexity inherent in operationalizing the EPA framework within educational and clinical settings. It underscores the potential discrepancies that can arise when theoretical pedagogical models meet the practical realities of medical training and assessment. Moreover, the proposition of a comprehensive assessment model that integrates EPA, professional development, and clinical cases alongside an expanded supervisor program mirrors the literature's discourse on CBME (Hamza et al., 2023). The advantages of such integrative approaches are fostering a holistic and realistic assessment of a learner's capabilities, while also acknowledging the inherent challenges of implementing complex, multi-faceted educational strategies within diverse organizational contexts.

Problem-based learning and student-centred pedagogy, necessitate substantial expertise, a solid foundation in academic theory, and pedagogical proficiency amongst the faculty to ensure both a successful implementation and sustainment that addresses the complexities of educational challenges. The assurance of competence, and competence development, across the university, teaching hospitals, and faculty employment forms underscores the need for institutional support and interorganizational collaboration. Moreover, while easily advocating for several and improved fora, the mechanisms for sustaining such initiatives and the investment required in terms of time and resources frequently lead to organizational resistance to development. An increasing plethora of meeting fora across the organisational systems can prevent faculty and staff from working on core assignments and might play a significant role

in the challenge of unifying the organizations in collaborative development activities. It can be important to create explicit maps, matrices, and administrative flows detailing how decisions and discussions are taken between the university, teaching hospitals and students; and how all parties can ensure the highest possible quality of both future education and healthcare.

Recommendations

The analysis highlights several key observations that may prove valuable for institutions employing similar pedagogic principles or organizational history over a prolonged time span. The main conclusions from our critical self-assessment are: (1) PBL is challenging to grasp initially, but once students have acquired proficiency, they possess a tool that is (a) applicable throughout their entire professional career, (b) easy to apply in clinical contexts. (2) Significant deficiencies have been identified in (a) an overloaded curriculum that leaves little room for individual reflection; (b) lack of communication channels between the university and the teaching hospitals' management, impacting the quality of clinical supervision; (c) internal and external marketing, complicating community-building and student and faculty recruitment.

The conducted self-assessment underscores the critical importance of continuous evaluation in medical educational settings. While the findings have pinpointed several areas for refinement, they also emphasized the programme's strong commitment to a student-centred pedagogical approach. Based on the findings, we established new objectives for each area and began reshaping the profile of the medical program across all defined areas of interest. The significance of adopting a systematic approach to self-assessment for medical schools becomes apparent. The educational landscape is continuously evolving, shaped by technological advancements, social values, and the changing needs and characteristics of the modern learner. As such, educational institutions must remain agile and responsive to these shifts. By implementing systematic self-assessment approaches, institutions can ensure that all facets of their programme remain relevant and in tune with contemporary pedagogical needs. This approach guarantees that critical components are duly addressed and promotes consistency and thoroughness. By proactively determining their pedagogical standpoint, institutions can make more informed decisions that resonate with the contemporary educational landscape.

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