Psychological safety and self-regulated learning through near-peer learning for the sustainability of rural community-based medical education: grounded theory approach

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Research Article

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Abstract

Background

Difficulties in improving psychological safety in medical education can be attributed to the hierarchy of medical professionals. Near-peer learning (NPL) can increase learning between students and residents and improve psychological safety. Rural community-based medical education (CBME) can use an NPL framework to improve psychological safety and compensate for the lack of resources, leading to sustainability. This qualitative study aimed to clarify the effects of NPL on the psychological safety and learning of medical trainees in rural CBME. It used a grounded theory approach.

Methods

Thirty-eight medical students, twelve second-year residents, and eight family medicine residents participated in this study. Purposive sampling was used to address the research purposes of ethnographic and semi-structured interviews.

Results

Three themes were identified: facilitating learning, change in perception, and change in learning. Rural NPL-based CBME drove learners’ engagement in clinical practice through constant participation and reflection. Respecting and supporting learners’ motivation and participation and effectively accepting them increased their sense of ownership and psychological safety. Furthermore, it supported participants in becoming self-regulated learners.

Conclusions

Rural CBMEs lack healthcare and educational resources, but implementing NPL could make rural medical education sustainable, increasing the motivation of healthcare students and the number of medical staff working in rural contexts.

1. Background

Psychological safety is the belief that one will not be punished or humiliated for their ideas, questions, concerns, or mistakes, which is essential for effective medical education [1]. Team members should share the belief that the team is safe for interpersonal risk-taking [2, 3]. When a team is psychologically safe, team members feel comfortable speaking up, asking questions, and sharing their opinions. Consequently, better communication, more creative solutions, and improved performance can increase the teams’ effectiveness [2, 3]. Creating a culture of psychological safety in a team requires leadership that actively encourages open communication, listens to team members, and creates a suitable environment [4]. In medical education, the collaboration between students and teachers is essential for learning with each other, and psychological safety can drive this [5]. As psychological safety can substantially impact the learning and performance of medical students, it is a crucial concept in medical education.
The difficulty in improving psychological safety in medical education can be attributed to the hierarchy of medical professionals [6]. Medical students and residents experience a professional hierarchy in their relationships with their medical supervisors, which impinges on their psychological safety [7]. Although educational culture and background can affect attitudes toward teachers, various studies from multiple countries have examined the effects of professional hierarchy on psychological softies [8, 9]. Especially in rural contexts, few medical educators teach medicine to their students and have a stronger relationship with them [10, 11]. When medical learners experience a strict professional hierarchy, there may be a loss of psychological safety in rural medical education. Educational systems and methods should be revised to enhance and overcome the effects of professional hierarchy on psychological safety.

An increase in learning between students and residents can increase psychological safety. One of the learning methods for this is near-peer learning (NPL). NPL can drive collaboration and mutual learning between medical students and residents [12]. It can be applied in various educational contexts and to rural community-based medical education (CBME) [13]. In rural contexts, NPL can improve participation in medical teams, which drives medical trainees’ learning [14]. It can also mitigate the lack of psychological safety in medical teams by making students feel a sense of safety [15–17].

In rural contexts, members of medical teams, including medical students, should collaborate as team members for the effective care of many older patients in family medicine [18]. Psychological safety is essential for the effective involvement of medical students in medical care at rural hospitals. To the best of our knowledge, there has been no research on psychological safety in rural CBME or how to promote psychological safety. To promote psychological safety, we implemented team-based NPL for the CBME of family medicine residents, medical residents, and students under the supervision of family medicine teachers [19]. The research question was, “How does NPL in CBME change medical trainees’ perceptions and behaviors of learning, regarding psychological safety?”

NPL in rural CBME is useful for reducing the burden that medical teachers face in these contexts due to the lack of medical resources. By clarifying the process of and effect on participants' learning and psychological safety, this educational method may be more applicable to rural contexts. It may promote psychological safety among medical trainees and improve patient care in rural community hospitals that lack resources. Therefore, this study aimed to clarify the effects of NPL in CBME on medical trainees’ psychological safety and learning.

2. Methods

This qualitative study used a grounded theory approach on medical students and residents undergoing training at a rural Japanese community hospital.

2.1. Setting

This study was conducted at Unnan City Hospital in southeast Shimane Prefecture, rural Japan. The hospital has 281 care beds: 160 for acute care, 43 for comprehensive care, 30 for rehabilitation, and 48
for chronic care. The hospital has provided CBME to university students and residents of tertiary hospitals since 2004. Under its curriculum, medical students and residents experience various clinical situations in treating inpatients, outpatients, and patients in homes and community care. Each clinical setting has a medical teacher [11].

Medical students and junior residents receive rural family medical education in medical and tertiary hospitals. As part of their university or hospital curriculum, they train in family medicine at a rural hospital for a month, with medical teachers and family medicine residents. Every year, the rural hospital accommodates 40 to 50 medical students and junior residents for training.

The hospital follows a rural family medicine education curriculum that includes three teachers. Under this curriculum, residents encounter various clinical situations while treating patients. In their first year, residents work at the Unnan City Hospital and treat typical diseases in both inpatient and outpatient settings. In the second year, they work at a rural clinic (Kakeya Clinic) for six months to learn about home care and community-oriented primary care. To broaden their scope of practice in internal medicine, pediatrics, and emergency medicine, residents also work at general or community hospitals for 18 months [20].

2.2. Participants

Between April 2021 and December 2022, 53 medical students and 16 residents were assigned to participate in the CBME curriculum, including family medicine, at Unnan City Hospital. The training aimed to produce the competencies required in Japan's general medicine areas, such as person-centered care, comprehensive and integrative approaches, interprofessional work, community orientation, professionalism, and systematic practice. In total, 38 medical students, 12 second-year residents, and 8 family medicine residents participated in this study. We used purposive sampling to address the research purpose of the ethnographic and semi-structured interviews with participants.

2.3. NPL in Rural CBME

The Community Care Department of Unnan City Hospital has implemented team-based patient management, including NPL. In this department, 100 to 120 patients are admitted to the hospital, and family physicians care for approximately 1,800 patients annually [20]. Each family medicine resident was assigned 15 to 20 patients. During the daily morning conference, they share their patients’ conditions with other members and discuss management plans. During the daytime, they can consult the department director about their patients’ conditions, and safely progress with their treatments [13].

There were three first-, three second-, and two third-year residents. They were supervised and shadowed by a family medicine supervisor. Family medicine residents are allocated to two teams consisting of four or five members. In addition to the morning conference, each team shared and discussed their patients’ conditions and supported each other, leading to effective patient management [14].
Medical students and junior residents were allocated to each team. They belong to these teams and play the role of reporters and interpreters in patient management. Specifically, they take the clinical history and physical examination of all patients assigned to their team, and perform gram stains of sputum, urine, and pus of those with infectious diseases.

In NPL, family medicine residents and teachers encourage open communication and active listening, creating a safe space, providing constructive feedback based on learners’ characteristics, and promoting a learning culture [19]. They actively encourage medical students to speak up, ask questions, and share their opinions. They listen to the students and respond to their questions and concerns in a respectful and non-judgmental manner to create a safe space in which students can make mistakes and learn from them. They provide students with regular and constructive feedback during discussions and conferences to promote a culture of learning that values continuous improvement and encourages them to take risks and try new things. They respect the diversity of students and provide feedback to refine their medical skills and attitudes through weekly reflections.

2.4. Measurements

2.4.1. Ethnographic and Semi-structured Interviews

The first researcher conducted ethnographic and semi-structured interviews with medical students, junior residents, and family medicine residents. The specialties of this researcher include family medicine, medical education, rheumatology, and public health. The researcher worked in all hospital wards, observed interactions among medical students, junior residents, and family medicine residents in each ward and conference, and took field notes during the observations. The researcher interviewed all residents, medical teachers, and nurses in the hospital conference room during the observation period. The interview guide included four questions: “What did you think of your participation in the team?”; “How did you evaluate your learning in terms of participation in the team?”; “How do you evaluate the difficulties of participating in a team?”; and “Do you have any ideas on how to improve your team participation?” Each interview lasted approximately 30 minutes, was recorded, and transcribed verbatim.

2.5. Analysis

An inductive grounded theory approach was used in this study [21]. After reading the contents of the field notes and conducting semi-structured in-depth interviews, the first researcher coded the content and developed codebooks based on the repeated reading of field notes as the initial coding for reliability. This study used the process and concept coding method [22]. Thus, the researcher induced, merged, deleted, and refined concepts and themes, by going back and forth between the research materials and the initial coding, for axial coding. The axial coding focused on concepts and themes while refining the codes. For triangulation, the first and second researchers discussed concepts and themes. The interview contents were analyzed iteratively during the research period, after completing each participant’s CBME training for theoretical saturation. Finally, the theory was discussed by both researchers, and they reached an agreement on the final themes.
2.6. Ethical Considerations

Participant anonymity and confidentiality were ensured throughout the study. All participants provided written informed consent before participating in the conferences and being interviewed. All procedures were performed in compliance with the principles of the Declaration of Helsinki and its subsequent amendments. The Unnan City Hospital Clinical Ethics Committee also approved the study protocol (No. 20220004).

3. Results

3.1. Results of the Grounded Theory Approach

Three themes were identified by using the grounded theory approach: facilitating learning, change in perception, and change in learning (Table 1).

<table>
<thead>
<tr>
<th>Theme</th>
<th>Concept</th>
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<tbody>
<tr>
<td>Facilitating learning</td>
<td>Allowance for participation</td>
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<tr>
<td></td>
<td>Perception as a team</td>
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<td>Respect for personal characteristics</td>
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<td>Effective support in practice</td>
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<td></td>
<td>Acceptance of learners in hospital</td>
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<tr>
<td>Change in perception</td>
<td>Interest in collaboration with physicians</td>
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<tr>
<td></td>
<td>Sense of ownership</td>
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<td></td>
<td>Recognition of team members</td>
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<td></td>
<td>Feeling of safety</td>
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<td>Change in learning</td>
<td>Controlling motivation for learning</td>
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<td>Going at one’s pace</td>
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<td></td>
<td>Adjustment of learning</td>
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Initially, the participants were nervous because they considered their participation as being limited to universities and hospitals. NPL facilitated the participants’ engagement in clinical practice. Residents and teachers of family medicine treated participants as team members. Constant reflection supported their
learning, motivation, and participation. Furthermore, other healthcare professionals’ acceptance of the participants motivated them to actively learn.

Learning in an NPL-based team changed the participants’ perceptions of learning in CBME. The participants felt a sense of ownership of their patients’ management through discussions with their team members. They also felt safe because of the realization that they were recognized as team members. Through their participation, they increased their interest in collaborating with physicians.

NPL-based CBME changed the participants’ learning behaviors. Through constant reflections with residents and teachers, they were able to control their motivation to learn medicine. By understanding their learning characteristics, they realized the importance of learning at their own pace. Through apprenticeship and legitimate peripheral participation (LPP), the participants observed the learning methods employed by residents and teachers and understood how to adjust their learning to fit their settings and patients (Fig. 1).

### 3.2. Facilitating Learning

For effective participation, the attitudes of family medicine residents and teachers were an essential factor. Initially, participants were nervous because they considered their participation limited to universities and hospitals. Residents and teachers encouraged them to participate in team-based treatments. Medical student 11 stated, “I was nervous about learning here because family medicine deals with many kinds of medical conditions, and I did not do anything here. But the residents and teachers encouraged me to gradually participate in the teamwork of treatments.” Medical student 2 stated, “The residents and teachers were very friendly and open-minded, so I could say any stupid thing about medicine. They answered my questions sincerely, and continuously learned with me.” NPL helped participants feel that they could participate in clinical medicine and be members of the team. Residents and teachers of family medicine treated participants as team members.

Constant reflection supported participants’ effectively learning in NPL. The participants considered that learning in clinical medicine must follow teachers’ directions. However, NLP and constant reflection could effectively support each participant’s motivation and participation. Medical student 16 stated, “Every day, the residents or medical teachers helped me reflect on my experiences of the day. By reflecting, I could learn the way of learning based on my character.” Participants could consider their learning methods based on their previous experiences and new cases, with the support of residents and teachers. Junior resident 4 stated, “The teachers supported me in everyday learning. They did not enforce any way of learning. I could learn various cases at my pace with my way of learning.”

Furthermore, other healthcare professionals’ acceptance of the participants motivated them to actively learn. Junior resident 1 stated, “This community hospital has various healthcare professionals supporting our education. In hospital wards, nurses know of me and support my activities. The clerks are also friendly and support me in learning. I could learn safely and comfortably here.” The hospital’s acceptance
was critical to participants’ learning. The learning environment in the community hospital facilitated their participation, allowing them to feel safe.

3.3. Change in Perception

Every day, the residents or medical teachers helped participants reflect on their experiences for the day. By reflecting, they could learn the way of learning based on their individual character. Participants were initially embarrassed in such a setting because it differed considerably from the previous educational environments. However, continual involvement and discussion with the residents and teachers changed their perception. Medical student 2 stated, “I did not think that the residents and teachers would be so close to medical students. I had not discussed medicine with medical teachers because there was a big gap in clinical experiences.” Medical student 3 stated, “I could discuss my patient's conditions with the residents. They might consider the discussion too easy, but I was amazed that they discussed seriously and openly.” NPL in CBME motivated participants to actively discuss their learning with physicians.

Their perception of learning in CBME and their continual involvement in practicing as team members changed their perception of their allocated patients. Through discussions with team members, participants felt a sense of ownership in managing their patients. Junior resident 8 stated, “The teachers always asked for my ideas about patient management. I had to consider the patients’ management continuously and seriously. It was a bit tough, but I trusted myself.” Moreover, participants realized that they were team members involved in learning. The sense of being a member motivated them to learn and discuss their clinical questions with residents and teachers. Medical student 6 stated, “The feeling of membership was strong in this CBME. I felt respected as a member and discussed my patient’s conditions openly with the residents. These learning environments encouraged me to learn more.”

Psychological safety was created during rural CBME learning. The participants felt safe after realizing that they were recognized and respected as learners and members of the team. Junior resident 3 stated, “I could learn freely in this CBME. The residents and teachers supported me a lot in learning. I did not become nervous and confessed my difficulty honestly. I feel a kind of safety in such learning situations.” Recognizing participants as learners and members of clinical teams fostered their perception of such educational situations as being psychologically safe.

3.4. Change in Learning

Through learning in NPL-based CBME, participants changed their learning behaviors. They controlled their motivation to learn medicine through discussions and reflections with residents and teachers. Medical student 7 stated, “The discussion with the residents is useful for my learning. I could learn different methods to stimulate my motivation. Through the reflection, I could understand that my motivation could be driven by realizing my drawbacks and taking the next steps to learn.” Medical student 2 stated, “My motivation decreased in this training initially. But, through this training, I could be motivated to learn medicine by experiencing various real cases. Reflecting on the realization of my motivation, the teachers increased my clinical experiences.”
Continuous reflection enabled participants to notice their learning characteristics and use them in CBME. Junior resident 13 stated, “In every reflection, the medical teachers and residents told me to consider that my learning functioned well. They said that I could learn using my methods of learning here.” The participants considered their learning methods in various clinical situations. Medical student 19 stated, “I have never considered in depth how I could learn in clinical situations. Through the experiences and reflections here, I could understand that I might get tired in some situations and not notice my fatigue until I nearly burn out. I learned that I could control my learning and burdens to prevent burnout.” Junior resident 9 stated, “I could say that I cannot do more now. Whenever I was asked for, I tended to say that I can do it. However, this trait might have impinged my learning. Through reflection, I noticed it.” Participants noticed the importance of their learning methods and characteristics. By understanding their learning characteristics, they realized the importance of learning at their own pace in clinical medicine for effective and continual learning.

The participants realized the importance of adjusting their learning methods. They experienced some difficulty in learning clinical medicine using their methods. Through apprenticeship and LPP, the participants observed the learning methods of residents and teachers and understood how to adjust their learning to fit their situations and patients. Medical student 15 stated, “I tried to learn everything I experienced. I checked textbooks a lot but could not complete all. I was slightly depressed. However, through reflection and observation of the residents, I could notice that I should change my mind and know the limitations in my learning methods and adjust my aim to learn.” Junior resident 11 stated, “Learning here was challenging for me. The amount of clinical exposure was huge, so I could not absorb all the content. Observing the residents could be beneficial for me. The residents had the same difficulty, but they adjusted their aims to learn and focused on a realistic way of learning, not absorbing all the contents of their experiences.” The participants learned the importance of adjusting their learning methods and their concrete aims of learning through observation and reflection.

4. Discussion

This study clarified the specific learning processes in rural NPL-based CBME. NPL facilitated participants’ engagement in clinical practice. Constant participation and reflection supported their learning, motivation, and participation. Furthermore, other healthcare professionals’ acceptance motivated the participants to actively learn. Based on NPL, by learning in a team, discussing with team members, and realizing that they are recognized as team members, the participants felt safe, had a sense of ownership in their patients’ management, and an increased interest in collaborating with physicians. Furthermore, learning in NPL-based CBME changed their learning behaviors. Participants could control their motivation to learn medicine, realized the importance of learning clinical medicine at their own pace, and understood how to adjust their learning to fit their learning situations and patients.

NPL and medical staff’s attitudes are essential for increasing the acceptance of medical trainees and boosting their active learning in CBME. In this study, the participants were involved in the medical team and specific treatments of real patients. In NPL, dialogue with patients is encouraged for mutual
understanding and co-learning within a team. Previous studies have shown that NPL can increase active learning and improve learners’ knowledge and skills in clinical settings [23, 24]. Moreover, medical trainees may be nervous about learning in different training situations, which may impinge their learning [25, 26]. NPL can mitigate these difficulties by establishing effective relationships with doctors and other medical professionals in learning contexts [27]. As this study shows, medical trainees can reduce learning difficulties, and effectively and actively participate in medical training through NPL. For effective initiation and learning in rural CBME, NPL is critical, and therefore should be applied in various contexts.

Medical facilities’ acceptance of trainees is also essential for effective initiation and learning in rural CBME. In rural contexts, the relationship among medical staff is strong, which is critical for them to work effectively in outpatient and inpatient departments [28, 29]. This can be applied to medical education. Medical trainees must establish effective relationships with various medical professionals [30, 31]. This study demonstrates that medical trainees do not feel much stress in this relationship. Team involvement can explain this perception through the experience of NPL and hospital administrators regarding medical education [12, 32]. NPL can facilitate medical trainees’ participation in medical care. Therefore, their behaviors, supported by medical teachers in hospitals, directly affect patient care, which could be acceptable to other medical staff [33, 34]. In addition, this study’s hospital had a long history of providing medical training to medical students and junior residents. Thus, medical staff could accept them and support their work in a medical team [35]. NPL can validate medical trainees’ activities, and the hospital’s acceptance of these trainees can be improved through continuous medical education in rural hospitals.

Psychological safety can be gradually established by continuously involving medical trainees in medical teams and patient care. Changing perceptions regarding the hierarchical relationship between medical trainees and teachers can be difficult initially [9, 36, 37]. However, as this study shows, medical trainees gradually became accustomed to collaborating with family medicine physicians and teachers by overcoming their perceptions from previous hierarchical learning contexts. This change can be supported by continual reflection and support for medical trainees' participation in patient care. Continual reflection is shown to drive medical trainees’ participation in medical care and reduce the gap between trainees and teachers [38, 39]. As this study shows, continual participation in patient management as a team member, based on cognitive apprenticeship and LPP, can make medical trainees feel a sense of ownership over patient care, which can improve their engagement in CBME [40, 41]. Previous studies have shown that enhanced engagement in medical education can improve medical trainees’ psychological safety [42, 43]. Improving their engagement and psychological safety can improve learning quality and patient care at medical institutions [42, 43]. This study shows that this process can be driven by NPL-based CBME.

Respecting medical trainees’ learning interests and giving them opportunities to observe family medicine trainees’ and teachers’ attitudes toward learning can make them self-regulated learners [44]. Controlling learning motivation is essential for continuous professional development [45]. As this study shows, continual reflection can support medical trainees’ learning motivation, by respecting their individual learning interests. In medical education, trainees tend to lose focus on learning because of the huge amount of medical information they must learn in clinical practice [46]. The vast amount of information...
can overwhelm them [46]. Medical trainees should reflect on their learning methods and focus [46, 47]. As this study shows, reflection can facilitate learning within their control and help medical trainees learn at their own pace.

Furthermore, training with family medicine residents and teachers based on cognitive apprenticeship and LPP enhanced medical trainees’ adjustment to learning. As this study shows, they can monitor their progress and reflect on the effectiveness of their learning approaches, using medical teachers’ support [32]. The trainees viewed their training as interesting and worthwhile. In addition, for self-regulated learners, engagement in and persistence with learning behaviors maximizes the degree to which learning occurs [48, 49]. In this rural CBME, the participants learned specific methods of self-regulated learning by observing family medicine residents’ and teachers’ discussions and dialogues about patients and their problem-based learning. Self-regulation can be achieved through lectures and experienced learning [48, 49]. The improvement of self-regulation in learning can occur during the progression of careers and is driven by the facilitation of impressive clinical experiences and mentors [50, 51]. This study suggests that rural NPL-based CBME can provide specific experiences for self-regulation through case-based cognitive apprenticeship and LPP, supported by continual reflection.

This study has several limitations. The first issue is the participants’ motivation to learn about family medicine. In this study, we clarified the learning processes of multiple participants using iterative data collection. Another limitation is its transferability, because this study was performed in only one rural Japanese hospital. To improve the reliability, we used iterative data analysis and collected data over a long period. Future studies should investigate effective educational methods in other regions and international contexts, using this research theory. Additionally, the first author coded the interview data, which might have affected the credibility of the study. To improve research quality, the second author reviewed the processes of coding, concepts, and themes through theoretical triangulation.

5. Conclusions

Rural NPL-based CBME can drive medical students’ and junior residents’ engagement in clinical practice through constant participation and reflection. Respecting and supporting each learner’s motivation and participation, and effectively accepting them as team members make them feel a sense of ownership and psychological safety. Furthermore, rural NPL-based CBME can support learners in becoming self-regulated. Rural CBMEs may lack healthcare and educational resources. However, implementing NPL in rural CBMEs can make rural medical education more sustainable. Effective rural CBMEs can increase the motivation of healthcare students and the number of medical staff working in rural contexts.

Abbreviations

NPL: Near-peer learning

CBME: Community-based medical education
LPP: Legitimate peripheral participation

Declarations

Ethics approval and consent to participate

This study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Ethics Committee of Unnan City Hospital (protocol code 20220004; date of approval: March 2021). Informed consent was obtained from all participants involved in the study.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed in the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author Contributions

Conceptualization, R. O.; methodology, R. O.; validation, R. O. and C. S.; formal analysis, R. O. and C. S.; investigation, R. O.; data curation, R. O.; writing—original draft preparation, R. O. and C. S.; writing—review and editing, R. O. and C. S.; visualization, R. O.; supervision, C. S.; project administration, R. O. All authors have read and approved the final manuscript.

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References


Figures
Figure 1.

**Figure 1**

Conceptual figure of learning in NPL-based CBME.