NOVA SOUTHEASTERN UNIVERSITY
Dr. Kiran C. Patel College of Allopathic Medicine

FACULTY PROBLEM-BASED LEARNING (PBL) SURVIVAL GUIDE
Version 2

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Daniel Griffin, Ph.D. and Lindsey C. Henson, M.D., Ph.D.

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WHY PROBLEM-BASED LEARNING?

> ***"The real voyage of discovery consists not in seeking new landscapes, but in having new eyes."***
> ***Marcel Proust***

Problem-Based Learning (PBL) starts with a problem that initiates the learning process. In medical education, most of the problems are based upon clinical cases. During PBL sessions, students work together to determine the significance of the information presented in the case, figure out what they need to learn in order to understand the problem, research and communicate the needed information to the entire group, and apply the information to solve/manage the problem. An effective PBL case describes a real problem, requires students to form multiple hypotheses, and encourages inquiry, analysis, and creative thinking.

The cases provide a framework for the integration of basic science knowledge with the patient's history, physical findings, and laboratory/diagnostic test results. It is important to remember that the goal of the PBL cases is to learn the basic sciences in a clinically relevant way, and sometimes the basic science is better delivered with slight modification to "real-world" clinical situations, such as access to diagnostic equipment or timing of when laboratory/diagnostic test results are delivered. It is important to remind students of this if they become concerned about sequence of the delivery of information. As the facilitator, you will know if the information they are seeking will be delivered in the case and this can be used to alleviate any concerns.

PBL has several strengths as a learning method. It engages students in active learning, requires them to take responsibility for their own learning, and encourages self-directed learning. PBL also promotes problem-solving skills, and develops interpersonal abilities in the areas of communication, teamwork and leadership. In addition, students provide feedback to each other at the end of each session and so learn how to give and receive constructive evaluations.

There are different models and formats for PBL. At NSU MD, cases use sequential disclosure of a patient case over several 2-hour sessions. Students read each part aloud and identify facts, hypotheses and what they would like to know after each part. At the end of each session, the students develop a list of **Learning Objectives** and divide them among the students. Each student takes one of the objectives, researches it, and prepares a short presentation with references for the rest of the group. When students return for the next session, they make their presentations and consider how the new information they have learned impacts their analysis of the case. They then read the next part of the case, and repeat the PBL process until the case concludes.

At the end of each case, the students are provided with **Case Objectives** determined by the faculty who wrote the case. If any of the faculty Case Objectives were missed entirely, students are expected to research them after the case is completed. Students often identify and research topics that didn't occur to the faculty, greatly expanding their learning. Students also prepare a detailed Study Guide with references for the Case Objectives to summarize the information and concepts they should learn from the case.

Throughout the case, the students work with a faculty facilitator who helps students follow the PBL process. The role of the facilitator is to guide students only when necessary by asking questions and providing feedback. The facilitator's role is NOT to answer content questions, lecture students, or direct the session by telling students what to do. PBL is a student-driven format, and responsibility for productive sessions and learning rests with the students. While the facilitator may occasionally need to ask a question if the group is getting off track or missing an important point, facilitator intervention should be kept to a minimum. In fact, an ideal PBL session is one in which the facilitator says nothing until the very end when the group members give each other feedback.

The facilitator is supplied with a **Facilitator Guide** for each case that contains not only the case scenario, but background information and questions that might be asked if needed. The facilitator should not share this information with the students, or go down the list of questions asking each one in turn. Rather, the Facilitator Guide is a resource so that the facilitator can become familiar with the case and the important concepts it covers, and so be equipped to monitor the student discussions and presentations. A facilitator does not need to be an expert in the case content in order to effectively facilitate the case.

THE PROCESS: HOW A PBL SESSION WORKS

The First Day of PBL:

Introductions: When a facilitator meets a new group in the first session, he/she should introduce himself/herself and ask the students to introduce themselves. Each person should share a few words about his/her background and interests to help 'break the ice.' Sharing information is a first step in building a team and appreciating the diversity that exists within the group.

Information about PBL: If students are not already familiar with PBL, they should have an introduction to the process that includes information about the basic principles, the advantages, and the format of PBL. Expectations should be clearly expressed and questions answered.

Roles and Rules: The facilitator should explain his/her role to the group. If necessary, the facilitator should review the way that a PBL case works and what is expected from each student, and answer all questions students have about PBL. Student responsibilities should be made explicit, including participating in discussions, researching and presenting information, and taking turns in their roles, such as Reader and Scribe. The facilitator should establish an open and safe learning environment where it is acceptable to say "I don't know." The facilitator should make it clear that group members need to respect one another's opinions, be polite and considerate, and ensure that everyone has the opportunity to contribute to the discussions. At the same time, students should be able to ask one another to clarify ideas that are expressed and challenge those ideas to ultimately arrive at a point where all group members thoroughly understand an important concept.

Some PBL rules are non-negotiable, including being on time and present for all sessions, participating in discussions, following the PBL format, creating a safe learning environment, and fulfilling all responsibilities to the group. Other rules are negotiable, and students can determine how to rotate the PBL roles (i.e. Reader and Scribe), how iPads/computers will be used, how to assign Learning Objectives, whether they will take a break midway through the session, etc.

First PBL Case for Novice Students: Doing a short PBL case will give novice PBL students a chance to experience PBL when they can focus on the process in addition to the content, and the facilitator can model the process and answer questions about it without interfering with their self-directed learning. Students who are PBL novices may find the process uncomfortable at first since they are unsure about what to do, and will look to the facilitator for reassurance and answers. While explaining the process and making suggestions as to how the group might function better are important, the facilitator should resist answering questions that students should be answering themselves, and should not become the authority figure who supplies all the answers, with the students looking for approval every step of the way.

The First Session with a New Team:

Team Contracts: During the pre-clerkship curriculum, students will be members of multiple PBL groups at predetermined time points. After initial introductions, the group will create a team contract, also known as a commitment plan. Using their experience in team settings, they will discuss the knowledge, skills, behaviors, etc. that excellent team members have or demonstrate. They will then consider typical challenges to team performance and develop solutions. Referring to these, they will create a team contract that will outline expectations for effective behaviors and processes for their PBL group, while respecting group member personalities and preferences. The facilitator can provide guidance by ensuring that the non-negotiable PBL rules are maintained and that the group members have the opportunity to create a contract tailored to them with negotiable PBL rules. The facilitator engagement in this process will be of greatest importance in new groups of students without PBL experience, and when acting to remind students to review and revisit their team contract over the course of the block.

<u>*The First Session of a Case:*</u>

Getting Started: The group should decide which student will be the Reader and which student will be the Scribe (and any other roles created by the team). These roles should rotate for each session so that all students have the opportunity to function as both. The Scribe should make four columns on a board or flip chart visible to the entire group where information will be consolidated as the case is read. The columns include 1) Facts- the important information contained in the case; 2) Hypotheses- ideas about the underlying causes of what happens in the case; 3) What We Would Like To Know (WWWLTK) - questions the group has that need to be answered; and 4) Learning Objectives (LOs) - concepts that need to be researched and learned in order to understand the case.

Reading the Case: The facilitator will distribute the first part of the case (Session 1 Part 1); the student copy of the case contains only the case scenario with no questions or background information included. The Reader will start reading the case aloud and should pause when appropriate (certainly at the end of each paragraph) so that the group can decide on the important facts and the Scribe can write them down on the board. Students may also generate hypotheses and pose questions that the Scribe should write in the appropriate column. If the group misses an important point, the facilitator should NOT tell them what they have missed, but rather should ask a question that will help the students see that there are additional issues to be considered. If a student states incorrect information as fact, the facilitator should not correct the student but rather ask “How do you know that?” or “Does everyone agree with that?”

Session 1 Part 1 of most PBL cases focuses on the chief complaint of a patient. Students should begin to develop critical thinking/clinical reasoning skills by considering the available information and brainstorming possible causes before they turn to researching symptoms on iPads/computers. To ensure that students consider a wide range of hypotheses, they should use a mnemonic aid, such as VINDICATE SLEEP, to review pathophysiologic possibilities. This will keep them from narrowing the differential diagnosis or list of hypotheses prematurely.

V	Vascular	S	Social
I	Inflammation	L	Legal
N	Neoplastic	E	Environmental/Nutritional
D	Drugs	E	Economic
I	Infectious	P	Psychological
C	Congenital		
A	Autoimmune/Allergic		
T	Traumatic		
E	Endocrine/Metabolic		

Students should continue reading and discussing in this manner until they complete Part 1 of the case. The facilitator can then distribute Session 1 Part 2 and the process repeats (and continues with additional Parts if applicable). The group should brainstorm and discuss each paragraph of the case thoroughly, and continue with reading the case only after all the pertinent information has been extracted and organized.

Learning Objectives: During the process of organizing facts, generating hypotheses, and posing questions, it will become apparent that the group has knowledge gaps. Some of these gaps may be as simple as "What does this word mean?" and can be researched on the spot to provide an answer. Other gaps will be broader, deeper concepts crucial to analyzing the case that cannot be answered easily and quickly. These questions should be moved to the Learning Objectives column and will form the basis for creating the group's LOs at the end of the session.

After completing all parts of the case for that day, the group should examine the WWWLTK column and the Learning Objectives column to create a list of Learning Objectives that will be researched before the next session. Questions and topics that the group has compiled serve as the basis for generating LOs. LOs are usually fairly deep or complicated topics that the group agrees are important for understanding the case. Formulating LOs as questions can help the students to focus on the essential aspects of each topic. For instance, an LO of 'high blood pressure' would be very difficult to research because it is so broad. An LO of 'What are the risk factors for high blood pressure?' or 'What are the long-term consequences of high blood pressure?' will help to direct student research and is more likely to generate information useful to the group.

There should be enough LOs so that each student can be assigned one LO to research and bring back information to the group. A group will often create more LOs than there are students, and so must combine and/or prioritize the LOs. Lower priority LOs can be saved for the subsequent session. If the group has done a thorough job of analyzing the case, their LOs should closely parallel the faculty Case Objectives for that day. It is not uncommon that students develop other relevant Learning Objectives that are not part of the Case Objectives, and this should not be discouraged. Rather, it is important to reinforce to the group that the time they spend researching Learning Objectives that are not faculty Case Objectives is not in any way wasted but rather represents an excellent use of time.

The facilitator should not supply LOs that the group might have missed, especially since the group may get to the LO in the next session. However, if the group has neglected a topic crucial to moving forward with the case, then the facilitator might ask a question that would guide the students in the direction of that topic.

Feedback: After the LOs have been created and assigned, the group should conclude the session by providing feedback about group and individual performance. When the group is new, students will be more comfortable giving feedback about group performance. As the group comes together, students can then evaluate their own participation as well as that of the other group members. Feedback should be specific, helpful, and constructive. Comments such as 'Good job today' and 'I think we did well with this case' do not identify ways in which the group or individuals can improve. The facilitator should prompt the group to reference their team contract as part of their feedback process. When necessary, it is encouraged that groups revisit their contracts and make modifications if they feel something in their contract is not working well for the group.

For the students, giving feedback is a skill that will develop over time. The facilitator can promote this development by modeling constructive feedback. The facilitator can also help by posing a question to focus the feedback, such as 'What is one thing the group did well today and what is one thing that could be improved?' or 'What could the group have done differently that would have better supported your learning?' For individual feedback, questions could include 'What one thing do you do that most helps the group?', 'What one area should you target for improvement?', 'What did the group member on your left do today that you found helpful?', and 'What is something that the group member on your right should continue to work on?'

Schedule: The facilitator should inform the students at the start of the session as to how many parts the case has on that day. Students should be responsible for managing their time so that they complete reading and discussing the case within the 2-hour session, and leaving ~ 10 minutes for formulating LOs and ~10 minutes for feedback.

Use of iPads/Computers: Students will usually need to look up some information during a session, but devices must be used wisely. Excessive iPad/computer use can interfere with group discussions as it causes students to focus on the device rather than the conversation. The main issue is that all the students must be engaged with the group and contributing to the process. A student who is spending too much time looking at his/her iPad/computer will miss crucial parts of the group discussion and become isolated.

There are different ways to handle iPads/computers. Some groups assign one or two members to be the Researchers for that day, who are responsible for quickly looking up questions for the group and supplying the answers without delaying the group discussion. Other groups do not use their iPads/computers until they have accumulated a list of questions. At that point, they take a 5 minute research break during which they divide up the questions and everyone spends a few minutes researching the answers.

As students become more proficient at the PBL process, they will learn to distinguish between questions that are quickly and simply answered and those that are more complicated. The simple questions are suitable for brief research during the session that can result in a definite answer. The complicated questions cannot be adequately answered during the session and should instead become Learning Objectives.

Between Sessions:

Research and Preparation: Each student should thoroughly research his/her assigned LO using multiple reliable sources, including text books, journal articles (preferably peer-reviewed), and validated web sites. Based on this research, each student should prepare a short oral presentation for the rest of group that communicates the essential information, including references that will be made available to the group. Presentations will be posted to the group's SharePoint site by 8:00 AM on the day of the session for which they need to present. Students are free to discuss their LO with other group members and to consult faculty as needed. Students are instructed to inform faculty whom they approach that their questions are coming from a PBL case, and that they may need to provide information from the case to that faculty member so their questions can be properly addressed. This should also minimize the chances that a faculty member inadvertently gives away information that would jeopardize the case.

The Middle Sessions of a Case:

Case Summary: One student will provide a very short oral summary of the case up to this point to refresh everyone's memory and provide a context for moving forward. Every student in the group should be prepared to do this and someone will be chosen randomly at the start of the session (either by the facilitator or by a method decided on by the group) to present. As a form of vertical integration, the format for this presentation will be very similar to the one used for oral case presentations in the clinical courses (i.e. POM 1 and POM 2), to give the students multiple opportunities in various settings to hone their skills. When summarizing, students will need to limit the details to those relevant to the problem.

Presentations: The students should determine the most appropriate order for their presentations so that the information builds in a logical fashion. Each student should then make his/her presentation. The students may use power points, draw on the board, etc. to effectively communicate their topic. Presentations should focus on key concepts, not numerous details, and should also contain a summary of 'take-home points' at the end. Presentations should be interactive, not mini-lectures. Presentations that include questions for the group, relate the LO to the case, and integrate the LO with other course information will be more effective. Both the facilitator and other group members should provide feedback on each presentation. Each student will supply the group with a written study guide on his/her LO, with references.

The length of each presentation will depend on how many students are in the group, but normally will be about 5 minutes. In general, the presentations, including questions and feedback on them, should be completed within the first hour of the session. The group may want to designate a Timekeeper to ensure that presentations do not run over the allotted time.

Applying the Information: Based on the presentations, the group may want to re-visit their Hypotheses and WWWLTK lists to add or eliminate specific items. *Student should not completely erase findings, differential, or hypotheses from the whiteboard*, as this information may still be important to the case.

Continuing with the Case: The facilitator will distribute the next parts of the case (Session 2 Part 1, Session 2 Part 2, etc.). The Reader will read the case aloud, and the Scribe will compile Facts, Hypotheses, WWWLTK, and LO lists with the group's help. The group will discuss each part using the same process as in the first session. New Learning Objectives will be generated and assigned for research, and the group members will give feedback to each other.

The Final Session of a Case:

Case Summary: One student will provide a very short oral summary of the case up to this point to refresh everyone's memory and provide a context for moving forward. . As in the Middle Sessions, every student in the group should be prepared to present, and one will be chosen randomly at the start of the Final Session. The format for this presentation will be very similar to the one used for oral case presentations in the clinical courses (i.e. POM 1 and POM 2).

Presentations: Having researched an LO, each student will make an oral presentation, answer questions, and supply the group with a written study guide on his/her LO, with references.

Wrapping Up the Case: Students will receive the last part of the case, which usually contains minimal new information. After discussion, the group may have some remaining questions that they can research and answer within the session. Students will then be given a copy of the faculty Case Objectives, and should go through them to determine which ones they have covered and which ones may require further research. The group should decide how any additional research will be divided up among the group members. The facilitator should assist the group with their plan for "closing the loop" on any LOs that are identified on the last day of the case, or any low priority LOs that were not addressed. Students are unlikely to address remaining LOs after they receive the case objectives and when they know they will move on to another topic in the next case. Encouragement and follow-up by the facilitator should reduce the chance that LOs are "lost" due to the circumstances. One way to close the loop is to have the students include these unaddressed LOs with their Case Study Guide (below).

Any suggestions for improvement of the case can be communicated to the facilitator or through an online evaluation tool. At NSU MD, each case will have a link to a site where students can anonymously evaluate the case. Facilitators will need to remind and encourage student feedback using one or both of these methods for continuous quality improvement.

The final session should conclude with feedback.

At the conclusion of each case, students must create a written Study Guide that addresses all the Case Objectives in sufficient detail to be a useful aid for student study of the case content, and all students must contribute to each Study Guide. The Study Guide should be completed and posted prior to the start of the next case.

LIFE-LONG LEARNING IN PBL

> ***"One of the defects of our plan of education in this country is that we give too much attention to developing the memory and too little to developing the mind; we lay too much stress on acquiring knowledge and too little on the wise application of knowledge."***
>
> ***William J. Mayo, MD***

Life-long learning (LLL) is an essential part of being a physician. To help students develop this ability, the first year of the curriculum will focus on various skills needed for LLL. During PBL sessions in the first year, the following LLL skills will be addressed:

1) Information Sources and Quality
2) Organization and Presentation of Information
3) Integration of Knowledge
4) Identifying Gaps in Knowledge

1) <u>Information Sources and Quality</u> - During the first 5 weeks of the Fundamentals course, students will be asked to find appropriate information sources and evaluate their quality. The facilitator should pay attention to this issue as students look up information during the sessions, and question as necessary the reliability of the information being discussed. During student research of Learning Objectives, students are asked to find and use at least one peer-reviewed source (journal article, text book, peer-reviewed web site, etc.) in investigating each LO. On a rotating basis during their oral presentations, 2 students will analyze a source or sources used in researching their Learning Objective. They should describe in less than a minute:

    1. How they found the source- i.e. search engine used, subject searched, how hard was it to find, how the search was modified as they progressed
    2. How reliable is the source- i.e. is the source professional level, how recent, is it peer-reviewed, how many times cited, have authors published previously in the field, conflicts of interest
    3. Why the source(s) was good for the specific Learning Objective- i.e. text book vs. research article, depth and breadth of information

This should generate an additional 2-3 minute discussion among group members on finding appropriate information and assessing its quality. The two discussions should occur at an appropriate time during the session, probably following each student's presentation. The discussions do not necessarily have to be at the end of the session or the end of all presentations. Students should put some thought into the sources they utilize and recognize that some sources are better suited to certain types of LOs. The goal is to make students proficient in finding information and in evaluating the general quality of the source. Students are <u>**not**</u> being asked at this point to evaluate the validity of data within a journal article; that skill will be addressed at a later time.

2) <u>Organization and Presentation of Information</u> - During the **rest of the Fundamentals course**, the focus will expand to include organizing information and presenting it effectively. There should be two students in each PBL session in which LOs are presented who receive feedback from the group about the organization and presentation of their LO, generating a brief discussion about presentation skills and considerations in organizing information. At the same time, the skill of locating and evaluating sources should be maintained, so the facilitator should occasionally ask questions about sources.

3) Integration of Knowledge - As students move to **Hematology course**, they will continue practicing the LLL skills from the Fundamentals course, and adding integration of knowledge. During each of their Learning Objective presentations, students should make at least one connection to content from Fundamentals or from earlier in the current course. This connection can be anything from comparing key proteins in disease processes to contrasting clinical symptoms, but it should be something significant that helps to organize knowledge, not some random association. The connection should reinforce important information and expand student understanding of it.

4) Identifying Gaps in Knowledge - In the **GI/HN/Endo/Repro course**, another LLL skill will be added dealing with recognizing deficiencies in knowledge. At the end of each of their Learning Objective presentations, students should identify one question they still had about their topic following their research, and provide a brief answer. The questions should be meaningful and result in extending student knowledge.

FACULTY FACILITATOR RESPONSIBILITIES

- **Be prepared.** Students appreciate faculty who know the case and keep them on track without dominating the team. Read the case and the facilitator guide. Remember, the students are in charge of learning and teaching one another and the facilitator is there to facilitate the group.

- **Be enthusiastic.** With all student groups, especially those that are PBL novices, a positive attitude will help students adjust to an unfamiliar process.

- **Help ensure that your PBL group begins and ends on time.** It is important to both begin and end on time. Students are expected to be on time as part of their professionalism and their responsibility to the group, and faculty need to set a good example. Students may also have other activities scheduled around the PBL sessions.

- **Create a productive environment.** Facilitators should trust the students and the PBL process. They should be respectful toward the students and encourage the attitude that there are no dumb questions and that the environment is a safe one for students to say they don’t know or don’t understand. If there are significant problems, the facilitator should meet with the student(s) privately as soon as possible to address the issues.

- **Promote critical thinking.** Facilitators should ask questions as needed that will encourage the group to analyze the problem in depth and understand/integrate the concepts they are exploring.

- **Facilitate rather than teach.** The facilitator’s role is to keep the group on track and probe for depth of knowledge by asking questions, not supplying answers. The facilitator should speak as little as possible and resist the temptation to fill in information or direct the group.

- **Give quality feedback to the students.** Facilitators should set an example during feedback at the end of each session to promote quality feedback from the students. Facilitators should also meet with each student individually partway through the course to discuss what the student is doing well and what the student should target for improvement. It is recommended that you start these individual meetings by giving the student a chance to reflect on their individual performance and then the performance of the group, prior to providing facilitator evaluations.

- **Take notes on student performance.** In order to complete student assessments and provide feedback, facilitators need to keep track of specific student participation in the PBL process. Facilitators will need to keep track of all aspects of student performance in order to write narrative assessments. Facilitators provide formative evaluations to their students at approximately the mid-point of their time with their group, and provide summative evaluations at the end of the time with their group. Facilitator evaluations are submitted to the Course Directors who will then determine student grades. Facilitators will also submit a list of action items to the Course Directors for each of their PBL students at the time of the summative evaluation. This list of action items for each student will be provided to their new PBL facilitator, to provide guidance for continued development of skills.
- **Check that students have properly posted presentations and Study Guides.** Students must post information on their presentations (power points, pictures, diagrams, etc.) with references by 8:00 AM on the day of the session for which they need to present. Study Guides on Case Objectives must be posted no later than 8:00 AM on the first day of the next case, and all students must make significant contributions to every Study Guide. Facilitators are responsible for checking both the quality and timeliness of student postings and documenting any deficiencies.

STUDENT RESPONSIBILITIES

- Be on time and prepared for all sessions.
- Be respectful of other group members and their ideas.
- Participate in group discussions.
- Prepare useful presentations and study guides.
- Provide specific, constructive feedback to the group.
- Develop teamwork and communication skills.
- Develop self-directed learning skills.
- Share PBL materials only within the group and post PBL information only on the designated secure web site.

PROBLEMS IN PBL GROUPS

It is normal for new PBL groups to require several sessions before functioning smoothly. The different personalities within the group must learn about each other and find their own place. For these initial sessions, feedback at the end of each session should focus on group procedures and dynamics, exploring what the group is doing well and where the group needs to improve. The facilitator can use this opportunity to remind students of their roles and responsibilities in the PBL process, and to generally address any concerns without focusing on individual students. However, the group should be encouraged as much as possible to identify problems and find solutions, and so take responsibility for creating positive group dynamics.

Other issues may need to be addressed privately between the facilitator and an individual student. Some students may be quiet and shy in the group setting, and feel uncomfortable jumping into a discussion. Often such students are well-prepared and have valuable contributions to make, but end up saying very little during a session. Since participating in group discussion is an important part of a medical career, these students should use the safe PBL environment to overcome shyness and develop the communication skills they will need. Setting specific benchmarks for such a student (say something at least twice an hour) and finding out where the student might be most comfortable making a contribution (Facts vs WWWLTK) can help the student develop a strategy for making progress. Other members of the group can also be enlisted to encourage participation and provide positive feedback when improvement occurs.

Other students may be domineering and talk more than their fair share during discussions. The reasons for this can be varied and include being verbose, liking to hear himself/herself talk, wanting to impress others, being egocentric, etc. The facilitator can first address this issue by reminding the group during feedback of the percentage rule (total number of minutes in the session/number of group members = approximate time each person should be talking). If the student fails to self-correct after a couple of sessions, the facilitator should have a private conversation with the student that is encouraging rather than confrontational. The facilitator can explain that the student can better help the group by encouraging others to contribute their ideas and taking a leadership role rather than always being the first to speak. The facilitator can also encourage other group members to give the dominant student constructive feedback as to how his/her participation could be adjusted to better help the group.

There may occasionally be a slacker in the group who doesn't participate due to lack of interest and/or doesn't come prepared with a quality presentation and study guide. This situation is quickly obvious. Feedback from the group and peer pressure can be effective in convincing such a student that self-directed learning is a critical part of becoming a physician and is also a responsibility to the group. The facilitator can meet with the student privately to explain that sub-standard performance is not acceptable and will affect the student's course grade and future recommendations.

SHARING PBL CASES

Students are free to share their work on the NSU MD PBL cases with other students in their class after the case has concluded. However, since many of the cases will be used again in future years, sometimes with only minor changes, *students are prohibited from providing the PBL cases themselves or study notes to students in subsequent classes.* Sharing PBL information with subsequent classes is a violation of professionalism. It is also against NSU MD policy for students to post any materials for PBL to Facebook or other social media sites that are not secure. NSU MD students are required to read and acknowledge the following:

> *I recognize the problem-based learning (PBL and IQ) case materials are confidential. I agree and understand that, at no time and under no circumstances, may these materials be copied, posted, tweeted or otherwise shared in any way with anyone outside of our institution or on any non-secure site. The only people with whom I may share this information are:*
>
> - *While a case is on-going, with the members of my PBL or IQ group, and*
> - *Once a case is concluded, with other members of my class.*
>
> *If I discuss or ask questions about content covered in or related to a case before the case has completed, I will identify to the individual(s), including but not limited to faculty and preceptors, that this is related to an ongoing case.*
>
> *Anytime case information is shared, I pledge to copy my PBL or IQ facilitator.*
>
> *I understand that no vertical sharing is permitted, meaning I may not share these materials with NSU MD students in other classes. I further understand that violation of this pledge is a serious failure of the competency of professionalism that will be dealt with by the medical school in the same manner as other failures of academic competency. The response to failure to demonstrate professional behavior can result in sanctions up to and including dismissal.*

THE TEN COMMANDMENTS OF PBL

1. Trust students to be motivated adult learners.
2. Trust faculty to be committed, competent educators.
3. Trust the PBL process.
4. Practice mutual respect.
5. There are no dumb questions.
6. It's okay to say, "I don't know."
7. Unscheduled and/or designated time is for student independent study.
8. The boards belong to the students.
9. Encourage synthesis of information.
10. Reflection on the group process is an important aspect of learning.

Appendix A
PBL Norming Checklist

Please discuss the following PBL norms at the beginning of each course or new PBL group, as well as any other norms you may feel are important to the optimal functioning of your group.

Review Non Negotiable Norms. These have been established by the faculty are not flexible.

- All PBL group members are expected to be on time and present for the entire session.
    - If a student will miss a session for an excused absence, the student will notify the Course Director(s), PBL facilitator and other members of the group. The student will make up the session by contributing to the learning of the team in a manner that will be determined by the facilitator, other group members, and/or the course director.
- Cases are read and discussed one paragraph/part at a time.
- Each student will research his/her learning objective and function as the group expert on that topic.
- All group members are expected to contribute group discussions and to the development of learning objectives in a meaningful way.
- All group members are expected to make significant contributions to the Study Guide for each case.
- The PBL group must promote a safe environment in which group members can feel free to express uncertainties and provide non-judgmental feedback.
- Debriefing feedback must take place at the end of every PBL session (~10 minutes).

Review expected professional behaviors and discuss why they are an important part of the NSU MD learning environment.

- Students should feel free to share PBL materials to other students in their own class at the conclusion of a case, but sharing PBL learning objectives or study notes with students in subsequent classes or outside NSU is a violation of professional behavior. The use of Facebook or other non-secure social media sites by students for any PBL materials is strictly prohibited.
- If computers/iPads are used during PBL sessions, documents and sites that do not relate to the session should not be accessed (e.g., email, Facebook, web surfing, working on other assignments).

Review additional norming questions. These may be helpful to initiate Team Contract creation.

- What expectations do students have of one another?
- How much should each group member participate in the discussion?
- What are your expectations of the faculty facilitator?
- How will the leader be assigned?
- How will the scribe be assigned?
- How will computers/iPads be used?
- Will the group take a short break during each session? Will there be food?
- How will the group assign Learning Objectives?
- How will the group divide up responsibilities for Study Guides?
- Are there any additional norms that the group would like to discuss?

Appendix B
Feedback: A Developmental Strategy for PBL Facilitators

The following is a developmental strategy for guiding feedback that will allow your PBL group to become comfortable and proficient in evaluating and improving the group process, and start to address the challenges of self-evaluation and peer-evaluation. Our students are expected to contribute to developing positive group dynamics, give and receive peer feedback (written and in small groups), and evaluate their own performance in PBL.

It is important for groups to be functioning reasonably well and for a "safe" environment to have been established before challenging too much with self-evaluation or peer-evaluation. Therefore, feedback during the initial weeks should focus more on the group process.

It may be helpful to pose your question(s) to the group and then give all of them 60 seconds of silence to write down notes for themselves before beginning the feedback process. Let them know at the beginning of the PBL session that you will be posing some questions at the end of the day, so they can adjust their timing of the case discussion.

<u>Suggested Feedback Questions: Early weeks:</u>

1. *Focus on group formation.* "State one thing that worked well in PBL today (or during this case) and one way that the group might improve."

2. *Focus on group process.* "Take 1 minute and write down answers to the following: 1) How does PBL facilitate your understanding of the concepts in the case? 2) What might the group have done differently that would have better supported your learning?" ***Be sure to take note of the important ways that the group wants to improve and consider reminding them about the major points the following week. This can really help your group to make very early group process corrections/improvements.***

3. *Focus on group process improvement.* "How has our group improved since the beginning?"

<u>Suggested Feedback Questions: Later weeks:</u>

4. *Focus on self-evaluation and self-awareness*. "Tell us one way that you help the group and one thing that you could do (or not do) that would benefit group learning."

5. *Focus on self-improvement*. "Please include in your feedback comments one way that you think you have improved during PBL in this course and one thing that you still want to do better."

6. *Focus on peer-evaluation.* "Give feedback to at least one group member about something that they did that was helpful to you or the group." ***Start by focusing on student presentations and hand-outs which are relatively non-threatening issues.***

7. *Focus on peer-evaluation*. "In your feedback comments today, challenge yourself to tell the person sitting to your left something that they have done well over the last few weeks and something that they could do (or not do) that would help the group." If group members are struggling to think of things, encourage them to get help from the rest of the group.

8. *Focus on peer-improvement reinforcement.* “Please include in your feedback comments one way that you have seen another group member make a change that has been beneficial to you and/or the group during this course.”

Appendix C
Weekly PBL/IQ Facilitator Feedback/Assessment Form

Weekly Student PBL/IQ Competency Report   PBL/IQ Team #   Facilitator:

NOTE: This is an internal report for use by Course/Block Director(s) and will not become part of any student's permanent file. However, Facilitators and Course/Block Director(s) may use information in this report for mid-block formative feedback and determination of final ratings for the EP, ICS, and PBLI competencies in the course.

Case #s	**Professionalism**		**Interpersonal Skills & Communication**	**Practice Based Learning and Improvement**		
Student Name	Late/Absent for a Session Notification?	Patient Presentation/ SOAP[2]; Discussion; or fulfilling team role (e.g. as team leader in IQ)	Appropriateness of Participation Quiet, domineering, disrespectful, balanced	Quality of constructive feedback during check-out	Response to feedback or self-evaluation	Any other concerns or accolades?

Have you discussed any significant or persistent concerns with the student(s)? YES ☐ NO ☐ If YES, please comment below.

Have you discussed any significant or persistent concerns with the student(s) Learning Community Mentor? YES ☐ NO ☐ Please comment below.

Appendix D
Midpoint and End of Course PBL Facilitator Assessment Form

Nova Southeastern University
Dr. Kiran C. Patel College of Allopathic Medicine

Narrative Facilitator Assessment for PBL

***Student:*_________________ *Facilitator:*_________________ *Date:* _____________**

Instructions to Facilitator: Please write comments for each competency area, providing specific examples where possible.

Behaviors	Targeted Areas for Improvement	Areas of Strength
Practice Based Learning & Improvement (PBLI): Research Skills • Generates hypotheses based on facts • Develops answerable questions for independent study • Uses appropriate resources to obtain information		
Practice Based Learning & Improvement (PBLI): Reasoning • Prioritizes data when solving problems • Justifies reasoning process using case • Synthesizes information pertinent to case		
Interpersonal Skills & Communication (ISC): Interpersonal Skills • Respects peers' ideas and questions • Balances active listening and participation • Accepts and acts on peer and facilitator feedback • Gives constructive feedback to group members • Facilitates group process		
Interpersonal Skills & Communication (ISC): Information Sharing • Presents well-organized information relevant to case • Provides high quality study guides • Helps peers clarify ideas • Shares knowledge with group		
Ethics & Professionalism (EP): Work Habits • Accomplishes tasks assigned by group • Shows initiative in study of case • Attends sessions regularly/is punctual		

***For end-of-group assessment only*:**

Global Assessment Comments (for inclusion in MSPE):

Additional Global Assessment Comments if Any (for internal use in NSU MD):